Title: There are so many moving parts. Epistemologies in physiotherapy: An exploration of disconnection.

A thesis submitted towards degree of Doctor of Higher and Adult Education

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Abstract

This thesis explores epistemologies in the author's own academic and clinical practice as a physiotherapist, examining knowledges that are privileged and emulated, and in active use by practitioners. The approach taken examines a personal disconnect between the epistemologies of disciplinary research used to generate evidence for practice and epistemologies used in practice. In addition, this thesis explores physiotherapy practitioner knowledge that does not appear in research outputs.

Physiotherapy as a profession, its identity and its knowledge sources were examined. This was completed with a historical review of physiotherapy in Ireland and borrows from Foucault's concepts of archaeology of knowledge and discipline, and with an examination of musculoskeletal original research published in two disciplinary journals. A qualitative approach was taken to explore epistemologies in practice. Twelve physiotherapists in private practice in Ireland participated in semi-structured interviews, which are analyzed and discussed using insight from Deleuzian concepts of the rhizome, common-sense, multiplicity and difference. The research creates a framing for how the author may understand their experienced disconnect between the epistemology of practice and the epistemology of evidence-based practice.

The findings of this research suggest that the processes of professionalization and an identity aligned with medico-scientific epistemologies lead much musculoskeletal physiotherapy disciplinary research to focus on methods that contribute to the legitimization and emulation of evidence-based practice. This research also finds that despite not seeing it in research outputs, tacit craft knowledge is strongly utilized by practitioners and is acknowledged and valued by them in their work. The physiotherapist practitioner respects and sees value in evidence-based practice, but they do not embody the disconnection, instead navigating through their practice drawing from multiple epistemologies.

This research provides an illumination of physiotherapy private practice in an Irish context. It examines knowledge sources in use by clinical practitioners and finds that craft aspects of practice are fully appreciated, though not easily articulated, and are felt to be beyond research in the format these physiotherapists are most familiar with.

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List of Abbreviations

Abbreviation	Description
ACL	Anterior Cruciate Ligament
ANCOVA	Analysis of Co-Variance
ANOVA	Analysis of Variance
BAM	Body as Machine
BC	Before Christ
BMI	Body Mass Index
BMJ	British Medical Journal
BPS	Biopsychosocial
BSc	Bachelor of Science
CAS	Complex Adaptive System
CPD	Continuing Professional Development
CSMMG	Chartered Society of Massage and Medical Gymnastics
CSP	Chartered Society of Physiotherapists
D&G	Deleuze and Guattari
DHAE	Doctorate of Higher and Adult Education
EBP	Evidence Based Practice
EMG	Electromyography
GP	General Practitioner
HCPC	Health and Care Professions Council
HSE	Health Services Executive
IAPT	Irish Association of Physical Therapy
ILB	Irish Local Board
IPA	Interpretative Phenomenological Analysis
IRL	Ireland
ISCP	Irish Society of Chartered Physiotherapists
ISTM	Irish Society of Trained Masseuses
ITCarlow	Institute of Technology Carlow
LASER	Light Amplification by Stimulated Emission of Radiation
MCIC	Minimal Clinically Important Change

MCID	Minimal Clinically Important Difference
MDT	Multi-Disciplinary Team
MRI	Magnetic Resonance Imaging
MSc	Master of Science
MSK	Musculoskeletal
NACCHO	National Aboriginal Community Controlled Health Organisation
NICE	National Institute for Health and Care Excellence
OM	Outcome Measure
OR	Original Research
OT	Occupational Therapy
PBE	Practice Based Evidence
PMI	Pregnancy Mobility Index
PPRJ	Physiotherapy Practice and Research Journal
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
PROM	Patient Reported Outcome Measure
RCT	Randomized Controlled Trial
RMDI	Roland Morris Disability Index
SEM	Socio-Ecological Model
SLT	Speech and Language Therapist
STM	Society of Trained Masseuses
TCD	Trinity College Dublin
UCD	University College Dublin
UK	United Kingdom
UL	University of Limerick
UU	Ulster University
WCPT	World Confederation of Physical Therapy
WOMAC	Western Ontario and McMaster Universities Osteoarthritis Index

List of Appendices

Section 1 – Background and Context of my Research

Section 1, *Background and Context of My Research,* consists of two chapters.

In chapter 1, *My Journey towards Engaging with this Inquiry,* I describe the catalysts and motivations that served to start and develop this journey of inquiry. It is an inquiry into a disconnection that I have encountered in my practice. This disconnection is a professional issue of mine stemming from my triple role as educator, researcher and physiotherapist practitioner. It manifests as a sense that much research and the evidence derived from research that I have encountered does not line up well with practice. At this start point, I am aware of this disconnection as being within me and use this inquiry to see if it exists for others in the physiotherapy profession. In this chapter I ask and begin the inquiry into my main research question: *"Is the disconnect that I experience between knowledge and epistemologies espoused and valued in physiotherapy research, and those in use in physiotherapy practice, alive for other practitioners?*

In chapter 2, *Framing the Disconnection Problem(s),* I set out aspects of physiotherapy that contribute to my disconnection problem in terms of disciplinary knowledge sources and disciplinary research. I also explore as a potential contribution to this disconnection; how much pedagogy tends to privilege one way of creating knowledge which may then augment a type of epistemological naivety of the profession. This chapter provides a platform for deeper analysis in Section 2- *An Analysis of the Profession of Physiotherapy*

Chapter 1 – My Journey towards Engaging with this Inquiry

1.1 The start-point for this inquiry

Physiotherapy, or Physical Therapy, is a wide-ranging allied health profession which assists in restoring, maintaining and maximizing physical function and well-being (World Physiotherapy, 2022) through different means; mostly exercise, manual therapy and some electrotherapy. This thesis explores aspects of my practice within the field of physiotherapy and athletic therapy and this chapter provides background for the starting point of this inquiry. I situate this research within my professional practice and how that practice connects to disciplinary knowledge and epistemology. I outline the purpose, rationale and significance of this piece of research and summarize my own perspectives as a physiotherapist, educator and researcher. I pose research questions as I progress through the elements of this chapter and go on to frame the problems as I see them.

I am a physiotherapist, a practitioner, a teacher and a researcher. I see and experience a disconnect between how I interpret the profession as seeing its knowledge and how it promotes the use of knowledge via physiotherapy research and evidence-based practice (EBP) and how the practice of physiotherapy sees and uses knowledge in the real world. These observations and experiences are based on substantial observations in multiple settings over many years. I am using this opportunity of conducting a professional doctoral thesis in education to enquire into this disconnect that I experience and interrogate its nature.

I initially noted my disconnect concerning epistemology and the types of knowledge that dominate physiotherapy in my own clinical physiotherapy practice as well as in my pedagogical work as an athletic therapy educator. Through different experiences formulating research designs and noting the adoption of EBP across my teaching spheres I began to see how the disciplinary knowledge in physiotherapy is predominantly rooted in a paradigm concerning positive scientific facts and phenomena, known as positivism (Adams et al, 2005). In positivism the primacy of sense experience and empirical evidence is the basis for knowledge and research (Calhoun, 2002). There is also a pre-eminence in the application of natural sciences to clinical scenarios, known as a biomedical approach (Clarke et al, 2003; Foster et al, 2003). There are many discipline-specific and more general sports medicine journals that publish research for dissemination and discussion, all of which act as sources of

knowing in physiotherapy. This way of knowing and knowledge derives from inquiries into clinical questions and is filtered through robust methodologies and scientific scrutiny. The conventions of scientific research and publication standards result in a strictness in design and methodology that I argue, may dissolve some of the clinical usefulness and applicability of the inquiry. From these research findings comes evidence and recommendations that can change the practice of physiotherapy. Those of us that practice physiotherapy are urged to consider and draw from evidence in our clinical decision making. The discourses around evidence-based practice (EBP) frame it in a very positive light (Piterman, 2005; Rycroft-Malone, 2006), and the message to physiotherapists from their professional bodies is to engage constructively with it. Research designs that tend to lean into scientific methods tend to lean into positivistic ways of knowing and conduct their research in a very biomedical and biomechanical way. In my teaching practice I could see most of the knowledge that is taught also leaning heavily into these epistemologies whereas in practice there are more ways of knowing the body, physical function, injury and the patient that inhabits the body. What are those ways and how are they drawn on in practice?

My experience as a practitioner was of a threshold in my practice when relying on biomedicine. The conventional ways of knowing the body through biomedical and biomechanical lenses can only take the therapist so far before falling short, something that I have experienced personally, and I am interested in whether this threshold would be reflected in the experiences of other clinicians. This disconnection my not be in the profession at all, but rather only in me. I wanted to inquire into this dilemma of disconnection by looking at other practitioners to see if they feel any of this disconnection and how they navigate it. For example, once they reach a biomedical threshold, to what extent do they rely on sources of knowing such as patient-physiotherapist communication, tacit knowledge, kinaesthetic attunement, personal experiential sources of knowing and intuition and imagination for clinical decision-making, which can be referred to as craft knowledges (Higgs, 2012; 2014; 2019). I was also interested in the extent to which they lean on research, evidence from multiple sources and how EBP is navigated and put to use in their practice. While scientific evidence from research is perfectly valid, there are aspects of clinical knowing that are lost if unidimensional measurement-focused methodologies are always enacted and evidence-appraising parameters are adhered to. I have been reading and thinking about whether physiotherapy has wedded itself to the medical and scientific models of knowledge production, at the expense of other ways of knowing. I have developed an acute awareness of

the position that EBP has been elevated to, and how savage the attacks can be on physiotherapy techniques and ways of practice that do not (as yet) or cannot generate the same types of 'strong evidence' (Meakins, 2015).

From this start-point, and with a focus on my own experience of a disconnection, my broad research question is 'Is there a disconnect between how knowledge in physiotherapy is generated and promoted to the outside and how knowledge is generated and accessed in practice?'

I set about an analysis posing the questions: How did physiotherapy get to be a profession? What does physiotherapy say about itself and the epistemologies it works with? How does physiotherapy research work and what epistemologies are visible in a sample of research journals popular in Ireland? Having done that, I turned my attention to epistemologies in practice. Most practitioners would not consciously operate from a particular epistemological position, rather they endorse particular professional practices which reflect epistemological positions. There are nonetheless epistemologies in use, and I have conducted an investigation to explore them with practitioners to ascertain if they experience the disconnection that I have been experiencing.

In collecting and disseminating the findings of this inquiry, I intend to resolve my own professional dilemma of disconnection in order to flourish in my triple practice, especially as IT Carlow transitions to a technological university with different emphases on teaching and research. In resolving my own disconnection, I intend to widen my epistemological base so as to position myself in a more advantageous position as a teacher, researcher and practitioner. It is also my aim to give more insight into the other knowledges that the practitioner of physiotherapy uses in daily clinical practice and give a voice to these ways of knowing and succeeding in being effective in practice as a physiotherapist. In illuminating useful knowledge and aspects of knowing for the physiotherapist, I contend that they can find life and space, side-by-side with evidence-based practice (EBP).

1.2 The catalysts for beginning this inquiry

I locate my motivation for undertaking this study and the evolution of a raison d'être for this thesis as stemming from conversations with colleagues in the aftermath of completing some continuing professional development (CPD) courses in the recent past. These courses were concerned with foot mechanics and the effects of foot movement on joints and muscles

further up the body's kinetic chain. They were developed for therapists and trainers of all backgrounds and qualifications and accepted attendees from all walks of therapy-life. This located these CPD courses in an unusual category in the physiotherapy landscape, as similar courses are usually structured in a way that only lets 'qualified' people access them, seeing pre-requisites to learning as having a recognized qualification at a certain academic level. An Irish Society of Chartered Physiotherapy (ISCP) number (proving your chartered status) and insurance to practice details are usually sought before organizers allow you to register and attend. This course was full of practitioners who would typically fall outside admission criteria set out by and for physiotherapists or chiropractors or other such 'legitimately qualified' therapists. It was a series of three 3-day courses, which were developed by the course presenter who had no medical or health science qualifications, but who came from an education and sport background. The CPD courses provided much insight and provoked much thinking in me, providing a different way of looking at human movement, beginning at the feet. I came back to my academic post effusing the benefits of this course, how much I had learned and how useful it could be. I was met with questions. Who is that guy delivering it, what are his qualifications? Has there been any research into what he is teaching? One of my colleague's first questions was 'How many Randomized Controlled Trials (RCTs) has he published on it?'. My answers did not impress them. There was a strong tendency to write off the course and its approach to movement assessment on the basis of a lack of legitimacy in terms of qualifications of the instructors and research outputs associated with the theories.

I wondered if it would be possible to test the theories and gather evidence by structuring some of our undergraduate research projects around the principles of foot movements, or mapping foot movements with mechanics and movement further up the kinetic chain. Next came the realization that we did not have the equipment, nor did the equipment exist to capture such fine split-second movements of the body in three planes, in multiple joints. To cut a long story short, after attempts at collaboration with our engineering department, almost recruiting a masters student and securing funding to conduct this research, it fell flat. The principal reason was collective concern about feasibility of accurately and reliably capturing data on tiny movement in different planes. The project was put on hold and led me to the point of becoming very attuned to what type of research was being conducted in the physiotherapy, sport biomechanics and human performance worlds, and what and how human movement was being measured. As I experienced things, the lens through which physiotherapy, sports biomechanics and human performance are framed are

greatly influenced and even curtailed by the constraints of available measurement and diagnostic tools. Does this then skew the type of research that can be conducted to meet the criteria of efficacy testing required for 'publishable' research?

On the back of this experience, two large issues emerged for me to consider about physiotherapy and athletic therapy life. It led me to believe that there are simply too many moving parts to measure in a human and confirmed that these foot mechanics theories would stay in the 'no evidence, therefore untrustworthy' category, making clear the role research has in forcing people to pay attention and take something new seriously. It also illuminated the judgement and potential snobbery about qualifications that exist in the physiotherapy territory of my workplace, and potentially more generally in the physiotherapy world. I was becoming increasingly aware that 'scientific research', conducted by suitable persons or institutions was the dominant and trustworthy way of knowing about what works in physiotherapy and what does not. I could see how limited this research is, working only from what is measurable, repeatable and capturable with equipment.

On another line of flight in my thinking about physiotherapy, I have always been interested in the existence of other ways of knowing, away from the frustrations of poor equipment. Knowing the body is fascinating. Being attentive to your own body and then tuning in to other people's bodies goes far beyond mechanics and the ideal or generalized body (Langaas and Middlethon, 2020) from which to compare. Embodied knowing rarely emerges in physiotherapy-discipline research either, and for the research that I and my colleagues were attuned to, qualitative inquiry hardly ever featured.

Concurrently through the last number of years, I have been aware of other arguments and lively discussions, some in person, most on social media, about what works in physiotherapy, based on evidence disseminated through the latest Consensus Statements (e.g., Doha Consensus Statement on Groin Pain, 2015), Cochrane Reviews (e.g., Articular Manual Therapy for Neck Pain 2015), National Institute for Health and Care Excellence (NICE) guidelines (e.g Guidelines for Low Back Pain and Sciatica in over 16s 2016) and original research findings that filters through to my academic team of physiotherapists, athletic therapists, sports scientists and strength and conditioning specialists. As an example of such clashes, I remember a work colleague argue with another that '*The Sacro-Iliac joint doesn't move,* according to a big review paper (Goode et al, 2008), *so how can you believe an*

intervention to change its position is what fixed your lower back and leg pain?'. The other colleague had just had her 8-year-old leg pain resolved with 3 sessions from a therapist who used manual therapy and movement on the sacroiliac joint fascias to re-position the joint. Such differing approaches to what we know and how we know what we know as therapists fascinated me. These debates and my previous experiences with other treatment techniques not yet backed by evidence mean that essentially, I feel that there is something very important missing in how we view what we do. My disconnect stems from a sense that we are increasingly relying on particular research findings to decide what is useful and not useful in practice and allowing a dampening down of the influence of our instincts, experience and ability to simply see and witness things that can help us to help our patients. I do not wish to present a binary of EBP on one hand and craft instinctual practice on the other as I appreciate that the investigations that gave rise to the research were driven in the first instance, in part at least, by the latter. Instead, I am drawing attention to the potential erosion of the validity of craft subjective knowledge by evidence derived from biomedical approaches. This erosion of craft aspects and the elevation of EBP was jarring with me.

The personal experiences outlined above and engagement in the Doctorate of Higher and Adult Education (DHAE) at Maynooth University has introduced me to epistemologies, knowledges and ways of knowing in physiotherapy practice, have provided the impetus for this inquiry.

1.3 Lenses from professional life experiences.

In reflexively looking at how my own professional practice has shaped by therapeutic approach; I have examined my work life. As mentioned above I am a physiotherapist, graduated 22 years ago this year (2021). I worked in the Health Services Executive (HSE) as a basic grade physiotherapist in numerous hospitals for the first three years after graduation and then completed a masters in sport and exercise physiology, before returning to the hospitals. I was never settled in those hospital environments and took a lecturing post at Institute of Technology Carlow (IT Carlow) quickly after my second spell in the HSE. There have been many bouts in private practice throughout the years, always as evening and weekend roles, never taking the step to full-time. The safety of whole-time secure positions in the public sector was generally more appealing, as I did not have to rely on my myself and my physiotherapeutic skills to survive financially. At ITCarlow I work with patients all of the time, in the campus clinic, tutoring Athletic Therapy students. Our patients tend to be from a

young, athletic demographic, with many minor traumas coming through our hands. It is almost entirely musculoskeletal (MSK) work. I love my job. I love lecturing, supervising research and tutoring in practical classes. I really enjoy treating patients, I enjoy the interaction and the spaces that the therapist inhabits with their patient as they try together to solve problems.

As a researcher supervising undergraduate and postgraduate endeavors, I wonder daily how it can be possible to capture, observe or measure behaviors, feelings and the soft aspects of practice. I have become passionate about bringing some value to a researcher who is visible in the research and patients who are participants with aspects to their recovery that cannot be measured or scored. This has taken me on a path of promoting qualitative inquiry through my research supervision work, recognising therapeutic engagements as dynamic interactions between therapist and patient in which not all processes or outcomes are necessarily measurable.

Educating therapists can be difficult. It is a career of more questions than answers and many students want solutions and formulae for certain scenarios with their patients. I find it enjoyable to challenge learners and open them up to uncertainty, like the idea of 'being content with a body that refuses to hold still' (McDonald & Nicholls, 2015), while fostering an ability to think critically. This approach to learning translates to physiotherapy practice where the patient explores and their injury is explored with their therapist rather than categorized according to their dysfunction and pain, giving the patient credit as being '*the best judges of the affective, non-technical aspects*' of their injury (Kidd et al, 2011: 154). This is an experiential approach, and one that I practice in my role as an educator, as well as a clinical practitioner. Being a therapist working with human injury and pain and educating learners around how to treat and manage their patients means that of course I live in a world of subjectivity. Most of the practice of physiotherapy and athletic therapy and the education around it is dealing with "messy" humans who do not fit into the injury categories we find in the textbooks. For example, a person with back pain, a long history of previous injuries and a recent bereavement who has stopped exercising. The physiotherapist needs the skills to know where to begin and what aspect to prioritize in their practice (Barradell, 2019). The research that informs the practice, however, is usually different, in that scientific methods around measurement and objectivity are privileged and standards of rigour, validity and reliability are upheld in research designs. This discord between practice and research is where I am

drawn, and this thesis is a process of helping me to explore my disconnection and create a framework to really think about it.

When I used to look at my professional life, I saw it as existing in the world of biomedical science, where professional knowledge looked on the body as a type of machine (Nicholls & Gibson, 2010), and the physiotherapist as a type of mechanic. Once you knew what could go wrong, you followed your logical clinical reasoning to find solutions. Of course, there were instances where this did not fit, but those tended to revolve around patient complexities that I thought were better suited to another profession, like psychology. An outlook I held was one where research regarding what can go wrong with the human body informed the physiotherapist of the most favourable options for solving those problems, and that practice should be based on best evidence. I came from a default position where excellence in physiotherapy practice meant citing 'evidence–based practice' as a logical basis for decision-making about our patients (Nilsagård & Lohse, 2010; Rycroft-Malone, 2006). This position I describe as default because I don't believe that I actively took it up, but rather it is a position of common sense (Deleuze & Guattari, 1987; Deleuze, 2001; Van der Wielen, 2018; Colebrook, 2020) that has come into existence through certain discourses. I will borrow from Deleuze's concept of common sense further in this thesis, and his conceptualization of common sense as an inertia. He finds common sense problematic in the way it takes over thought and action, conforming them, and inhibiting anything new and different to happen, being "incapable of giving birth in thought to the act of thinking" (Deleuze, 1995: 139). A fear of being ineffectual with our patients or of using techniques that do not work is a major concern for physiotherapy practitioners. The balsam to allay this fear is to interrogate our techniques under the microscope of scientific research and reassure ourselves that we are doing good work. Although I was not very cognizant of my choices of approach in my early clinical career, research career, or pedagogy, there is a leaning into positivist approaches in all three aspects of my experiences of physiotherapy. There is also a clamour for evidence to back up or refute decisions and choices for the therapist. I do not mean to portray evidence as a negative thing, it is absolutely right and proper that it has such status and serves as such a useful tool in physiotherapy. I feel however that much of it is limited and tends to be deemed worthy within my professional circles only if it is the result of large-scale measurement-focussed studies, imitated from the scientific world. The limitation is partly in the narrow frame of reference within these outcome-focussed large-scale studies, but also in the translatability of these findings into real-world practice.

The idea that the world is 'out there', available for study in a fairly static form (Hutchinson, 1998), independent of the researcher, who objectively observes and constitutes scientific knowledge (Gall et al, 2007) about human 'subjects', is the prevailing mode in my discipline area and within the institution where I work. As Scheurlich (1997) speaks about the researcher attempting to control the researched, "*spreading her imperial tentacles across and over the strangled research subject*" (1997:85), so it is in my previously inhabited space as a practitioner where the Other is converted into the Same as often as possible through standardization and the control of variables, and when it cannot be, it is overlooked, forgotten about or shelved for being unsuitable for research. I have developed an awareness of how much of the athletic therapy and physiotherapy education and research that I am involved with has evolved to a space where it is based on a very scientific deductive form of knowing, utilizing quantitative research to represent our way of thinking and exploring the world (Clifford, 1997). The position that is held by the physiotherapy I know is sympathetic to how research is conducted in the physical sciences, where the importance of a single reality is a key assumption (Stenner et al 2017). As Lichtman (2013) says, a view that "*would accept that reality can only be reached in an imperfect manner but nevertheless would anticipate a researcher striving to reach it*" (2013:25), aligns well with the scientific realm of physiotherapy disciplinary knowledge and that of EBP. It is not the only way of conducting research in physiotherapy, but for whatever reason, I have not been aware of the other ways- they do not cross my desk. I would need to go and search them out. This makes me wonder if my view of physiotherapy research is peculiar to me, if it is skewed or if it is held by others? When I read about positivism in its pure form; I know that we, the world of physiotherapy and athletic therapy, do not operate in what I interpret as that coldness or to that unwieldiness a level.

Knowing our patients, caring for them and helping them can hail from a different way of knowing the world, where multiple realities exist, not a finite number of objective truths. Human behaviour can only be understood in context (Carpenter, 1997), and so the physiotherapist in clinical practice should know their world as interpretivists. I feel that this is lost, except for a few quiet voices that advocate a qualitative interpretivist approach in physiotherapy research and education (e.g. Domholdt, 1993). These quiet voices are gathering momentum and getting louder, contributing to an articulation of the critique of EBP in physiotherapy and highlighting other knowledges used in practice and that we need to

function (Higgs, 2014; Nicholls et al, 2015; Nicholls 2017; McDonald & Nicholls, 2017; Gibson et al, 2018; Higgs 2014; Setchell et al, 2018; Kerry, 2018; Anderson et al 2019; Higgs, 2019). By this functioning I mean how the clinical physiotherapist in practice operates with and for their many diverse patients. There should be a blend between the traditional types of research in physiotherapy where measurement and cause and effect scientific logic still has a place, but there is room for the interpretivism of the holistic approach to the body, where knowing and attuning to the body is a tacit affair. The navigation of this blend is where I am drawn to as an educator, and now as a researcher.

1.4 Lenses from personal life experiences

Leaving aside my practitioner and researcher roles and writing as a person looking at my own particular life story, I have had some personal issues around my gay identity that were dampened and anesthetized for a long time until I was more ready and self-aware in later years. These issues were around disappointing others and moving away from the expected heteronormative socio-cultural trajectories in my family before I was better able to know myself. I feel that the experience of self-assessment and finding myself as a person created a particular lens through which I view my world. When you learn to keep something silent within yourself, it shapes how you see and navigate the world. My personal context has shaped my approach to my work and I tend to see learners in a holistic way, seeing their needs as learners as existing in all domains of learning, affective and psychological as well as in the cognitive domain. I feel that I possess a certain mindfulness regarding their complexities that come from my own lived experiences. I believe many gay people hone an awareness of our 'Otherness' as we grow and develop with time. I have been aware of myself as 'Other' in my family, the church I was a default member of and other social circles as I grew up. This eases significantly with maturity, self-acceptance and loving relationships, but there is a sensitivity and a heightened acuity that is part of me. I carry a sensitivity for subjugated knowledge and injustices that probably stems from the silenced parts or my own story. My experience of otherness also enlightens and is key to challenging the status quo. This also translates to how I interact with my patients as a physiotherapist practitioner, with a sense that their experiences with and of their bodies can be shaped by so many factors.

I had a successful amateur golf career, which cultivated an attention to my body, my movement patterns and capabilities that happens in athletes. It also served to build a self-belief, hard work ethic and a discipline within me. This provides me with another lens, of

trusting myself and believing in a depth of strength within, bolstered by navigating the many ups and downs of athletic successes and failures. It also allows me to use my body and inhabit it with awareness that I can bring to my physiotherapy practice. This self-belief and discipline that I gained from sport helped to focus my studies, and my educational orientation during secondary school and at physiotherapy school was quite formulaic and conservative, with little exploration or deviation from classic old-fashioned ways of learning and thinking paradigms. This had its advantages, I had academic success, but also some significant disadvantages; around the lack of exploration, which certainly stifled my ability to think critically and laterally. Reflecting now, I was disciplined into norms for the time that I was in school and university, eventually disrupting those norms as I got older.

1.5 My position as a researcher

In practice, the simple cause and effect deductive logics work well in many ways and serve a sound purpose for many cases and patients, in particular the simple trauma cases. Once we get into the clinic, however, with complex layers of human movement and feelings, we can drop off the edge of what can be researched in those traditional quantitative ways. And so, we have a space where the physiotherapy clinician functions without the traditional scientific causal evidence to back up techniques and decisions and uses their 'Other' knowledges to good effect with their patients. I have wondered if physiotherapy research needs to be liberated from the old school structures of control, randomization and reductionism? (Denzin & Lincoln, 2011), to include the many aspects of our work that do not fit 'the rules of research'. I have also wondered if there is a fundamental difference in approaching and knowing the world between the different sides of the physiotherapist, those sides being the researcher (stranded between the endeavour for excellence in scientific methodology and limited in the aspects of physiotherapy that they believe they can research), and the clinical practitioner (operating with many different knowledges). The physiotherapy educator finds herself as inhabiting and drawing from each and every perspective and must find a way of navigating the dissonance. I am foremost an educator, then a clinician and researcher in the physiotherapy and athletic therapy worlds. I recognize that I am caught between these differing ways of knowing and operating. I absolutely accept evidence and the logic of working from it. It is without any doubt appropriate and beneficial in our work. I like to read research outputs and back up much of what I teach using evidence. At the same time, I criticize the limitations and disadvantages of positivist approaches and point out how we need to navigate the middle ground instead of basing practice only on evidence derived from those

research methodologies. I conceptualize myself as a scholar practitioner in the terms of Bentz and Shapiro (1998) "*as someone who mediates between her professional practice and the universe of scholarly, scientific, and academic knowledge and discourse. She sees her practice as part of larger enterprise of knowledge generation and critical reflection"* (Bentz & Shapiro, 1998, p.66). I think this fits with my conceptualization of myself as a living practitioner and someone who recognises the inseparability of theory and practice.

I used to think that I aligned fairly well with most scientific and factual views of a social world being patterned and predictable, but as soon as I examined practice in more detail, I saw the value of interpretation as well as the element of constructivism that exists in physiotherapy. In the therapeutic space the physiotherapist is interpreting the patient's constructed stories about their bodies and their injures, while the physiotherapist constructs their versions of truths about their patients, all the while interpreting what each sign and piece of information means. I hold an ontological position of accepting that the social world is continually being constructed by human interactions and meaning is interpreted from each new situation. As a researcher I am an interpretivist, working out of an interpretivist epistemology and using methods of interpretation as I conduct this inquiry. I situate the empirical part of my overall inquiry, the exploration of practice via interviews with physiotherapy practitioners, as a descriptive thematic analysis which will be discussed in chapter six.

1.6 Conceptual Framework

In order to illustrate how all of the pieces of this inquiry fit together I will utilize a structure that can facilitate understanding of the network of ideas I am espousing (Dickson et al, 2018). I have brought together some broad philosophical concepts and ideas, as well as ones that are more discipline-specific for physiotherapy that could be useful in helping me to think about this topic. There is a conceptual framework threading throughout this study, with concepts alive in the background as I conduct an analysis of physiotherapy knowledge and again as I analyze the practitioner interview data. The following concepts contribute to this sense-making.

Aspects of Michel Foucault's theories regarding knowledge and power are valuable for this inquiry. Encountering Foucault gave me a sense of understanding that physiotherapy is a social construct with a history and a set of power relations and competing interests. Who

defines what is true in a discipline, who is excluded from this debate and whether an archaeology of knowledge exists (Foucault, 1972), are concepts that I have drawn from to help me to think about the physiotherapy world and develop my own philosophical understandings. An archaeology of knowledge is a system built through discourses around how a domain, in this case physiotherapy, functions. It goes beneath consciousness of individuals and can describe the conditions for the emergence of particular sets of rules and the boundaries of how the discipline of physiotherapy thinks and acts. Foucault's interpretations of and about agency (Foucault, 1975), and how we discipline ourselves, our patients and how our professional and regulatory body disciplines us (Foucault, 1977), also facilitated depth in my analysis. I have drawn from Foucauldian concepts of agency and discipline in developing my own understandings of physiotherapy engagement with continuing professional development, adopting EBP or resisting changes in professional practice.

Gilles Deleuze and Felix Guattari came to the conceptual framework as I embarked upon and engaged with section 3 – *Investigating Practice*. Their concepts of the rhizome, multiplicity, common sense, desire, and difference (Deleuze and Guattari, 1987, 1994, Deleuze, 2001, Parr, 2010, Colebrook, 2012, Van der Wielen, 2018), were indispensable in helping me to reconceptualize the binary of EBP versus craft knowledge sources. The multiplicity in and of each clinician is very relatable as practitioners can hold many, sometimes conflicting, positions within themselves and what they present to their patients and the public. Deleuze is not impressed by thinking that passively mirrors or represents the world. He suggests that most of the time '*we fail to really think, simply wallowing in the inertia of common sense*' (Colebrook, 2020:2). The acceptance of EBP as a logical common-sense approach to physiotherapy practice would never have sparked anything but agreement in the me of old. Now it sparks energy within me and a chance to illuminate some of my interview findings in the context of whether the concept of EBP works or not. Deleuze suggests that if we think of life as desire (Grace, 2009), we no longer have any single foundation or ground which we ought to obey. What something IS, is its flow of desire, but desire is not based on the lack of something, rather it is productive. I am challenged to see that EBP is a concept, that serves the desire for legitimacy, it also serves the scientific biomedical desire to be orthodox and moving in the same directional current as other dominant forces in society. Moving in the same direction as dominant forces of society is a reasonable aspiration of any discipline, so perhaps this is an unfair accusation, but

interrogating the ramifications of this alignment is of interest. Understanding the purpose of EBP and of physiotherapists conceptualizing ourselves as scientific allied-medical practitioners is also of interest to me. Conceptualizing some of those Deleuzian concepts have motivated me to assess the common-sense of evidence and to interrogate the concept of EBP as part of a framework from which to begin my interpretation and analysis.

Physiotherapy practice is not just EBP and EBP and the science foundation upon which it sits is really only a small part of what we do, an important part, that I do not seek to undermine. I draw from Deleuzian concepts to develop an understanding of my disconnect and facilitate philosophical insights as I critique the current position of EBP in all its Deleuzian (1987; 2001) common sense and then try to bring physiotherapy practice forward into a new territory and reclaim it. I hope to follow a new line of flight in physiotherapy practice, moving beyond where we are. This is a chance of Deleuzian re-territorialization, where I can bring EBP and all the other ways of knowing and doing and being in my practice into a new space, in the future where I can move ahead of my current problem of disconnection and reclaim the territory of my physiotherapy practice.

The thought-provoking writings of Foucault, and Deleuze and Guattari serve as disturbing forces to my previous perceptions. They are joined in that task by some physiotherapy-specific authors and thinkers and many fellow students and research participants, all acting as conceptual personae. I am also pregnant during a lot of the process of writing and thinking, and I feel the power of creation within me. This baby, who I am proudly and joyously carrying, and both privileged and overwhelmed at the thoughts of our imminent outside-worldly meeting, is a potent concept at work quietly thinking in me. My baby has been growing and developing side by side with this thesis, and I feel that each has benefitted the other. The final drafts and editing have happened for me as a new mother to baby Nessa, a changed woman, which brings a different energy and different considerations to the thinking and writing. The journey to motherhood has been smooth for the most part and the overriding feeling is one of gratitude. Feeling thankful is an unusual emotion in the final months of this difficult doctoral process but the transformational learning process that I have just been through means that it is the case.

Chapter 2: Framing the problem(s).

2.1 A nice bowl of soup and some pot pourri.

Medical and scientific knowledge is appealing to physiotherapy, as physiotherapy fits in the same territory, allied to medicine and very likely to use science to inform and validate our knowledge. Physiotherapy is, and always will be in the process of trying to understand the mechanisms by which many of our treatment techniques work and uses different research methodologies in this pursuit. I see scientific method and rational approaches as dominating this process, with a sense of them being seen as the best way to approach problems and answer questions in physiotherapy. Interrogating old assumptions and practices is the proper thing to do in order to validate knowledge and the preferred approach of a profession that endorses evidence-based practice in this pursuit would be via scientific method. The favouring of scientific research as the best approach is seen in many disciplines and in wider society. It is summarized well in a quote from a Dara O Briain comedy stetch; '*Science knows it doesn't know everything. Otherwise, it would stop. But just because science doesn't know everything doesn't mean you can fill the gaps with whatever fairy tale most appeals to you*' (BoreMeScience, 2009). Physiotherapy aligns with medico-science for different historical reasons outlined later in chapter three, and thus wants to avoid fairy tales, preferring to interrogate our disciplinary knowledge with scientific method in an effort to know what we should include in our practice and what we should not. The same sketch sees O' Briain criticize many non-scientific aspects of modern life including alternative and herbal medicine, arguing that science has tested it and the useful parts are now part of mainstream medicine. The parts that failed the scientific tests are akin to '*a nice bowl of soup and some pot pourri*' (BoreMeScience, 2009). Being in the same category as the herbalists, be too alternative or be prescribing or administering pot pourri is not the position of the physiotherapists that I know.

The history and development of the profession is charted and discussed in chapter three, which gives some insight into the development of the desire to be allied with medicine and medico-scientific epistemology. The pursuit of professional integrity aside, it can also be linked with the status and power that medicine holds. If there are sides to be taken, for me, physiotherapy will pick the one that science is on.

This is the first contributor to my disconnection problem; because drawing from multiple sources can be seen as weak, uncertain and lacking focus in the hierarchical and hegemonic standards of medicine, physiotherapy is trying hard to 'not be' something instead of allowing identity to exist in many forms.

2.2 Types of Professional Disciplinary Knowledge in Physiotherapy

As outlined above, the physiotherapy profession would like to be principally aligned with the medico-science and be robust in our disciplinary research which will determine what knowledge is useful. Articulating what knowledge is and finding a way of expressing and understanding how we come to know what we know is a difficult task. Tapping into some theories of knowledge generation and how we use them in the context of physiotherapy practice can help to frame the types of knowledge that are represented in the profession.

Examining how physiotherapy and education research and literature views knowledge we can see that disciplinary knowledge is broadly split into two categories: propositional or codified knowledge in one domain and non- propositional, tacit and craft knowledge in another domain (Higgs & Titchen, 1995). Some of these professional disciplinary knowledges are overt, more dominant, and readily visible, while others are not easily articulated and less visible. Blends and combinations of knowledge sources from each domain inform the practice of physiotherapy, and 'practice knowledge' may be defined as any knowledge for use in practice, incorporating both propositional and craft knowledge (Estabrooks et al, 2005; Higgs, Richardson and Abrandt-Dahlgren, 2004). The literature sees different definitions that follow similar lines using similar terms, like Eraut's (2000) propositional or codified knowledge as being different from non-propositional or personal knowledge.

2.2.1 Propositional Knowledge

Propositional knowledge can be described as knowledge of facts, often described as *knowledge-that* a proposition is true and can also be characterised as descriptive or declarative knowledge (Pavese, 2021). It is characterized as different from *Knowledge-how*, which pertains to knowing how to do something and is part of the experience and tacit knowing domain (Moser, 1987*)*. Since Plato, philosophers have explored the conditions that are necessary and required for having propositional knowledge, those being the truth

condition, the belief condition and the justification condition. Although the defining components of propositional knowledge can vary in interpretation, the concept that it requires justified true belief has been mostly accepted (Grayling, 2003; Niedderer 2007). Gettier (1963) challenged justified true belief, giving examples of difficulties with it, and since then it is accepted that some modifications are required, that justifications are 'undefeated' and that justifications do not rely on falsehoods (Moser, 1987; Pavese, 2021). Niedderer, (2007), argues that 'justified true belief' as an understanding of propositional knowledge is implicit in the definition of research because of a number of factors. These are the written requirement of an intellectual position via a thesis, the logic of verification through evidence and argument as justification and the requirement for the research findings to be communicated explicitly. This situates research and theory as propositional knowledge, being easily communicable and disseminated.

2.2.2 Non-Propositional Knowledge

Knowledge that is not propositional may be described as *Knowledge-How* (Ryle, 2009; Pavese, 2021), and is a type of practical and personal knowledge that is necessary to complement the theoretical propositional knowledge in order to make it applicable (Polayni, 1958). Experiential or tacit knowledge is a non-linguistic form of knowing that is context-specific, personal to each individual and thus rooted in individual experiences, values, emotions and ideas (Eraut, 2000; Gourlay, 2002). It resides in both individual and social relationships (Aadne et al, 1996) and may not be communicated because it is embedded in individuals' actions in specific contexts (von Krogh and Roos, 1995). If knowledge held implicitly is something we know but do not wish to express, tacit knowledge is described as *'something we know but cannot express: it is personal, difficult to convey, and which does not easily express itself in the formality of language and is thus non-communicable*' (Baumard, 1999:2). Tacit knowledge is tied to the senses, tactile experiences, intuition, kinaesthetic movement, unarticulated mental models, or implicit rules of thumb (Nonaka and von Krogh, 2009). Janik (1988) further categorizes tacit knowledge as '*things not (yet) put into words*, and '*things inexpressible in words*'. It is generally accepted that experiential or tacit knowledge is difficult to specify and is associated with practice and skill. Tacit knowledge is associated with expertise, which may be defined as '*an intuitive grasp of the situation and a non-analytic and non-deliberative sense of appropriate response to be made'* (Berliner 1994:110). It is also described and expressed as connoisseurship, which in the context of inquiry is referring to an ability, acquired through extensive training and

experience, for very fine (qualitative) discrimination that is usually beyond scientific measurement (Beeston & Higgs, 2001; Polayni, 1958). It may be possible to share aspects of tacit knowledge, but if shared at all, it is mostly shared in the course of story-telling and conversations (Shannak et al. 2012).

According to Eraut (2000), tacit knowing lies in the ability to recognise which behaviour strategy is suitable in certain situations and which is not. If one is to develop their tacit knowledge she/he must be able to recognise cues in the environment signalling that specific knowledge is useful, before tapping into and applying that knowledge to solve of problems (Taylor et al, 2017).

Within the non-propositional domain and as a version of experiential knowledge is craft knowledge. It has been described as elusive when trying to grasp its essence (Greehalgh, 2002). Craft knowledge is a version of experiential knowledge and is important for art, design and craft because it can provide data, verify theoretical conjectures or observations within a theoretical framework. (Neidderer & Townsend, 2014). These authors discuss how experiential craft knowledge can be described, though the tacit parts remain uncommunicable and so the practices of justification and evidence dissemination in research do not fit it well (Ball, 2012; Neidderer, 2007; Neidderer & Townsend, 2014). This echoes the idea that non-propositional knowledge belongs in vocational training and may be excluded from academic research, because it withstands articulation and argumentation and thus wider dissemination (Herbig et al, 2001). Deleuze and Guattari's (1987) rhizome concept can fit well as craft aspects of practice knowledge may be described as deep rooted and multidimensional with intersecting aspects following simultaneous directions of thinking.

In physiotherapy, Higgs has written extensively about craft knowledge (2012; 2014; 2019) describing in detail the different elements of craft in physiotherapy. She proposes that personal knowledge from life experience and engagement with patients, plus what she describes as practice artistry and wisdom, are at work in a physiotherapist's practice. Patient-therapist communication, intuition and imagination are also elements of practice wisdom within the domain of craft knowledge in physiotherapy practice, which serve as knowledge sources for practitioner decision making. Higgs (2014) contends that propositional knowledge is easy to identify, easy to make visible and lives in spaces where the obvious and expected can be measured and communicated. The other types of knowledge involved in the

craft domain; personal knowledge and artistry, are much more difficult to describe, measure and teach, especially for the physiotherapist who is used to working from a scientific position in their thinking and reasoning. For this reason, craft knowledge will rarely fit the rules of inclusion into scientific study and thus rarely generate scientific evidence. The tacit dimension of craft knowledge, while essential in our ability to obtain highest achievements in practice (Niedderer, 2007), does not yield to research practices of justification and evidence dissemination (Niedderer & Townsend, 2014).

In the non-propositional domain, and similar to Higgs' craft knowledge is relational knowledge (Patton et al 2013) for physiotherapists. Patton et al's research explored theories of learning that physiotherapists draw from in a workplace and identified Learning as Practice (Dewey 1933), Social Learning (Rogoff, 1990; Vygotsky 1978), Situated Learning (Lave & Wenger, 1991) and Reflective and Critical Thinking (Schon, 1983; Dewey 1933) as helping the physiotherapist in practice construct knowledge for practice. They termed it 'relational knowledge' and highlight how practices are embedded in distinctive arrangements of people, roles, and relationships and are therefore constituted in a web of "relatings" (Kemmis, 2009). This relational nature of physiotherapy knowledge is especially relevant because physiotherapy practitioners rely on patients' active participation during treatments and adherence to healthcare advice in between treatments (Trede and Higgs, 2009). Relational knowledge for physiotherapists reflects consensual understanding between people. Patton's analysis and use of education and learning theorists who are aligned with social science instead of medical science takes a step beyond scientific method and acknowledges the more muted, less visible knowledges that a physiotherapist may use in clinical practice.

2.2.3 A blend of knowledge in physiotherapy

In summary, there is propositional knowledge (Eraut, 2000), that is mostly theoretical knowledge generated though research with a scientific basis (Higgs & Titchen, 1995; Beeston & Higgs, 2001; Niedderer, 2007) and formed from technical interests (Habermas, 1972). There is also non-propositional knowledge, much of which is tacit (Eraut, 2000), difficult to articulate (Gourlay, 2002), fundamentally relational (Patton et al, 2013) and part of the craft of practice. Non-propositional craft knowledge for physiotherapists includes knowledge personal to each individual therapist, is generated through experience in practice where intuition, imagination and artistry develop practice wisdom (Higgs, 2012; 2014; 2019). Of these knowledge types, one is researched far more often and far more easily using the

scientific method. The tacit and craft knowledges are subdued by propositional knowledge and technical interests of the profession when it comes to research outputs and the ability to generate evidence for practice (Herbig et al, 2001). The practical interest aiming for pragmatic understandings in practice and the emancipatory interest aiming for critical understandings in practice (Habermas, 1972; Trede, 2008) are not as visible in physiotherapy research or literature. This lack of visibility of craft knowledge in research results in little scientific evidence for its use, which undermines its value in practice knowledge and in the profession as a whole. In reality, the relationship between the two sources is dynamic (Rycroft-Malone et al, 2014). This dynamic relationship should function as the experience of craft knowledge filtering back to inform research and the creation of new knowledge. Richardson et al (2004) describe a need to update and credibly use professional disciplinary knowledge in physiotherapy. The researchers also see one way of knowing, the theoretical propositional knowledge of Higgs and Titchen (1995) as being heavily dominant in the profession of physiotherapy. They stress a need to acknowledge the wide variety of sources from which overall professional disciplinary knowledge is generated (Richardson et al, 2004), especially practice knowledge (Higgs et al, 2004). For physiotherapy-specific contexts propositional knowledge is derived from research and theory (Higgs and Titchen, 1995) while craft knowledge is derived from practice experience, (Higgs 2012; 2014; 2019). Professional disciplinary knowledge types can be seen in figure 2.1.

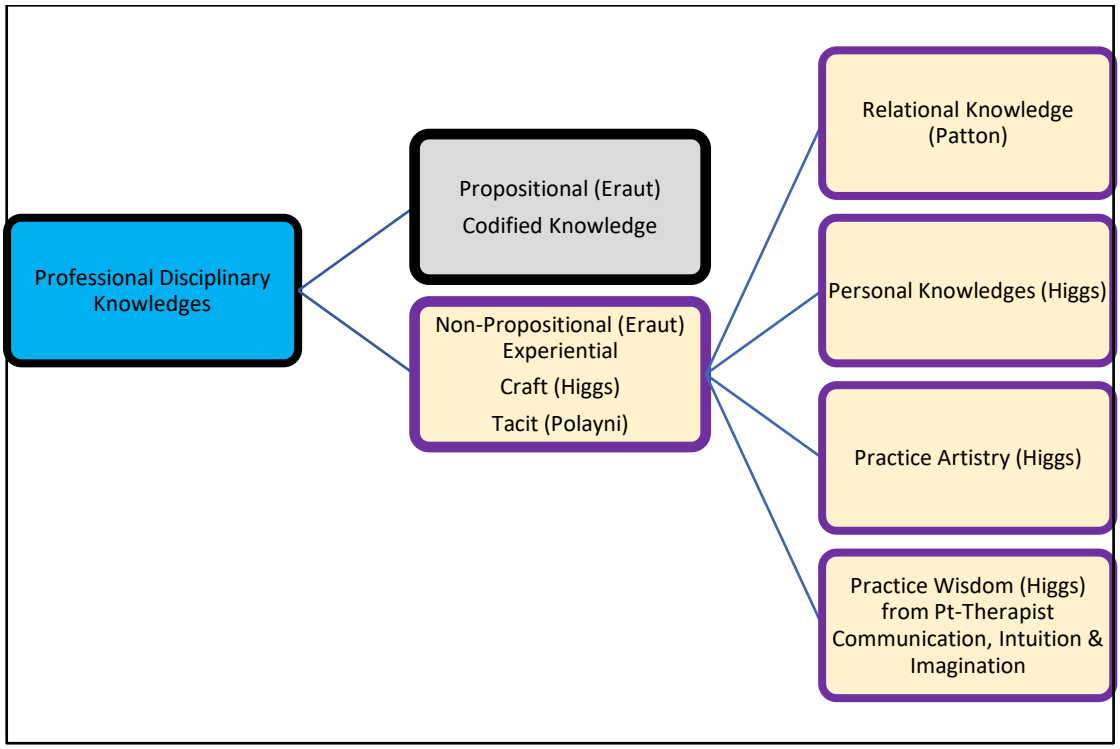

Figure 2.1 Types of professional disciplinary knowledges in physiotherapy.

Physiotherapy practitioners are not passive unquestioning recipients of any type of new knowledge, they will take propositional knowledge and apply their craft to it, as well as filtering aspects of craft back into the laboratory for research to be carried out on it, (Rycroft-Malone et al, 2014). There is however a dominance of the propositional side of knowledge and the vast majority of new knowledge is generated in the same way, demoting craft to less visible less useful less worthy status.
In the context of the overall problem, the dominance of one type of knowledge source facilitates the disconnect that I experience.

2.3 Types of physiotherapy research: knowledge pursued and represented

The profession of physiotherapy wants to be able to stand over what we do and be able to show and know what is effective in our therapeutic practice. Physiotherapy is a profession full of different patients in different contexts, which generates many different questions about preferred treatment approaches. There are many moving parts, something that generates problems for our research, and one such problem is that of reductionism. Physiotherapy research can be varied, broad and deep, but I see the predominant way that original research in the musculoskeletal domain is designed is along objective lines. Taking the most basic biomechanical outlook, it is very difficult to capture what is going on in the human body that moves very subtly in three planes, using multiple joints. It is extremely difficult to measure the whole in detail, and so researchers may find themselves reducing their attention to individual parts, one joint or one tendon for example, controlling for other 'variables' in the body and producing research findings that have large limitations (Shaw et al, 2010). These reductionist approaches come at a cost of creativity in presenting the whole picture (Abrams and Gibson, 2016).

Another problem is that physiotherapy original research often tends to try and emulate epidemiological medical thinking and research design, for example the randomized controlled trial as being gold standard for producing best quality evidence. Taking the lead from medicine, physiotherapy research tends to adhere to scientific standards of reliability, validity, generalizability and a culture of standardization (Reivonen et al, 2020) found in quantitative study designs. There is of course mixed methods and qualitative research undertaken, but on the whole, musculoskeletal (MSK) physiotherapy research mostly seeks to

answer its disciplinary questions via objective measurement, observation and outcome measures that are reducible to nominal values. Positivistic epistemologies in physiotherapy research are alive and well in many journal outputs. This refers to the position in research thought where observable evidence is the only form of defensible scientific findings. A positivistic epistemology will assume that only 'facts' derived from the scientific method can make legitimate knowledge claims (Cohen & Maldonado, 2007), with a researcher as a separate entity in the process, not affecting the outcomes of the research. There is a problem here, as physiotherapy practice is a complexity of different patients, illness, pain, motivation, emotion, and all the layers of each individual. Our default methodologies that focus on measurement and objectivity in observation will generate knowledge that captures a small propositional-domain piece of the overall picture, which does not allow us to see very much of our practice. Nor does it make visible the extent to which the variability and dynamic nature of practice influences and compromises 'controlled' interventions and 'objective' measurement outcomes.

As we adopt scientific research to test theories and gather evidence the other knowledges fade into less visible spaces in the background. According to Crosbie (2013) physiotherapists are not encouraged to name or explore knowledge from the craft domain in research, preferring to focus on technical interests which in turn form more propositional knowledge. Investigating patient-physiotherapist communication, intuition and imagination and other tacit knowledges used in clinical decision-making requires different research methodologies designed to capture lived experience (Gibson & Martin, 2003). Some of these named as possibilities by Reivonen et al (2020) are 'Experience Based Co-Design', aspects of 'Implementation Science' and 'Rhizoanalysis'. There are many qualitative research studies conducted, but their numbers are overshadowed by the quantitative ones, at least in my academic consciousness. In general, qualitative research is faulted for lacking inter-observer reliability, absence of standardized measurements and its inability to accommodate inferential statistics (Gergen et al, 2015), and medicine (Audrey, 2011) as well as physiotherapy may see it like that. Moving towards heterogeneity and variation in research methods and away from standardization and regulation will allow for some of the craft knowledge to be examined, enabling a 'dealing with mess' (Law, 2004). Tacit knowledge, part of the craft domain, in use in practice occurs in a space that precedes our ability to explain our actions coherently, (Higgs et al, 2008), demonstrating the difficulty in finding space for them in research, where coherence is required. This again underlines the problem of

lack of representation of craft knowledge in research outputs, leading to the potential undervaluing of it in the profession as a whole.

In summary, there are a number of contributors to my disconnection problem that arise from physiotherapy research that are discussed above. The first is reductionism in research, zooming in on one aspect of function or one joint in an effort to observe something. If equipment cannot pick up subtle changes in multiple planes and joints, then it cannot be observed. If we cannot detect something it does not mean that it does not exist.

The second is that physiotherapy is not an epidemiological science and does not need to mirror those research approaches designed for very different research questions.

The third is that positivistic epistemologies are flawed for a practice that deals with people and the fourth contributor is that physiotherapy research serves only technical interests.

2.4 Types of physiotherapy practice: incorporating evidence.

Higgs (2014) uses Habermas' theories and suggests that it is important for physiotherapy practitioners to understand their interests, making them explicit in order that their practice becomes compatible with these interests; doing and being what they believe in. She invites the physiotherapist in practice to explore their knowledge interests, their epistemologies. Early research names practice models as the competent clinician model, the reflective practitioner model, the scientist practitioner model (Higgs, 2003) or the critical practice model (Trede, 2008). Higgs sees many options for the physiotherapist practitioner, where they can choose a practice model that is technical-rational, empiric-analytical, evidence-based, interpretative or critical emancipatory (Higgs, 2014), depending on their interests. By recognizing interests in the practice of others, practitioners can seek to understand the rationale for their practice and question the basis for different practice models in use by and advocated by others. Higgs' (2014) recommendation to philosophically interrogate practice model options based on knowledge sources and interests requires epistemic sophistication and good appreciation of the different professional disciplinary knowledges, which may not be a realistic proposition for practitioners.

While that is all possible, the reality is that practicing out of evidence: using EBP, is the dominant choice, in theory. EBP is discussed in more detail further on in chapter four of this section, but the problem for physiotherapy is that the vast majority of the evidence pool is generated using objective measurement-focussed scientific methods, arising from technical interests and facilitating more propositional knowledge. Embracing evidence results in some

very positive changes to physiotherapy practice but sticking rigidly to it is also flawed as much of physiotherapy practice will not be captured in epidemiological evidence gathering. Physiotherapy practice is much more than propositional knowledge. As outlined above, it involves layers of understandings based in care, communication, connection and soft aspects of therapist craft, especially for therapists demonstrating 'person-centred healthcare' (WHO, 2016; Healthy Ireland, 2019; Sláintecare, 2018).

2.5 Interrogating professional disciplinary knowledge: expanding epistemology

There have been some attempts to bring philosophy of knowledge to the physiotherapy world to inspect our knowledges, thinking and practices with respect to different theories of knowledge. Kerry et al (2008) examine different philosophical theories that can be related to physiotherapy knowledge in order to illuminate the fundamental logic behind our practice. These authors use Kuhn's ideas about paradigm shifts (Kuhn, 1972) and his philosophy would accept that truth is relative to the environment from which it emerges and does not exist objectively without that contamination. Kerry et al (2008) also examine the theories of Feyerabend (1977; 1993) who sees science as an ideology and suggests that myth and science are similar. Questioning the status of science in society Feyerabend sees science as just another ideology amongst many (Feyerabend, 1978), rejecting it as a superior way of producing knowledge. He argued that other "*rival ideologies would work just as well if you believe them, but because of the dominance of scientific ideology within the state we are taught to ignore them"* (Feyerabend, 1993:77). Kerry et al (2008) use these theoretical arguments to critique the dominance of propositional knowledge in our profession. The concept of the paradigm shift in physiotherapy will be discussed in more detail later in chapter four in the *Analysis of the Profession* section, comparing the move towards EBP to a new Episteme (Foucault, 1972), a body of ideas which shape the perception of knowledge in this current period.

More recently, there has been some focus on identifying and surfacing epistemological beliefs for physiotherapists, both students and practitioners (Bientzle et al, 2013; 2014; Domenech, 2011; Christiaan-Beenan et al, 2018). A continuum from simple epistemic beliefs (considering knowledge as certain and absolute) to sophisticated epistemic beliefs (considering knowledge as variable, constructed and tentative) is proposed (Bientzle et al, 2014) which layers a physiotherapists individual health concept with their epistemic belief.

The simple epistemological beliefs were linked with a biomedical therapeutic health concept, and the more sophisticated epistemologies were held by practitioners who tended to be more experienced and with more complex mixed therapeutic health concepts. Christiaan-Beenan et al in 2018 examined epistemic beliefs in physiotherapists across 10 European counties, not including Ireland. They argue that

> *Epistemic beliefs can be considered as a focal point for how physiotherapists create meaning in their daily practice, what their strategies are for selecting knowledge, what is relevant for decision-making, how this affects the ongoing learning process of accumulating experiences among individual physiotherapists, and how this has its place within the professional community*. (Christiaan-Beenan et al 2018: 86)

This reflects a new focus on this aspect of knowledge consciousness that has arguably never existed for physiotherapy. Their findings, after surveying 1419 physiotherapists, found low to moderate levels of what they termed 'epistemic sophistication'. Poor connections with one's epistemologies resulted in simplified, or naive view that superior knowledge is that derived from scientific research. They considered the epistemic belief of the practitioner as being on a spectrum from naively viewing knowledge as coming from an authority or scientific source, being objective and static by nature, to a more sophisticated view of knowledge being context-dependent in a practice situation (Christiaan-Beenan et al, 2018). Seeing knowledge as objective, as a series of context-free scientific facts, predominantly derived from empirical-analytical research (Greenhalgh et al 2014; Marks, 2002) can summarize a good deal of propositional knowledge. It also aligns with much of the knowledge that is converted into evidence, for use in practice as EBP, being 'translated' into the explicit and rational decision making of clinicians. Practice, being more complex and uncertain in nature, is in contrast with the simplified objective knowledge from scientific research. Evidence from practice is always a situation-based, negotiated product (Wierenga and Greenhalgh 2015). Christiaan-Beenan et al (2018) argue for the use of evidence from different sources, such as patient values and goals and experiential evidence as well as scientific evidence. They see professional disciplinary knowledge as blended from a mixture of the best tacit and explicit practical knowledge, very similar to the blend of craft and propositional knowledges of Higgs and Titchen (1995) and derived from practice. This places demands on practitioners who need some sophistication in their epistemological viewpoints in order to improve the critical use of different resources in EBP (Greenhalgh et al 2014).

McDonald and Nicholls (2017) conducted some case study research on embodied knowledge with physiotherapy student populations in New Zealand and South Africa. Upon challenging students to interrogate their knowledges they observed '*students experiencing the difficulties and opportunities offered by a developing awareness of their professional epistemologies and ontologies and exposure to other conceptualizations of critical thinking and professional practi*ce' (2017:313). During this exercise McDonald & Nicholls again highlight the physiotherapy profession's historical inattention towards the body as a philosophical/theoretical construct. Their research tries to challenge the hegemonic position of the dominant theories of the body in physiotherapy, while '*making space for more diverse and inclusive approaches to embodiment' (2017: 313).* This type of research seems to be derived from emancipatory interest as being directed towards critique and emancipation, aiming for critical understanding (Habermas, 1972).

The generation and appreciation of more sophistication in epistemic beliefs lead, in practice, to the use of more constructivist and more self-regulated learning (Otting et al, 2010). The Christiaan-Beenan et al (2018) research shines some light on epistemic beliefs or epistemologies of physiotherapists, where little specific research has been done (Bientzle et al, 2014). Can one's epistemic beliefs be articulated easily and are they based on concrete ideas (Hofer, 2000), or are epistemic beliefs implicit and thus less articulated or more difficult to articulate (Stahl, 2007)? In the case of the physiotherapist practitioner, they more than likely have not been given opportunity in formal physiotherapy training to explore and consciously develop their epistemologies (McDonald & Nicholls, 2017). Within this context, they would not be able to make explicit that their knowledges from complex practice situations are likely to be more personal, emotional and dependant on context (Clarke & Wilcockson, 2002; Green & Wood, 2013; Kienhius et al, 2008), part of the craft domain. To summarize, the disconnection problem that I am exploring is linked with epistemic naivety in physiotherapy.

2.6 Potential for Epistemicide

Since the 1960s, a '*withering criticism'* (Bentz and Shapiro, 1988b: 177) of positivism as an ideology for social, relational human sciences has emerged (Ryan, 2006). In practice, it seems likely that most physiotherapists might agree with the criticism of positivistic ways of seeing the world and view and experience themselves as interpretivists, with elements of constructivism. They may need some basic explanations as to the meaning of the terms, as

ontological descriptors such as positivism, interpretivism and constructivism would be unheard of for the vast majority of us. Considering the waves of criticism of positivism since the 1960s (Adams et al, 2005) and considering the relational nature of physiotherapy practice, physiotherapy research should be more in tune with the variety of practice knowledges and utilize interpretivist and constructivist methodologies more. The EBP movement and the dominant structures of thought that come with it hold power at the moment. Research delivers evidence and the perceived wisdom of our era, this Episteme, (Foucault, 1972) is that utilizing this evidence despite its foundation in biomedicine and positivism is the best way to think and behave like a physiotherapist. This positions the therapist as a passive recipient and conveyor of this evidence, which is problematic, and not the case.

As Foucault says, *'it is not that everything is bad, but that everything is dangerous'* (1983: 231-232). The danger manifests as unexamined assumptions. The physiotherapy profession has been quite slow to examine its culture, identity and fundamental principles (McDonald & Nicholls, 2017). There are narrow perspectives in how physiotherapists think and practice, focussing on the practicalities of work, and what they were doing day-to-day with patients, with little to no attention to bigger perspectives (Barradell et al 2019). There have been strides more recently, but Gibson et al (2018) suggest that the general disregard for culture and identity inheres in the profession's practices. They argue that as a consequence of pursuing an identity of being "scientific" and allowing it to go unquestioned, we have clung on to the body-as-machine, (Nicholls & Gibson, 2010) way of knowing, and allowed the other ways of knowing in physiotherapy practice to be side-lined, (Nicholls et al., 2016). "*The myriad cultural, economic, existential, geographical, historical, philosophical, political, social and spiritual dimensions of health and healthcare have been largely bypassed by physiotherapy*", (Gibson et al, 2018:18). The physiotherapy profession needs to be careful not to commit epistemicide (De Sousa Santos, 2007) by elevating EBP to status of being the only concept and the evidence within it as that discovered only through specific scientific means. Knowledges that are grounded in an ideology that is radically different from the dominant one are silenced, rendered invisible and swallowed up in a process of epistemicide. If knowledges associated with touch, relationality and experience cannot be measured, even as static observable blocs for research, then they do not appear as evidence and are unlikely to filter into what is taught in a physiotherapy education based on an EBP philosophy. Privileging scientific evidence for use in EBP is likely to silence practice knowledges.

Foucault was interested in the conditions that give rise to the thinking, and for me these conditions are the reasons behind why the physiotherapist researcher chooses a particular question and why they catalogue and order their data and findings in a particular way. Arguably, the influence of the EBP movement has become more diffuse rather than centralized through the regulating governing bodies of the physiotherapy profession. If a routine of always seeing EBP as the go-to method of finding information is adopted, physiotherapists conform and fit in to the normalcy of EBP. Much of that work of conformity is done internally, by the therapist, to herself/himself (Foucault, 1977). The result would be a version of epistemicide, another contributor to the problem of disconnection that I will explore in more depth in the following chapters.

2.7 Summary

Physiotherapy, in particular the MSK domain, has adopted and privileges evidence-based practice and seeks to interrogate its disciplinary knowledge using mainly scientific research to appraise its usefulness and efficacy. The profession wishes to avoid the pot pourri, takes the side of medico-science and is on this pathway for that reason. This has resulted in a disconnect between the epistemologies of disciplinary research used to generate evidence for practice and epistemologies currently used in practice. I have interpreted my arrival at this disconnection because of a number of problems:

- Being determined to avoid pseudo-scientific ways of knowing,
- Allowing propositional knowledge to strongly dominate craft knowledge,
- Adopting research practices that are reductionist and positivistic, mirroring epidemiological thinking and serving technical interests,
- Allowing evidence for practice to come from those technical interests which produce propositional knowledge, rather than interests more aligned with practice,
- Being unaware of our collective epistemic naivety which in turn risks epistemicide of knowledge and knowledge sources that do not serve technical interests, or that are inherently difficult to measure and observe.

In order to soften the disconnect that I experience and running parallel with the quest for scientific evidence is the requirement for other types of research that will legitimize the aspects of physiotherapy that do not come from technical interests. This would make craft

knowledge more visible in research and see researchers adopting methodologies from different genres. Epistemic naivety may be part of the problem, facilitating epistemicide in physiotherapy

The following chapters will delve deeper and conduct an analysis of the profession in order to analyse (a) the historical development of the profession of physiotherapy, (b) the contenders for legitimacy as physiotherapy knowledge and (c) musculoskeletal original research in two disciplinary journals with regard to epistemologies that are visible.

Section 2 – An Analysis of Physiotherapy as a Profession

Section 2, *An Analysis of the Profession,* consists of two chapters. Encountering Foucault gave me a sense that physiotherapy is a social construct, with a history and a set of power dynamics and interests, and so I set about looking back at its roots. I draw from the concept of an archaeology of knowledge (Foucault, 1972) to develop my philosophical understanding of some aspects of the profession of physiotherapy. An archaeology of knowledge is a system built through discourses around how a domain, in this case physiotherapy, functions. It goes beneath consciousness of individuals and can describe the conditions for the emergence of particular sets of rules and the boundaries of how the discipline of physiotherapy thinks and acts. Captured in this section are the questions of (a) How did physiotherapy become a profession, and what journey has it taken to get to this point in time? (b) What are the disciplinary knowledges that appear in physiotherapy literature aimed at members of the chartered societies? and (c) How does physiotherapy express its dominant epistemology in research journals?

Chapter three, *Physiotherapy in Ireland: History and Literature* presents a chronological history of physiotherapy in Ireland and contains an exploratory audit of musculoskeletal original research from two physiotherapy journals. I examine the historical development of the profession in order to point up where we have come from, and how we have traditionally sought to legitimize the profession through alliances and adoption of medical viewpoints. The journal audit provides insight into the type of original research in the musculoskeletal domain that is presented to members of the chartered societies in Ireland and The United Kingdom.

In chapter four, *Epistemology in physiotherapy literature: contenders for status as legitimate knowledge,* I examine and discuss contenders for legitimacy as physiotherapy knowledge sources including evidence-backed knowledge, evidence-based practice and knowledges that do not have the same levels of evidence behind them.

Chapter 3 – Physiotherapy in Ireland: History and Literature

3.1 A Chronological History of Physiotherapy in Ireland: Early Epistemologies

3.1.1 Introduction and Context

This chapter is a chronological overview of the historical development of physiotherapy in Ireland. The conditions that gave rise to the practice of physiotherapy are examined and how it gained status as a profession are considered. How the profession developed and the ways in which it established and refined its identity, sought legitimacy and now views itself as a health profession is scrutinized because it illustrates where physiotherapy epistemologies have come from. The foundation of the profession is traced, which emerged in London in the late 1800s and arrived in Dublin shortly afterwards. The identity of physiotherapy, from early struggles for legitimacy to modern day political battles for authority in identity is laid out. The genesis and nature of some of the truths in the profession are analysed in order to give context to how the modern-day physiotherapist in private practice sees their place in the multidisciplinary team of allied health professions, sees their knowledge and sees themselves.

3.1.2 Earliest Days; Massage, Medical Gymnastics and Medical Electricity.

When we track the evolution of physiotherapy as a therapeutic practice in Ireland we start in the United Kingdom, of which Ireland was a part at the turn of the last century. The formation of the profession we recognise today began in London in the late nineteenth century, but some of the roots of what we now recognise as physiotherapy can be traced back millennia in many different cultures around the world. As we examine the evolution of physiotherapy in the Islands of Great Britain and Ireland, we begin with three core skills, or roots, from which the practice of physiotherapy emerged. The primary and most fundamental 'root' is massage. This, along with medical gymnastics and medical electricity began as the main nucleus around which the profession organised itself.

3.1.2.1 Root One: Massage

Massage in some form or other has existed in every culture, and '*is a very ancient form of treatment, so ancient that one may consider its history to be as old as that of mankind, and its*

beginning prehistoric' (Kleen, 1921, Cited in Calvert, 2002:1). From as far back as records begin, documents and images that make reference to massage in different forms from different cultures and geographical areas of the world emerge. In Ancient China circa 2700BC "*The Yellow Emperor's Classic Book of Internal Medicine*" was written, which detailed manual practices and techniques that are used in current Oriental Medicine and Massage Therapy. The tomb of Alcmanthor in Ancient Egypt from 2500BC has drawings depicting reflexology, foot massage and manipulations (Calvert, 2002; Goats, 1994). The Ayurvedic Medicine movement circa 1500BC in India, detailed massage as an integral part of the Hindu practice that mind, body and spirit were all connected. Massage was seen as an indispensable healing factor in that culture (Hendtschel and Schneider, 2004) and is still regarded as such today. Japanese Massage was documented in 1000BC, the ancient Greeks describe rubbing knots as a form or massage in 800-700BC and Hippocrates, the father of medicine, advocated frictions and rubbing as a form of healing in 500BC (Calvert, 2002). In modern western medicine massage appears in the 1800s, and Per Henril Ling, a founder of what became known as Swedish Massage, is seen as the pioneer who put structure on massage techniques and practices, as well as a detailed description for dissemination. Ling believed that vigorous massage could bring about healing by improving the circulation of the blood and lymphatic fluid (Vickers et al, 2001). At a similar time, a French publication *Du Massage*, written by Estradene in 1863 from a school of medicine in Paris (cited in Goats, 1994), also brought massage techniques, doses, consideration and indications for use into the western medical consciousness.

Massage or 'medical rubbing' as it was called, became a viable and recognisable set of techniques, which were popular with those seeking relief from muscle pain and injury. The practitioners who could market their services saw an opportunity to exploit their skills, especially as we come towards the latter half of the nineteenth century. As the industrial revolution advanced, there was a coupling of more musculoskeletal injury with comparatively higher incomes in society, and the massage therapist could carve out a market. It did not require a lot of training, was relatively safe and did not require expensive equipment. But there was a temptation to be led by the market. The concept of converting massage into a practice for making money beyond its therapeutic uses becomes clearer when its exaggerated claims from over the years are considered (Barclay, 1994), including that it made

> *thin people plump, fat people slight and graceful, that internal pains and troubles can be cured, it counteracted the craving for stimulants and sedatives, benefitted women at the critical age, for old people it kept the tissues nourished and muscles and joints supple, it restored the appearance of youth, by increasing secretions it kept the joints from becoming dry and stiff and it prolonged life.* (Oakley 2005:93)

In Great Britain, towards the end of the 19th century, before physiotherapy courses were imagined, some hospitals began to organise and offer short courses in massage to nurses and midwifes. In those days, certain types of massage were associated with less medical, more adult and illegal or immoral practices, such as prostitution, (British Medical Journal, 1894), something that went strongly against Victorian etiquette and the rigid social constructs of the middle and upper classes. While those services classed as 'massage' went against the outward sense of morality, prostitution in Victorian London nevertheless was very common, and, in some ways, society was becoming ambivalent with authors arguing that '*the conditions of society itself meant that for both working and upper classes, it was inevitable'* (Trollope, 1983:165). Massage was becoming a euphemism for prostitution, and sexuality, especially women's sexuality during these times of social change, was scrutinized, something explored further by Nicholls and Cheek (2006). These practices of massage were hardly spoken of in middle and high society, and certainly not written about. This changed in the 1890s, when a distinguished medical journal began publishing articles on "Massage Scandals" and "Immoral Massage Establishments" (British Medical Journal, 1894; 2:114). The British Medical Journal's campaign against massage and those women practicing it in Victorian Britain was alarmist and designed to cut to their 'truth' that "*in these dens of infamy the worst passions of man or woman are excited by treatment that they are pleased to call massage*" (British Medical Journal, 1894; 2:114) The author of that British Medical Journal editorial was strongly negative about the massage practitioners and their work that any attempt to regulate it was deemed a losing battle (Judge, 2015).

> "*Such recognition would mean neither more nor less than a recognition of prostitution*" (British Medical Journal 1894; 2:114).

It was a belief of that time that massage with medical intentions was not worthy to sit in the category of medical treatment but instead was tarnished as something 'Other' to be aligned with unpalatable practices and behaviours. While human touch can be considered the most natural form of medicine, at this point in history it stirred up too many alternative

connotations that side-lined it from mainstream medical practices. This can be interpreted as the beginning of a campaign for legitimacy and identity in early physiotherapy.

The nurses and midwives who practiced medical massage felt threatened in their profession. Ten of them responded to the scandals stoked up by the British Medical Journal's articles by forming 'The Society of Trained Masseuses' (STM) in the UK in 1894, the same year as the article was published, which became 'The Incorporated Society of Trained Masseuses' (ISTM) in 1900. They were determined to make massage a safe, clean and honourable profession. Their rules of professional conduct included

- No massage should be undertaken except under medical supervision
- No general massage for men should be undertaken
- No advertising to be permitted in any but strictly professional journals
- No sale of drugs allowed to patients (Oakley, 2005).

Their guidelines also stated that no house with infectious illness should be visited, no stimulant should be accepted and there should be no gossip about patients.

> *They were encouraged to practise only during daytime hours and, in time, to organise their clinic spaces within the grounds of hospitals. Their clinic rooms would be free from adornment and conveyed a message of sterility, objectivity and detachment. Each of these steps, though innocently considered, represented a further refinement of the moral crusade to rid massage of its seedy connotations.* (Nicholls and Cheek, 2006: 2244)

These were the early days of what we now see as a professional regulatory body protecting its members, and its own existence. The way those early nurses and midwife masseuses staked their claim that massage was a benefit for the sick and injured was by aligning with the medical, biomedical and biomechanical model, by becoming more objective and detached while practicing, lest they be aligned with the women who worked with the pleasures of the flesh. They acted to legitimise massage, which had been sullied by its association with prostitution. That they succeeded has been analysed by Nicholls and Cheek (2006), who reason that the early founders established a clear practice model for massage, which effectively regulated the sensual elements of contact between therapist and patient. Massage practices were regulated through clearly defined curricula, examinations and the surveillance of their Society's members. A biomechanical and biomedical model of physical rehabilitation was adopted to enable masseuses to view the body as a machine (BAM) rather than as a

sensual being. Sensuality was removed and aligned as separate from therapeutic aspects of massage, but interestingly no room was left to consider any non-sexual sensual-therapeutic aspects of massage. This is an early positioning of medical massage knowledge as being aligned with medical epistemology. Medical patronage of the Society was courted, and they succeeded in aligning themselves with eminent high-profile doctors and surgeons of the era, enabling the Society to prosper amongst competing organisations (Nicholls and Cheek, 2006). Identity and legitimacy battles had success in these early days.

The Irish School of Massage, a division of the ISTM in London, was established in 1905. A teacher at the Irish School of Massage was Louisa L. Despard, who wrote *'Textbook of Massage',* first published in Dublin in 1910 with second edition in 1914, which was used in the early decades of training in Dublin (Oakley, 2005). Detailed anatomy, physiology, and theory and practice of massage are outlined with descriptions of effleurage, stroking, friction, kneading, petrissage, tapotement and vibration. General massage for the whole body as well as local treatment for sprains and fractures are described in Despard's textbook. Passive, active and active-resisted exercises are advocated at the end of sessions. Bandaging, fomentation and the use of cold compresses were also described (Oakley, 2005). This curriculum is outlined, along with details of early anatomy examinations in Dorothy Oakley's (2005) historical look back at physiotherapy in Ireland. Her work shows us how detailed and regulated the early curricula were, part of the legitimization process, which was seen as vital in order to gain respect and currency of approval in medical and general societal circles. The practice of massage in Ireland was aligning with medical viewpoints and epistemologies.

3.1.2.2 Root Two: Medical Gymnastics

Medical Gymnastics, or Swedish Remedial Exercise, is described as the second arm from which the profession of physiotherapy emerged (Oakley, 2005). Gymnastics Institutions in Stockholm began to train medical gymnasts and send them abroad in the early and mid-nineteenth century. Their ideas filtered into the British Isles as well-trained Swedish therapists became better known as they spread their message and skills, partly through a Swedish state-funded project to spread the culture of Swedish exercise and health (Lundquist-Wannaberg, 2014). A leader in the development of gymnastic movement for health was Per Henrik Ling, and his name appears remarkably often in the early literature, as well as the form of gymnastics he established during the nineteenth century, known as Ling gymnastics or Swedish gymnastics (Wikström-Grotell et al. 2013, Nicholls and Cheek 2006;

Ottosson, 2011). Ling was also instrumental in advocacy of massage and used certain whole-body movements, with hands-on massage, as part of his therapy philosophy. With the aid of specially designed movements, Ling gymnastics aimed to exercise the body in as balanced and holistically harmonious way as possible, including the body's internal organs and inner soul. The idea of holistic harmony originated from Ling's understanding of the philosophy of nature, namely that everything was interconnected. He was clearly not a positivist! As individuals consisted of a number of different parts, they could not be regarded as completely whole. Rather, wholeness was dependent on how the different parts related to each other. In short, it was thought that harmony led to good health, while disharmony created ill health. This holism view of the body was an early aspect of the epistemology of physiotherapists, where there were no binaries or dichotomies to navigate, and reductionist views were seen as limited. The link between physical exercise and health constituted one of the cornerstones of Ling gymnastics (Lundquist-Wannaberg, 2014). The Irish School of Massage's curriculum changed to include medical gymnastics when Miss Despard's second edition of her textbook in 1914 included a section on Swedish Remedial Gynmastics (Oakley, 2005). The gymnastics 'root' was very soon a mainstay of the profession, being added to the society's title when it received a charter in 1920, making it the Chartered Society of Massage and Medical Gymnastics (CSMMG).

3.1.2.3 Root Three: Medical Electricity

The third root of early physiotherapy was that of medical electricity. The battery had become more accessible and useable for different machines (Oakley, 2005), and the view of electricity as a therapeutic use that began in the 1700s became more mainstream. The term "medical electricity" came to be used in the eighteenth century to indicate the applications of electric fluid to the human body as a medical remedy (Bertucci, 2003). Long before this, the ancient Greeks had noticed some therapeutic benefit of electricity but in the absence of mechanical generators, relied on electrically charged fish to gain the desired effects (Selcon, 2001). Early advocates of electricity treatments as medicine included John Wesley (1703-91), the founder of Methodism and an evangelical preacher. He advocated electrotherapy in large doses for the treatment of '*epilepsy, sore throat, head-ache, palsy, gout, rheumatism, sciatica, and feet violently disordered, etc'*, (Selcon, 2001: 208). Welsey was not a doctor, and while dismissed by the medics, had a large following in the general public. In Selcon's paper (2001) on the history of electrotherapy, he concludes that it was left to a 'proper doctor' to make electrotherapy respectable. A distinguished physician at Guy's Hospital in

London, Dr Golding Bird, started an electrical department at the hospital in the Autumn of 1836. In the spring of 1847, he delivered a course of lectures to the Royal College of Physicians on 'Electricity and galvanism in relation to physiology and therapeutics' (Selcon, 2001). Electrotherapy became mainstream and fashionable as the new cure for all ills, with different machines developed for use in the clinical setting utilizing interrupted galvinism for stimulation of paralysed muscles and interrupted faradism for general muscle stimulation (Oakley, 2005). Examining the Irish context, at the Irish School of Massage, the 1914 edition of Miss Despard's textbook included a short section on 'electrical methods' (Oakley, 2005). Oakley (2005) informs us that the Irish School of Massage was one of the first in Great Britain and Ireland to run a training course in Medical Electricity and hold an examination. They were following the trend coming from London, as well as staking a claim for the electrical therapeutic practices to find a home in their society's scope of practice. This was a chance to broaden the territory of what would become physiotherapy and in doing so further legitimize the fledgling society as aligned with medical practice.

In the early days electrical treatments for the extremities were applied while the limb was immersed in a bath, radiant heat, ultraviolet light, medical diathermy, and high frequency currents were the early treatment options that have today evolved into electrical stimulation, shock wave diathermy, ultrasound and LASER treatments used by physiotherapists. Today, electrotherapy lies within the physiotherapist's scope of practice, though has fallen from favour as evidence for its effectiveness and indication for therapy are scarce and the current concepts that influence its application vary considerably from those proposed historically (Watson, 2000). The physiotherapist adopting EBP would likely have little use for electrotherapy modalities today.

3.1.3 Professionalisation of Physiotherapy

'*Professionalisation is a process whereby occupations have become, or seek to become, publicly recognised as professions according to the degree to which they meet the alleged criteria'* (Hoyle, 2001: 15472). The process of professionalising different trades began in the early twentieth century as a method of improving quality through standardization and prescription of consensus-based standards. As early physiotherapy (and its earlier iterations) was finding its feet and organising its treatments along the lines of massage, exercise and electrotherapy, a movement started in the United States which endeavoured to bring some quality assurance to medical education. Educationalist Abraham Flexner undertook an audit

of medical schools in America, establishing criteria upon which to judge them and identify those which were substandard and considered to be producing poor quality physicians. His Flexner Report (1910), for the Carnegie Foundation, harshly criticised the vast majority of medical and osteopathic medical schools that he visited, resulting in many of them closing down. In 1915, Flexner compared social work against the benchmarks of what were believed to be the true professions of medicine, law and preaching. Flexner found that those who provided social work services had not yet achieved true professional status, (Flexner, 1915; Morris, 2008). He saw the social worker of the day as a "narrow minded technician." In deference to social workers, Flexner also viewed nurses and pharmacists the same way; with nursing and pharmacy as sub-professional categories, or as 'an arm added to the medical profession'. The pharmacist was singled out as a specific example of technical thinking because "*the physician thinks, decides, and orders, [but] the pharmacist obeys . . . and does not originate*."(Flexner, 1915, cited in Linker, 2005: 33). Nurses were placed in the same category, partly because of the inferior aspect of nursing scientific knowledge but also because of their gender, as '*subordinating loyally to his theory'* (Linker, 2005:33), illuminating Flexner's' highly gendered view of professionalism (Linker, 2005; Brumberg and Tomes, 1982). While the educated medical physician used his 'mind', the craftsman 'relied on his hands' (Linker, 2005). Medicine was seen as an 'elite profession' and thus held a particular socio-cultural status. Physiotherapy found itself seeking a place in this medical hierarchical landscape and physiotherapists, all women, used their hands in manual therapy and aligned with medicine for legitimacy, accepting a subordinate role in the early years. Flexner's criteria below stipulate what a true profession is:

1. Is basically intellectual (as opposed to physical) and is accompanied by a high degree of individual responsibility
2. Is based on a body of knowledge that can be learned and is developed and refined through research
3. Is practical, in addition to being theoretical
4. Can be taught through a process of highly specialized professional education
5. Has a strong internal organization of members and a well-developed group consciousness
6. Has practitioners who are motivated by altruism (the desire to help others) and who are responsive to public interests (Flexner, 1915).

Disorganised disciplines required some professional cohesion and the opportunity to consciously create an image for themselves in society (Zernich, 2014). This led to Flexner's work being developed over the twentieth century and different trades and groups that wished

to professionalise argued that they could do so once certain conditions and criteria are met (Houle et al, 1987; Friedson, 1994; Hoyle, 1975). Those conditions are as follows:

A. Governance by a regulatory authority that is sanctioned by the State.
B. Agreed Standards of practice usually set by the regulatory authority.
C. A supporting body of scientific knowledge that his validated academically.
D. A recognition of CPD.

Early professionalisation centred around medicine and law (Levine, 2001) and soon spread to other sectors. The foundation of professional organizations, publication of books, journals, ethics standards and training guidelines was set in motion (Levine, 2001). Pharmacy, social work and nursing began to professionalise, and physiotherapy followed a similar route, establishing ethical codes and inviting scrutiny of practice (Linker, 2005; Oakley, 2005). The Flexner criteria provided a methodology for ascertaining if physiotherapy could achieve the benchmark of legitimacy as a profession in the coming decades, with some analysis in Canadian physiotherapy, which was regulated and legislated for much earlier than in Ireland (Truelove, 1965; Tompson, 1976). The Irish Society of Chartered Physiotherapy has been the governing body of physiotherapists in Ireland since 1973, setting the standards of practice and developing a professional cohesion, allowing members to describe themselves as 'chartered' to distinguish themselves from other types of therapists with similar skills. This governance transferred to a statutory footing recently and now physiotherapists are regulated through the Irish Health and Social Care Professions Regulator CORU. The sites of learning shifted to the universities early on for physiotherapy and degrees, masters and doctorates in highly specialized professional education evolved. The criterion of requiring a supporting body of scientific knowledge for each profession is a crucial one, as it sets in motion the obligation to conduct research in order to agree what (scientifically validated) knowledge is part of a particular profession.

The discretion of what to do next with one's patients and the responsibility for any subsequent actions are hallmarks of a Flexner profession. Autonomy for the physiotherapist practitioner, especially in private practice away from the hospital environments of medial hierarchies and multidisciplinary teams was a key development of physiotherapy into a stand-alone allied-health profession. Graduate education, either formally through a university certified programme or informally through short CPD courses is also a key element of the professionalisation process (Houle et al, 1987). Graduate students develop shared cultural scientific norms, with support and adherence to those norms being part of the socialization

within graduate education (Menton, 1973; Levine, 2001). The scientific body of knowledge that physiotherapists use is tested with research and is influenced by research findings. The EBP framework is within this 'scientific knowledge of choice' and has its roots in the processes of professionalization that physiotherapy has gone thorough.
The development of physiotherapy education is mapped out in the following section.

3.1.4 The Organization of Physiotherapy in Ireland

Physiotherapy in Ireland evolved from small beginnings at the turn of the 20th century, from a seed that drifted to Dublin from a London establishment; The Incorporated Society of Trained Masseuses (ISTM). The ISTM founded the Irish School of Massage (ISM) in Dublin in 1905, as a course of study of a few months' duration, usually taken by nurses and midwives. It specialised in training females in hands-on massage for medical problems. As mentioned above, medical gymnastics and medical electricity soon became incorporated with massage as the mainstay of what the students of ISTM and ISM learned and practiced.

By 1920 a qualification in medical electricity was possible as students attended Trinity College Dublin for classes in anatomy, physiology, electricity, physics and chemistry. That same year, 1920, A Charter was granted by the King of England, George V, to the Society of Massage and Medical Gymnastics in the UK, allowing them to use the word 'Chartered'. The Irish Local Board of the Chartered Society of Massage and Medical Gymnastics (CSMMG) was established and their first meeting in Dublin was held in 1923. In those days, the students of this young profession were all nurses or midwives, a sector of the working world what was devoid of males. As was typical of the time, once married, a woman was forced to leave the workforce to focus her attention on home and family. This was facilitated by the Marriage Bar, a legacy from pre-independence and enacted by the 1924 Civil Service Regulation Act and the 1941 Local Government Act. It required single women to resign from their jobs upon getting married and disqualified married women from applying for vacancies. The Marriage Bar (Ireland, *Civil Service Act* 1924; Ireland. *Local Government Act* 1941) influenced and shaped cultural norms and reflected social attitudes that it was a husband's duty to support his wife and a married woman's place was in the home. The CSMMG was a society of no men and no married women members (Oakley, 2005), a reflection of the socio-political influences upon cultural norms of the time.

Soon after, the course in Dublin had incorporated medical electricity into its title and by 1947 it had evolved into a 3-year programme of study and was linked to and recognised by the British Society of Chartered Physiotherapy, the new title that evolved from the previous CSMMG. Physiotherapy was the new name, which could accommodate the wide range of subjects now being practiced. Not everyone was happy with the name change and some perceived the dropping of the word 'massage' as 'forfeiting our birth right' (Wicksteed, 1948, cited in Oakley, 2005). Students studied for qualifications in Theory and Practice of Medical Electricity, Theory and Practice of Light Therapy, High Frequency and Medical Diathermy, and Theory and Practice of Hydrotherapy. The Dublin School of Physiotherapy was founded in 1942, (See Figure 3.1), and became part of Trinity College Dublin, giving it much appreciated esteem and more potential for prominence as a possible career. 1949 saw the establishment of a School of Physiotherapy in Belfast, which went on to become part of University of Ulster at Jordanstown, now Ulster University. In Dublin, as a reaction to Trinity's theological or religious position, Catholic Archbishop McQuaid helped to set up the School of Physiotherapy at UCD in 1955, to give, as he saw it, catholic students the option to avoid Trinity (Oakley, 2005:16). Graduates from these University programmes could gain employment in Irish hospitals, alongside nurses and doctors as legitimate allied medical practitioners.

The Kings' charter of 1920 was important because it was only granted to one society in any profession and constitutes a hallmark that cannot be emulated by other groups in the same field. Once the society of chartered physiotherapists was established and had that official recognition from the King, it was elevated into a place of acceptance and respect in society. It also had a new distinguished position from which to dominate any competition such as other practitioner organisations treating injuries and physical dysfunction. As Eire was not yet established in 1920, the Irish physiotherapists organised themselves as the Irish Local Board (ILB) of the British Chartered Society of Physiotherapists which continued until 1973, when the Irish Society of Chartered Physiotherapy was launched. Dorothy Oakley (2005) notes the debates and discussions of the pros and cons of such a move and whether or not to retain the use of the Charter in post-colonial Ireland. Much of the reason to continue was to do with status and the distinction of a title, albeit chartered by the British Crown, establishing itself as the original and best qualification for practitioners in the field of injury in Ireland. It began life as massage therapy, then added popular allied-medical practices to its scope. It fought for legitimacy, which was won with chartership, and has never let this title

go, favouring the esteem and reverence linked with the title over new Irish republican identity. Foucault's analytic approach to processes of knowledge construction which he called archaeology of knowledge (1977), allow me to see the conditions for the emergence of dominant structures of thinking. There were particular sets of rules and boundaries which allowed and constrained how physiotherapy thought and acted through its early history. The logic and reason within physiotherapy were and are historically contingent. Discourses around medicalization of the body and alignment with medical science as a way to legitimize a fledgling profession are very clear in early physiotherapy and continue to exist today. Contemporary physiotherapy is still drawn to the same biomedical model that helped shape its identity and legitimacy in the early days.

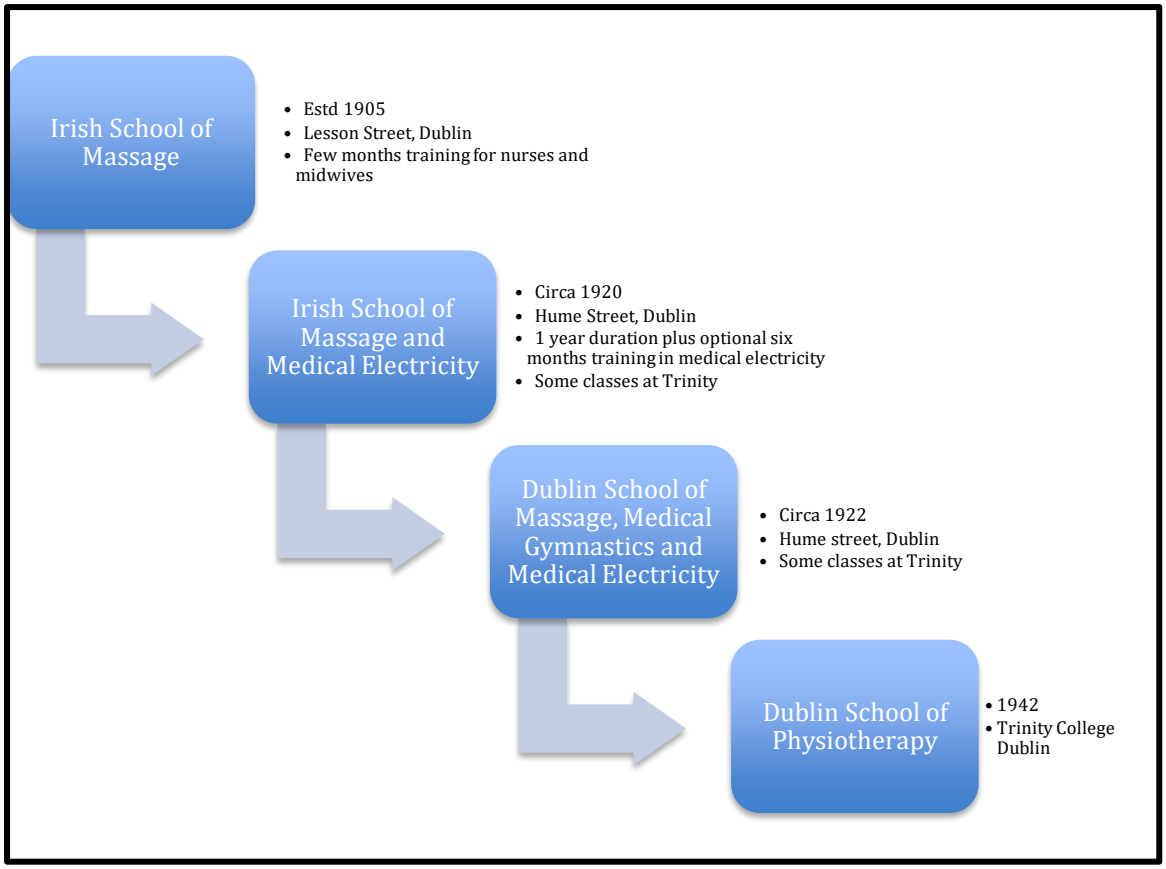

Figure 3.1: The First Steps in Physiotherapy Education in Ireland

Figure 3.2: A schema and timeframe of Physiotherapy Education Providers in Ireland

From small beginnings, physiotherapy education is now delivered as a four-year full-time undergraduate programme in five Irish universities, and as a two-year Masters in University College Dublin, University of Limerick, and University College Cork, (see Figure 2.2). The accrediting professional body has always been the Irish Society of Chartered Physiotherapists (ISCP), which rubber stamps the curricula, learning experiences and practical learning for each university programme. A new Statutory body, CORU, a word derived from the Irish cóir, meaning fair and just, has recently taken over these duties. Physiotherapy student numbers have risen dramatically, from 20 students studying in 1944 to approximately 734 in 2019. It has proven to be a popular choice of profession for many, (see Figure 2.3).

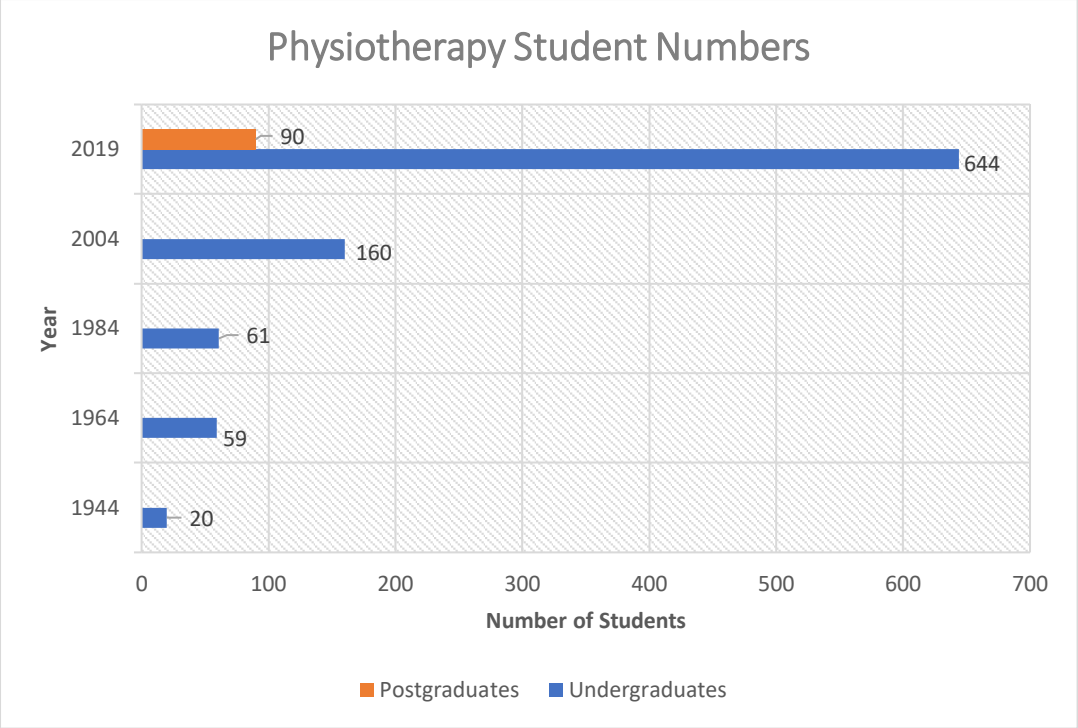

Figure 3.3: Physiotherapy student number changes 1944-2019. Source: University intakes as advertised on individual websites: Undergraduate: UCD: 56 per year, TCD: 40 per year, UL: 30 per year, RCSI: 35 per year. Postgraduate numbers variable, conservative average intake 15 students per year per course. Accessed October 7th, 2019.

The Irish Society of Chartered Physiotherapists is the national, professional body representing over 3,500 Chartered Physiotherapists in Ireland. In their own words,

> *The Society is respected and recognised both within and outside the profession, as the voice of physiotherapy in Ireland. We support our members in delivering the highest standards of professional care and work with them to develop their skills and support them in their practice'* (ISCP, 2022).

The Society is the sole Irish Member Organisation of the international physiotherapy professional organization and the World Confederation for Physical Therapy (WCPT) and contributes to the development of the profession both nationally and internationally. In Ireland the title Chartered Physiotherapist can only be used by current members of the Society or by the members of the equivalent, and parent body in the United Kingdom, the Chartered Society of Physiotherapy (CSP).

The initials MISCP indicate that a physiotherapist is a member of the Society. Chartered Physiotherapists represent the highest standard of practice and service and set the benchmark for professional practice in Ireland. (ISCP, 2022).

3.1.5 Physiotherapy Tensions in Ireland

The physiotherapy society has sought to have their organization and scope of practice recognised and regulated by the Irish State for almost 100 years. The earliest record of chartered physiotherapists in Ireland calling for statutory regulation dates from 1926 (Oakley, 2005). They have lobbied as a group for self-protection, public interest and public protection and exclusive legitimacy under legislation in a bid to strengthen and protect the society and the profession as a whole, staking their claim on the territory of therapy for physical function. In 1982 the Department of Health submitted an outline of statutory regulation, but it never materialized, possibly as a result of the frequent changing of governments during the 1980s. In 1989 the ISCP wrote to the Minister for Health warning about the advertising and subsequent setting up of a private School of Physical Therapy in Dublin. In most countries, the terms 'physiotherapy' and 'physical therapy' are interchangeable titles, with the same educational and training requirements for each. In Ireland, from 1989 until 2018, it was possible to study for a 'Physical Therapy' qualification that was quite different to the physiotherapy qualifications offered in Irish universities. The 'Physical Therapy' courses sole focus was the musculoskeletal domain, they ran for profit, for shorter time frames, with minimal entry requirements and with limited practical experiences and negligible research activities built into the training. While work in the public hospital sector was exclusively the territory of physiotherapists, there was now a cohort of graduate Physical Therapists, competing with all other injury/exercise medicine/health professionals in the private sector.

This was a significant problem for the ISCP and its members, who regularly and sometimes forcibly expressed anger and frustration at the situation, calling on the government to legislate for protection of the two titles as interchangeable with one another. As the ISCP membership grew from 703 in 1986 to 2178 in 2004 and over 3500 today, its voice became louder. The regular argument was that the two titles are confusing for the public and lead to a public safety issue. The ISCP points out that Ireland is the only member country of 111 members of the World Association of Physical Therapy (WAPT) that has a separation in the two titles (ISCP, 2016). The O'Sullivan Report (2003) commissioned by the Department of Health on title protection, stated in relation to confusion:

> *In the absence of protection of title, there would be a significant risk of public and professional confusion now and in the future between physiotherapists and physical therapists in Ireland; and between physical therapists in Ireland and in the rest of the English-speaking world. Significant problems would be associated with any decision not to protect the title of physical therapist in Ireland*. (ISCP, 2016)

These years of striving for title protection in Ireland coincided with the explosion of research in physiotherapy. Examining our practices and techniques and adopting evidence to inform us was a large part of the setting aside of any competition. While research conferred legitimacy and separation from the un-researched physical therapy and other alternative therapies, the increase in size of the profession with many more and larger academic departments accounts also for an exponential increase in research.

In 2005 The Health and Social Care Professions Act was passed into law, its purpose founded in public safety in the monitoring and regulation of 10 different health and social care professions. The Health and Social Care Professions Council, CORU, was established in 2007 and began to invite eligible applicants to register, including Dieticians, Medical Scientists, Occupational Therapists, Optometrists and Dispensing Opticians, Physiotherapists, Psychologists, Radiographers, Social Workers, Social Care Workers and Speech and Language Therapists (CORU, 2022). The problem for the ISCP was that the 2005 Act and CORU only allowed for the protection of the title 'Physiotherapist', allowing anybody who so desired to use the term 'Physical Therapist'. This set off a decade of lobbying and fighting between the ISCP and the Irish Association of Physical Therapists (IAPT), the former demanding the use of the name, the later citing unfairness and loss of livelihood. After a period of facilitation in 2011-2012, the two organisations made a joint proposal to have the Physical Therapists grandfathered into the ISCP under certain conditions. More wrangling in Department of Health Subcommittees ensued, with no agreement reached. The ISCP advised its members to boycott registering with CORU until it was satisfied with the situation. Only as recently as mid- 2018 has the boycott been lifted and the physiotherapy register is starting to become populated. Physiotherapy grand parenting closed on September 30th, 2018, giving graduates of Physical Therapy a chance to protect their livelihoods and continue using their titles, (CORU, 2020). The Institute of Physical Therapy is no longer running courses in Physical Therapy, having re-branded to professional diplomas in rehabilitation, manipulation, and osteopathy, (Institute of Physical Therapy, 2018). The establishment of CORU and accompanying legislation sets obvious rules and boundaries which allow and prevent

physiotherapy to think and act in a certain way. These are recognisable benchmarks in professionalisation processes which direct all professions in a particular way (Hoyle, 1975; Houle et al, 1987). This is not unique to physiotherapy but has had an obvious benefit in eliminating competition in the musculoskeletal domain within the private sector in Ireland. If discourses are historically contingent, then we will look back at the last decade as being pivotal in physiotherapy identity securing state-sponsored dominance in the area of physical therapy and health.

3.1.6 History Summary

The tension that has surrounded the protection of the title of 'physiotherapist' in Ireland has been ever present in my physiotherapy lifetime. The ISCP have actively and strategically positioned their members as more qualified, more legitimate and the sole genuine practitioners to look after public health within the appropriate physiotherapy scope of practice in Ireland. From small beginnings in 1905 Irish Physiotherapy has fought to be recognised as legitimate, their main tactic being to align with medical practice, and ways of knowing associated with medico-science; those being the Western scientific aspects of modern medicine. This background seeks to give some context to the mentality of the physiotherapist in private practice in Ireland and some of the challenges and opportunities that they encounter. It also seeks to illuminate where we have come from, and from where some of the traditional 'truths' in our profession were borne. The roots of the profession are clearly linked with massage, medical electricity and medical exercise. Evidence-based practice has become dominant more recently as I will discuss in the next chapter and with it we have almost lost medical electricity to the evidence (Kroeling et al, 2005), are losing massage, (manual therapy) to evidence (Meakins, 2015; Reid et al, 2017; Rabey et al, 2017; Mintken et al 2018) and are keeping exercise also based on evidence.

3.2 Analysis of Physiotherapy Musculoskeletal Original Research: Visible Epistemologies

3.2.1 Introduction and Context

This chapter analyses two professional physiotherapy journals and highlights the knowledge and epistemologies that are visible in their original research from the musculoskeletal domain. I felt that it was important to see how some musculoskeletal original research (MSK OR) (the best match to conditions seen in private practice) is conducted. I am interested in how this type of research comes about before it filters as evidence into decision making during practice. With this exercise I am not investigating the overall disconnection that I have been exploring per se, rather using it as a helpful step to seek out dominant epistemologies visible in two journals prominent in Irish physiotherapy circles.

This chapter begins with *Physiotherapy*, the official journal of the Chartered Society of Physiotherapy (CSP) of the United Kingdom and moves on to *Physiotherapy Practice and Research*, the official journal of the Irish Society of Chartered Physiotherapy (ISCP). I chose these two journals as they are the ones endorsed and funded by the two chartered societies and should represent current physiotherapy thinking. Every member of the ISCP received a print copy of each edition, delivered by post twice each year up until 2020. It has only recently switched from print copy to online access for members. This makes it a publication that is easily engaged with and the journal most likely to be read by physiotherapists in Ireland, especially in the years when it arrived by post. Many Irish physiotherapists over the past three decades have trained in the UK, for different reasons including limited places and more difficult entry requirements in Ireland. Eleven of my 12 interviewee participants pursued at least part of their physiotherapy training in the UK. For the many Irish graduates who trained in the UK, who are or were members of the CSP, for the close alignment between the two countries and because of mutual recognition of qualifications, the journal *Physiotherapy* is esteemed and respected. It is the official journal for members of the CSP, of which there are many in Ireland. I have conducted an audit of all original research from the musculoskeletal domain over a five-year period to focus on methodologies, outcome measures and statistical analyses used. The initial data was scrutinized with descriptive statistics. Further analysis highlights the types of knowledge that are visible, the perceived epistemological preferences and the dominant ideologies within this sample of MSK OR. I have again drawn from Foucauldian perspectives on knowledge and power in the latter endeavour.

It must be stressed that this exercise is an audit of one small element of specific research within a huge sphere of different academic and grey literature sources. There are many avenues and locations in which to publish research related to physiotherapy but the fact that both journals are the homes of the chartered societies makes it a worthwhile exercise and valuable insight into how research is conducted and what research is presented to its readers.

3.2.2 *Physiotherapy* Journal

Physiotherapy is a journal that has recently reached its 105th birthday, (Harms, 2014). It was first published in July 1915 and was circulated to its 750 subscribers as *The Journal of The Incorporated Society of Trained Masseuses*. Before this, some columns of *Nursing Notes* were dedicated to publishing professional activity information for the early members of the profession (Van Leuven, 1964). The journal changed its name to *Physiotherapy* in 1948 and from those modest beginnings it has grown to be a world acclaimed source of physiotherapy knowledge and latest thinking. In 2009, the United States National Library of Medicine recommended the journal for inclusion in MEDLINE, which saw a large increase in citations and *Physiotherapy* was awarded its first impact factor (Harms, 2014). It is published by Elsevier on behalf of the Chartered Society of Physiotherapy and has grown to be a publication with 4 issues per year, in March, June, September and December annually. It currently has an impact factor of 2.531 and a 5-year impact factor of 3.103 (Clarivate Analytics 2019) and an editorial team consisting of one editor, Michele Harms of St Georges University London, 9 associate editors and a team of 30 on its international advisory panel (Physiotherapy Journal, 2022).

Physiotherapy is the official journal of the Chartered Society of Physiotherapy in the United Kingdom, a society that was founded by 4 nurses in 1894 and gained its chartered status from King George IV in 1920 (CSP, 2022). The Chartered Society of Physiotherapy (CSP) in the UK is the oldest of its kind in the world. It has more than 53,000 members, with graduates from 64 University programmes; both undergraduate and postgraduate courses (UCAS, 2022). The CSP is the only professional body in the UK that represents physiotherapy, and as such it is dominant, and quite powerful in representing the interests of its members. From 1920-2003 the CSP had the role of regulating its members for the benefit of the public and was seen as both a professional and regulatory body. The United Kingdom began to legislate for the roles of allied health professions towards the end of the 1990s and

The Health and Care Professions Council (HCPC) was set up in 2003 to regulate and provide state assurances as to the qualifications and standards of different allied health and care professions in the UK (HCPC, 2022). Physiotherapy was one of the first 14 professions to be regulated. Before the HCPC was brought into existence to have statutory oversight, the CSP established and oversaw regulation of physiotherapy in the UK. It had (and still has) strict admission policies, and for a physiotherapist to be accepted into the CSP and thus use the term 'chartered' was and still is a way of verifying their legitimacy. To be eligible to become a member of the CSP was (and still is) vitally important to gain employment and status and to function as a physiotherapist. To link back to the earlier discussion on professionalisation, the creation of a regulatory body with 'scientific' knowledge is the essence of professionalisation. The journal of the governing body acts to appraise and create new knowledge for the profession.

Physiotherapy is held in esteem and is regarded as a fundamental source of physiotherapy thinking, practice and research knowledge. *Physiotherapy* publishes a range of different articles from different sources and categories of physiotherapy research and practice. It sets out its aims below:

> *Physiotherapy aims to publish original research and facilitate continuing professional development for physiotherapists and other health professions worldwide. Dedicated to the advancement of physiotherapy through publication of research and scholarly work concerned with, but not limited to, its scientific basis and clinical application, education of practitioners, management of services and policy. We are pleased to receive articles reporting original scientific research, systematic reviews or meta-analyses, theoretical or debate articles, brief reports and technical reports. All papers should demonstrate methodological rigour*. (Physiotherapy Journal, 2022)

Each issue has an average of 16 articles, which includes a variety of different types of literature, from editorials, commentaries, systematic reviews, original research, to protocol papers, letters to the editor and discussion and correspondence articles. It publishes at least 4 systematic reviews of the literature in each issue, from all 3 pillars of physiotherapy practice, (musculoskeletal, respiratory, neurology), the majority of which are from the musculoskeletal domain. These systematic reviews follow a journal-specific format, following the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines, (Harms, 2014), which lay out guidelines for those researchers that undertake a systematic review or

meta-analysis and how this should be presented in a written journal format. By far the most common type of article published, and the one for which the journal exists, is its original research. This is the section that I am most interested in, particularly musculoskeletal original research (MSK OR), as the epistemology of the profession is reflected in the original research it fosters, publishes and disseminates to its members. Whatever *Physiotherapy* publishes is a reflection of what is happening in the physiotherapy profession, assuming it is in touch with its membership base and is connected to the work that the physiotherapist does in their practice.

The research findings, especially those from original research published in a professional journal like *Physiotherapy*, reflect a dominant discourse on what constitutes evidence. Evidence-based knowledge can come in many forms, from casual evidence derived from positivistic medical-scientific studies, to evidence arising from more qualitative and alternative methodologies from social science and medical sociology. This exercise seeks to find out how physiotherapy MSK OR is conducted in terms of choice of methodology, outcome measure and data analysis. How MSK OR is conducted reflects how physiotherapy researchers gather evidence and the quality of that evidence. It reflects the types of knowledge that are deemed to be most important and useful and are therefore privileged. Analyzing this MSK OR and the ways in which it is conducted will also illuminate the epistemologies at play, if there is diversity in physiotherapy knowledge, and the ideologies associated with physiotherapy research.

3.2.3 Method of Journal Analysis

3.2.3.1 Inclusion and Exclusion Criteria

Private practice is the overall focus of this inquiry and the musculoskeletal domain is the mainstay of private physiotherapy, therefore I chose to focus on MSK OR, published in *Physiotherapy*. As the focus of my inquiry was on empirical work, I excluded systematic review or meta-analysis, editorial, commentary, protocol and correspondence papers. Where there was overlap with other domains, for example concerning muscles, joints and the skeleton in the domain of neurology, I included original research articles if research participants and/or patient populations were usually seen by the physiotherapy clinician in the private setting. If there was no obvious link with the MSK domain, and if the patient/research participant was most likely an in-patient in a hospital or medical facility, then I excluded it from my analysis. Another subsection of original research visible in *Physiotherapy* is

education, where the focus lies with physiotherapy students, graduates or clinical placement instructors, examining student learning, experience, tutor-student dynamics and optimal learning environments. This type of research was also excluded from my analysis, as it does not fit with what the private practitioner faces during their typical day. That left me with a clear subset of published research, MSK OR, upon which I conducted my analysis.
From a start-point in late 2017 and early 2018, I chose to focus on the previous 5 years of *Physiotherapy* publications. I began at the first issue of 2013, 99(1) and finished at the fourth issue of 2017, 103(4). There were 281 articles published in Physiotherapy between 2013-2017, and of those 110, or 39% were Musculoskeletal Original Research (MSK OR).

3.2.3.2 Data Sorting

MSK OR, published in *Physiotherapy*, comes in different forms. For my analysis I needed to determine what it is about a piece of research that reflects knowledge creation and epistemology in terms of those conducting it and those reading it. I decided on three different aspects that can sum that up:

- the research design and subsequent methodology,
- the outcome measures used by the researchers to gather data in order to measure, track interventions and make conclusions about their sample population, and
- the strategies they undertook to analyse their data.

Firstly, I was interested in the most basic method of categorization, what type of method was chosen to answer the research question of a particular study? For this, I read each article, paying particular attention to the research question(s), the section in which the methodology is outlined and the author's description of the steps they took in gathering their data. From this I deduced, easily in almost every case as it was usually stated by the authors, whether their study used quantitative methods, qualitative methods, or a mixture of both types in order to answer their research question.

Secondly, I examined the Outcome Measures (OMs) that each study deemed elemental to gathering the information and data that was required to conduct their study. Outcome Measures are any type of data or information that can be captured by the researcher about the participant. They take many forms, like quantitative Objective Measures, such as sprint speed measured in seconds or joint range of motion measured in degrees. Patient-Reported

Outcome Measure (PROM) are used where the patient participant records aspects of their function on a scale, and there are Researcher-Scored Scales as well as Surveys, Interview Findings and Focus Group Findings. The OM that is used in research studies is the characteristic or situation relating to the human participant that can be captured or measured in order to say something about that participant. When trying to answer a research question in the world of the physiotherapy practitioner, the researcher needs to find a way of measuring the effect of something, capturing information about function, movement, status, feelings or beliefs. To show the effect of a treatment, or an intervention, or to simply demonstrate the state of a phenomenon, we need OMs. They serve as evidence, showing something to the outside world and to the reader in tangible form. Quantitative research cannot function without OMs. For example, objective measures are seen in all traditional scientific research, suiting the experimental nature of measuring an inanimate world. Once the researcher has a suitable piece of equipment, the objective measure is fairly straightforward to collect. Some Objective Measures, like blood test measures, lung function tests, heart rate and blood pressure use well-established medical devices, for example heart rate monitors, blood pressure monitors and spirometers to collect their numerical or categorical data. PROMs are different to objective measures as they capture more subjective information and standardize it via yes/no, true/false statements, or more commonly, Likert Scales of agreement with a particular statement.

The OM that is chosen for a particular study defines the researcher's focus and where they see knowledge as coming from. It may reflect how they see their research world, and how they feel they can measure and capture what they need to answer their research questions. Researchers with a particular worldview, and research view, will act from an epistemological position and conduct their research to answer their physiotherapy question using approaches suited to that paradigm. The choice of OM reflects an epistemological position, albeit that in certain fields of study and for certain research questions there may be very little choice and deliberation on epistemological positions is not needed. In physiotherapy there is usually a choice of how to collect data via OMs. I also see the OM as a piece of data or information that will be displayed as evidence by the researcher.

Thirdly, I investigated how the publication authors analysed their data to make conclusions about their research findings. I did this in order to get an idea of the data analysis techniques and strategies that are visible in MSK OR. This third element of my documentary analysis is obviously linked with the previous two and follows on from choices the

researchers made in constructing their research design, methods and how they collected their data. If a study was a quantitative study using objective measures to collect ordinal and numeric objective data, then it follows that the data analysis strategy will also be quantitative, most likely one of statistical analysis. If a study chose a qualitative design to answer its research question and asked research participants about their experiences using interviews, then it follows that statistical analysis is unsuitable in this type of study. The natural knock-on effects to the second and third elements of my analysis from the first element, research design and methodology, must be acknowledged as obvious. Nevertheless, I was interested in finding out the breakdown of these elements and what the trends over the past 5 years are.

3.2.4 *Physiotherapy* Overall Findings

3.2.4.1 Element 1: Research Design and Methodology Type

For this analysis, as described above, I identified MSK OR and looked at whether it was conducted purely quantitatively, purely qualitatively or using a mixture of the two types. There were many different research designs visible in the journal, the most common examples being Cross-Sectional Observational Studies, Randomised Clinical Trials, Randomised Controlled Trials, Surveys, Reliability Studies, Exploratory Qualitative Studies and even a couple of Experimental Animal Studies. I analysed each and allocated them into one of three categories: Quantitative, Qualitative and Mixed Methods.

Table 3.1 illustrates the breakdown of how these three categories are represented in all MSK OR over the 5-year period. Of the 120 total studies included in this analysis, 84 (76%) were quantitative, 18 (17%) were qualitative, and 8 (7%) were a mixture of both methods. Figure 3.4 represents these findings in graphical form.

Table 3.1. Research Method Type, Original MSK research. *Physiotherapy* 2013-2017.

	2013(n)	2014(n)	2015(n)	2016(n)	2017(n)	Total n(%)
Quantitative	15	15	16	14	24	84 (76%)
Mixed Methods	2	1	1	0	4	8 (7%)
Qualitative	1	3	3	6	5	18 (17%)

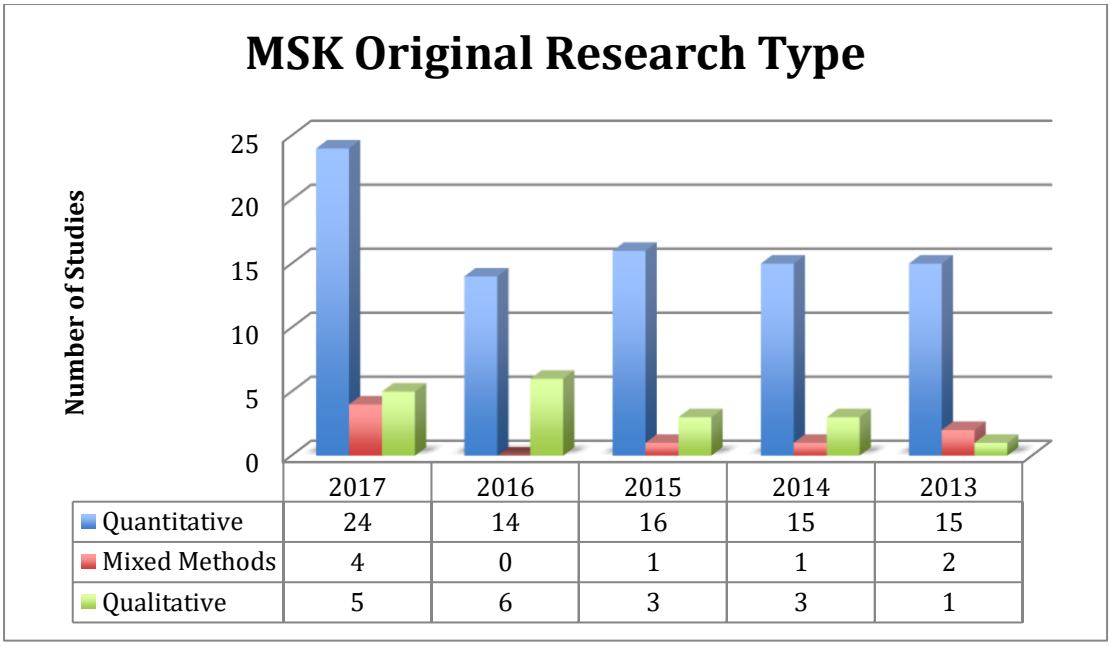

Figure 3.4: MSK Original Research Type 2013-2017.

3.2.4.2 Element 2: Outcome Measures Breakdown

The second aspect of this documentary analysis is drilling into the MSK OR to analyse what OMs the respective researchers and authors have been using to track their participants. The following is what I have found.

Table 3.2 and Figure 3.5 represent the spread of Outcome Measures in *Physiotherapy* over 2013-2017. As can be seen in the chart and graph below, PROMs and Objective Measures are the most common forms of capturing data, being used more than five times more often than the third type of OM and when combined, are presented as evidence over 3.5 times more often than the use of all other measures combined.

Table 3.2 Evidence presented in the form of Outcome Measures in *Physiotherapy* MSK Original Research between 2013-2017.

Evidence Presented	**2017(n)**	**2016(n)**	**2015(n)**	**2014(n)**	**2013(n)**	**Total n(%)**
Patient Reported Outcome Measure (PROM)	35	27	24	22	12	120 (41%)
Objective Measures	14	25	29	13	32	113 (39%)

Researcher Scored Scale	5	7	4	2	3	21 (7%)
Interview	5	4	3	2	1	15 (5%)
Survey	8	1	0	1	3	13 (4%)
Focus Group	5	2	1	1	1	10 (3%)
Observation	0	1	0	0	0	1 (0.3%)

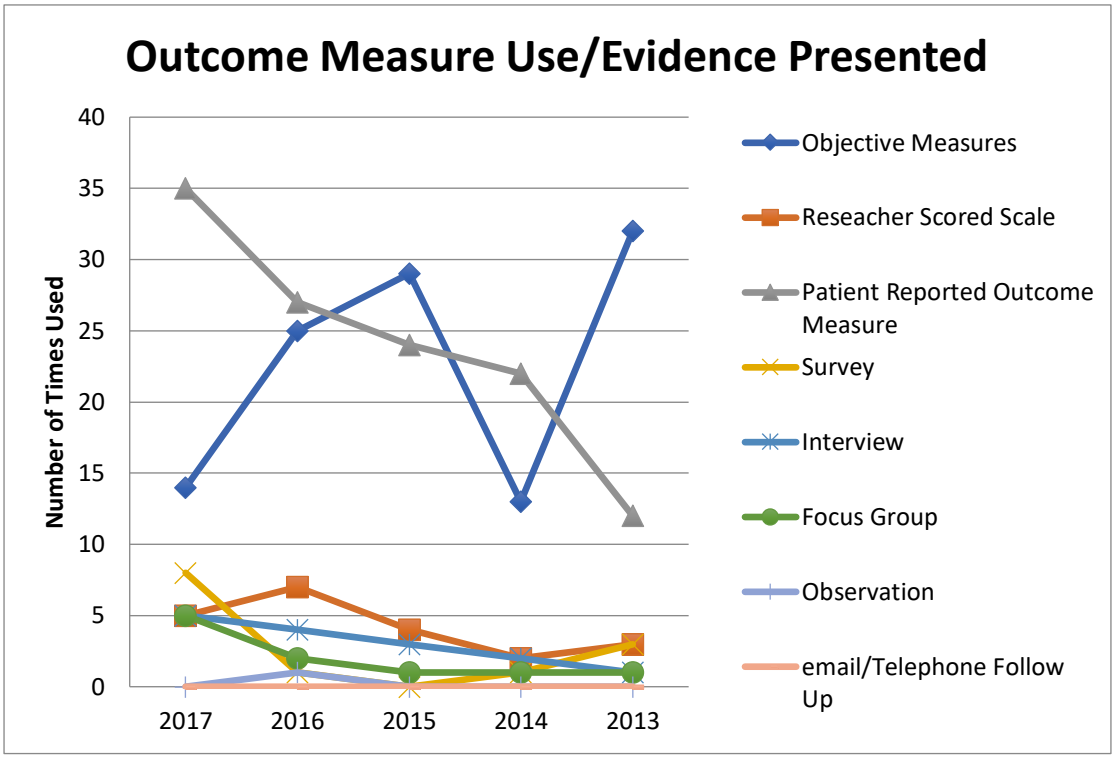

Figure 3.5 Evidence in the form of OMs used in *Physiotherapy* 2013-2017.

The Patient Reported Outcome Measure (PROM) is the most common tool used in *Physiotherapy* between 2013 and 2017 for establishing information about a phenomenon being researched, whether it is patient status measured at one point in time or used to track the effectiveness of an intervention over time, and thus used in a pre- and post- setting. The PROM gives a voice to the patient, the most common type of participant in physiotherapy literature. These PROMs tend to take the same structure, they are patient-reported, or filled in by the patient, usually a physical form, with yes/no, true/false statements, or more commonly, Likert Scales of agreement, with patients reporting how difficult or easy it is for them to complete a task, how much they agree or disagree with a statement that is designed to capture something about their disease or pathology or function or dysfunction. There are many different PROMs in physiotherapy literature, which purport to be the voice of the patient, but make it succinct and easy to convert to numerical form, in order to quantify how disabled

they feel, now much pain they are experiencing, how much stress they perceive or how active they are. Examples in the literature that are frequently used are the Visual Analogue Scale for Pain, The Neck Disability Index, The Roland Morris Disability Questionnaire, Patient Specific Complaints and the European Quality of Life Questionnaire. Table 3.3 breaks down the different PROMS that I have found in the literature.

Table 3.3 PROM Categories used in Physiotherapy MSK OR 2013-2017.

PROM Categories		
Pain (36)	**Functional Status (17)**	**Psychological Coping/Stress/Fear (12)**
VAS x22	Pt-Specific Functional Scale (PSFS) x 2	Tampa Scale of Kinesiophobia x 3
Revised Pain Neurophysiology Quiz x1	Lower Extremity Functional Scale (LEFS) x 1	Fear Avoidance Beliefs Questionnaire (FABQ) x 2
Pain Self-Efficacy Questionnaire x1	Falls Efficacy Scale (FES-1) x 2	Pain Catastrophizing Scale (PCS) x 2
Numeric Pain Rating Scale (NPRS) x4	Physical Function Score SF-16 x 2	Coping Strategies Questionnaire x 2
Brief Pain Inventory (BPI) x1	Activities Balance Confidence Scale (ABC) x 1	Impact of Events Scale (IES) x 1
Pain-Related Self-Symptoms (PRSS) x1	SF-36 x 2	Maslach Burnout Inventory (MBI) x 1
Pain Self-Efficacy Questionnaire (PSEQ) x1	SF-12 x 1	Penn State Worry Questionnaire (PSWQ) x 1
Chronic Pain Self-Efficacy Scale (CPSS) x1	International Physical Activity Questionnaire Short Form (IPAQ-SF) x 4	
Pain Vigilance and Awareness Questionnaire (PVAQ) x1	COOP WONCA Functional Assessment Charts x 1	**Single Measure PROM (7)**
Von Korff Pain Scale x1	Functional Index Questionnaire (FIQ) x 1	Self-Reported Incidence x 2
Illness Perception Questionnaire-Revised-Back Pain (IPQ-R-BP) x 1		Self-Reported Adherence x 1
Health Care Providers Pain and Impairment Relationship Scale (HC-Pairs) x 1	**Spine Specific Scale (16)**	Self-Reported Fatigue x 1
	Quebec back pain disability questionnaire x 1	Patient Satisfaction x 1
Joint Specific Scale (15)	Neck Disability Index (NDI) x 4	Ambulatory Status x 1
Constant-Murley Score (CMS) Shoulder Dysfunction x 1	Roland Morris Disability Questionnaire (low back pain) x 5	Number of Injuries x 1
Disabilities of the Shoulder Arm and Hand (DASH) x 2	Northwick Park Questionnaire (NPQ) Neck pain x 1	

Shoulder Pain and Disability Index (SPADI) x 3	Oswestry Disability Index (ODI)(Low Back Pain) x 4	**Other (13)**
Non-Arthritic Hip Score x 1	Cervical Spine Outcomes Questionnaire (CSOQ) x 1	Global Subjective Outcome Scales (GSOS) x 1
Hip Outcome Score/Scale (HOS) x 1		Borg Scale x 5
Foot & Ankle Computerized Adaptive Test x 1	**Pathology Specific Scale (4)**	Patient Specific Complaints (PSC) x 1
Western Ontario McMaster University Osteoarthritis Index (WOMAC) x 4	Ankylosing Spondylitis Quality of Life Questionnaire x 1	Global Perceived Effect x 2
Saudi Knee Function Scale (SKFS) x 1	Bath Ankylosing Spondylitis Functional Index (BASFI) x 1	European Quality of Life Instrument (EQ-5D) x 2
Oxford Hip Score (OHS) x 1	Bath Ankylosing Spondylitis Disease Activity Index (BASDAI) x 1	Work related behaviour and experience patterns questionnaire (AVEM) x 1
	International Consultation on Incontinence Questionnaire (ICIQ-SF) x 1	General Self-Efficacy Scale (GSE) x 1

In total, there were 120 uses of 62 different PROMs by researchers published in *Physiotherapy* between 2013 and 2017. The different categories of PROM that I could see are outlined in Table 3.3 above. They vary from trying to capture pain, to measure functional status, derive a measure for spine function, joint-specific function, or capture stress, behaviours, activity or effort during a task. PROMs are interesting because they are completed by the patient/research participant, in the attempt to give them ownership of their subjective view or feeling about themselves and they include a psychological dimension to assess psychological experiences as well as functional status. For ease of research purposes, they have all been distilled into the most useable form of data: numbers and scores.

The Objective Measure is probably the simplest to capture and calculate. It is a piece of data taken by a suitable piece of equipment, measuring something about that human participant (there are two instances of animal subjects) in objective form. I found many different types of objective measures but common examples are muscle strength, joint mobility, jump height, sprint speed, number of out-patient visits, grip strength and blood pressure. Table 3.4 lists the different objective measures that I have found in the literature.

Table 3.4: Objective Measures Used in *Physiotherapy* MSK OR 2013-2017.

Muscle/Joint (29)	**Functional Score (29)**	**Gait/Stance/Balance (14)**
Muscle Electrical Activity x 4	Reach Distance (cm)	Centre of Pressure
Muscle Size (mm) x 6	Timed Up and Go(min) x 5	Sway on FP
Ms Strength x 7	6 Minute Walking Test(m) x 5	Balance
Joint Range Of Movement x 9	10 Minute Walking Test	Posture Measures
Speckle Tracking Analysis Findings	Intermittent Shuttle Walking Test x 2	Spatiotemporal, kinematic angles, kinetic Kg/Nm x 3
Leg Power	Grip Strength x 4	Joint Proprioception
Limb volume	9-hole peg test	Gait Speed x 2
	Functional Position (prayer test)	Number of Turns
Behaviour Logistics (9)	Light Tough Perception	Direction of Turn
Counts of appointments	Energy Expenditure	Gait Step Length
Time to appointment	Sit To Stand x 2	Gait Step Height
Non-attendances	Step Down Test x2	
Length of Stay x 2	Sit & Reach	**Blood Related Tests (12)**
Actual Discharge Destination	Back Scratch Test	Reactive oxygen species (ROS)
Class Attendance Data	Ito Shirado Endurance Test	Lipid peroxidation (LPO)
Home Practice Data		Creatine kinase (CK)
Number of Web visits/searches	**Objective Pain (5)**	Lactate dehydrogenase (LDH)
	Pain Pressure Threshold x 5	C-reactive protein (CRP)
Lung Function Tests (2)		Aorta Diameter
Spirometry	**Anthropometrics (12)**	Peak Systolic Velocity
Oxygen Saturation	Heart Rate x 5	End Diastolyic Velocity
	Body Mass Index x 2	Resistive Index
Other (1)	Blood Pressure x 2	V02/Gas Analysis
Vaginal Pressure	Body Weight Change	Blood Lactate
	Anthropometrics	Anti-oxidant capacity against peroxyl radicals (AC-AP)
	Limb Girth Circumference	

In total, there were 113 uses of 63 different Objective Measures by researchers published in *Physiotherapy* from 2013 to 2017. The main categories of those Objective Measures, as seen in Table 3.4 above are Muscle or Joint Measures, Functional Score Measures, Measures of Gait, Stance or Balance, Blood-Related Objective Tests, Anthropometric Scores and Objective Measures of Behaviour.

The Objective Measure is seen in all traditional scientific research. It suits the experimental nature of measuring an inanimate world. Once the researcher has a suitable piece of equipment, the objective measure is fairly straightforward to collect. Some Objective

Measures, like blood test measures, lung function tests, heart rate and blood pressure use well-established medical devices, for example heart rate monitors, blood pressure monitors and spirometers to collect their numerical or categorical data. Many of the behaviour logistics that have been used are simple counts of how many times or how many days a phenomenon occurred. The same is true of some of the functional and gait tests, where the time it takes to rise from a seat, walk a set distance and return is the simple objective measurement using a stopwatch. Where the objective measure suffers in terms of scientific objective purity is the attempt to measure joint range of movement and muscle strength. These are almost always done in a seated or lying position, with joints above and below the one being tested controlled in order to target one joint in one plane or one muscle (group) in one concentric or isometric phase. Human function does not work in such isolation and so these objective measures as evidence of what is happening are very distorted. Apart from this issue with muscle and joint function, the Objective Measure is clean and repeatable and once you trust your equipment is easy to capture.

Researcher Scored Scales are outcome measures when the researcher, usually a physiotherapist with experience and expertise in an area, will observe and make a judgement on their participant's ability to perform a task, or the quality of their movement during a task. They were used 21 times over the 5-year period.

Surveys are fairly self-explanatory as an OM. There were 13 instances over the 5-year period where surveys were used, most of which were national, and most of which were administered online. Surveys are an example of data collection procedures that could have been quantitative or a mixture of both quantitative for the closed questions, and qualitative for the open questions.

Interview and focus group findings are forms of OMs, or methods of capturing data in the form of participant's words. There were 15 Interviews and 10 Focus Groups visible as OMs in all of the 110 MSK OR pieces published in *Physiotherapy* in my audit between 2013 and 2017.

In the same category of qualitative research, there was one Observation used as a method in 2016.

3.2.4.3 Element 3: Data Analysis Breakdown.

For the third section of the documentary analysis, I examined the data analysis strategies used in MSK Original Research. As outlined previously, once it was clear that most studies were quantitative, using objective measures or quantitative PROMs, then there would also be a quantitative strategy for analysis of data. Nevertheless, an examination of the data analysis strategies that have been used in *Physiotherapy* over the past 5 years should reveal the extent of the research orientation. The task proved challenging, as the array of statistical tests was wide. Most studies used more than one method of analysing their data, for example, beginning with descriptive statistics and then running some statistical tests of association or comparison in the statistical software package Statistical Package for the Social Sciences (SPSS). I created 5 categories of data analysis strategies that are reflected in the journal articles I read. This consisted of grouping different tests into one of the following categories:

- Descriptive Statistics
- Association Statistics
- Comparison of Means Statistics
- Other Numerical Statistics and
- Qualitative Transcript Analysis.

Four of these categories analyse numbers and one analyses words.

I made a decision to count the instances in a particular way, based on my interpretation of the choices the researcher had to analyse their data. If a study used three different tests of association on their data, I counted that as one use of Association Statistics. If that study used descriptive statistics, tests of association and a test of comparison of means in their analysis I counted that once in each of the categories, so it appears three times.

The ‘Descriptive Statistics’ Category consisted of any calculation and presentation of Mean, Median, Inter-quartile Ranges or Standard Deviations.

The ‘Association Statistics’ Category consisted of calculations, usually using SPSS of Chi-squared, Inter Class Coefficients, Pearson’s Correlation, Spearman’s Correlation, Odds Ratio, Regressions, Univariate and Bivariate analysis, Effect Size (Cohens D), Kappa Statistics (Cohens Kappa), Polychloric Correlation Matrices, Cronbach’s Alpha, Bland-Altman Plots and Fishers Exact 2x2 Contingency Analysis.

The ‘Comparison of Means Statistics’ Category consisted of calculations, again mostly using SPSS of T-Tests, Analysis of Variance (ANOVA), Analysis of Co-Variance (ANCOVA), General Linear Model Repeated Measure, Mann-Whitney, Wilcoxon Sign Ranks, Kruskal Wallis, Friedman’s Test, Pitman Test and Factor Analysis.

The Category of ‘Other Statistical Tests’ was made up of statistical tests that were used in the original MSK research that did not fit in the previous three categories. The tests here were Intention to Treat Calculations, Minimal Clinically Important Difference, Minimal Clinically Important Change, Isotemporal Substitution Analysis and Mapping Exercises between subgroups.

The last subgroup I created was the ‘Qualitative Transcript Analysis’, which consisted of the analysis of transcripts, either from interviews or focus groups and the strategies described in the literature were Thematic Analysis, Framework Analysis, Content Analysis and 4-stage IPA analysis.

The data analysis strategies for the journal articles that I analysed are as follows in Table 3.5 and Figure 3.6.

Table 3.5: Data Analysis Strategies for MSK Original Research in *Physiotherapy* 2013-2017

	2013(n)	2014(n)	2015(n)	2016(n)	2017(n)	Total n(%)
Numbers Associations Statistics	12	10	12	17	17	68 (36%)
Numbers Comparison of Means Statistics	13	8	9	10	10	50 (26%)
Numbers Descriptive Statistics	11	4	3	9	9	36 (19%)
Words Qualitative Transcript Analysis	3	4	3	6	6	22 (12%)
Numbers Other	0	0	0	7	7	14 (7%)

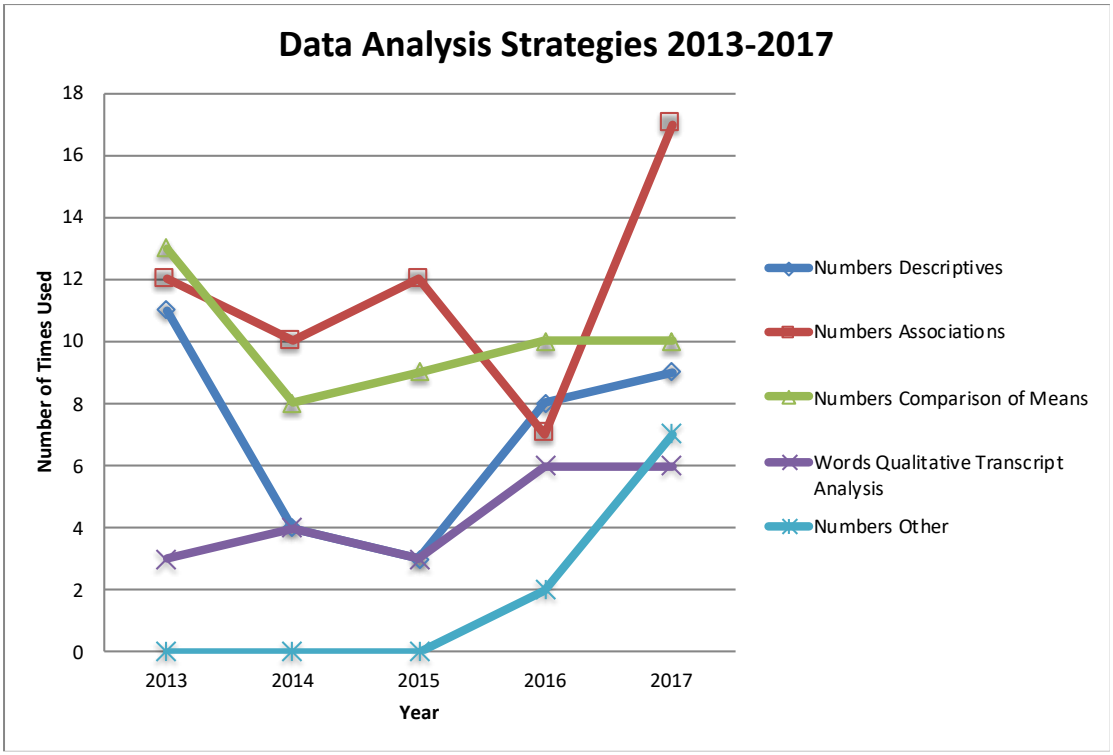

Figure 3.6 Data Analysis Strategies between 2013-2017 in *Physiotherapy* MSK Original Research.

Again, I must stress that these numbers have had a layer of interpretation imposed upon them. If a study used three different types of data analysis, from three separate categories in its research, each one was counted in the specific category. As can be seen in Table 3.5 and Figure 3.6 above, the dominant forms of data analysis were statistical tests of associations, looking for strength of relationships between variables, and comparisons of means, looking for differences between variables. Because most of the studies were quantitative in nature, using quantitative outcome measures, it follows logically that most of the data analysis techniques are statistical tests that produce probability values (p-values) for use in providing evidence for the value of the intervention, treatment or phenomenon under study. These tests are traditional statistical analysis tests that run the numbers and provide p-values which effectively make the decision whether there is a significant effect, association or difference between variables, as collected by the Outcome Measures. Once a researcher has her/his p-value, and significance is set at 0.05, or a 95% confidence interval, then the job is done. This is a very objective black or white version of answering a research question, where 95% of the sample has shown the effect, association or difference. The 95% threshold is extremely high and difficult to attain but is undoubtedly the dominant form of data analysis on show in MSK OR in this journal.

There were a number of tests that did not fit into the first three categories, (association statistics, comparison of means statistics and descriptive statistics), and all of them were found in the two most recent years. These tests include 'intention to treat analyses' and 'detection of the minimal clinically important change/difference', of a patient population. These tests are slightly outside the traditional norm and represent the solution to a specific clinically led research question, giving information to the clinician about the grey areas of what is useful to know, as opposed to the black and white answer from a p-value. These tests give the reader information on what may be clinically significant, existing below the confidence interval of 95%, as opposed to what is statistically significant, at or above the 95% threshold.

It was no surprise to see that qualitative data analysis of transcripts or open questions from surveys is the least utilised form of analysis undertaken by authors of MSK OR. Because qualitative research is much less common compared to quantitative, then it is to be expected that the data analysis trends match that representation.

3.2.5 Trends Visible in the Analysis of *Physiotherapy*

One trend that became discernible after embedding myself into this process was how there was an inverse relationship between the use of PROMS and Objective Measures, see Figure 3.7.

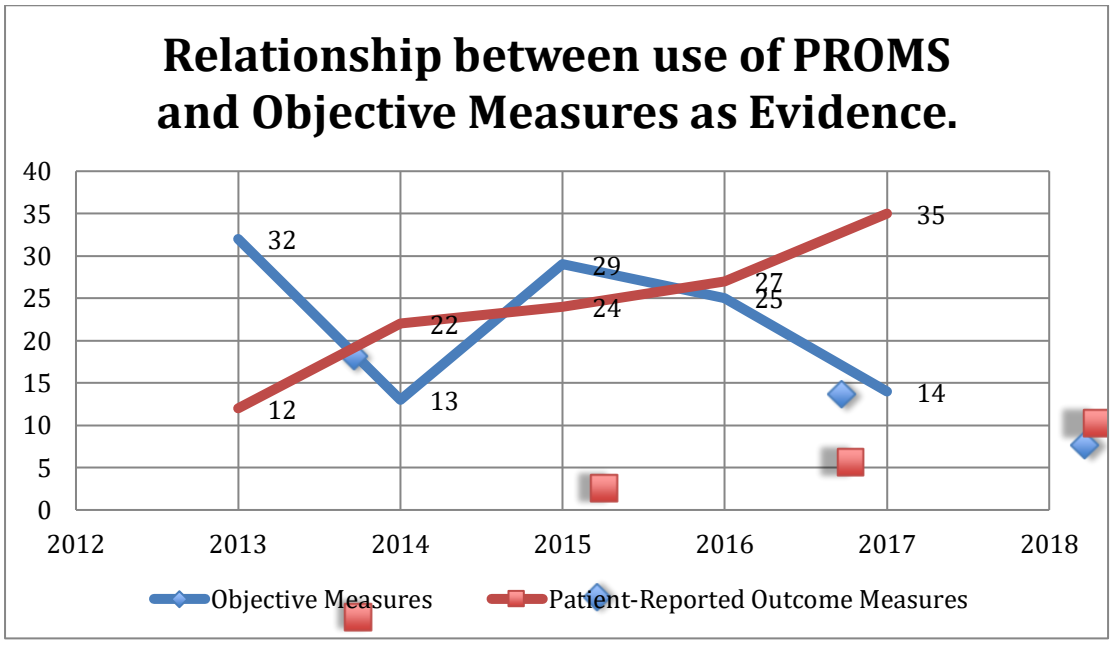

Figure 3.7: The Relationship between the use of PROMs and Objective Measures between 2013-2017.

The use of Objective Measures in MSK OR is declining, from 32 uses in 2013, to 14 in 2017. There is an inverse relationship with the use of PROMs, which have increased in their usage, from 12 in 2013, to 35 in 2017. It is interesting to wonder if this trend reflects changes in research thinking and design over this time? It seems that the patient voice is stronger, albeit a voice that can be reduced to a single score or number.

Another trend is the emergence of new way of analysing data. In the latter 2 years of my analysis of all the MSK OR in *Physiotherapy*, newer tests called Intention to Treat Analysis, and Minimal Clinically Important Difference or Change (MCID, MCIC) appear. This is an interesting observation, because it seems that there is a trend away from tests that produce p-values and state that a finding is statistically significant or not. These traditional statistical tests (associations and comparisons of means) follow rules based in epidemiological ideals (Sackett et al, 1997), where in order to be without doubt, 95% of the sample must have the same change or trend before the researcher can state that the finding is significant. The fact that there were no uses of the newer tests between 2013-2015, two in 2016 and six in 2017 is interesting. Perhaps the physiotherapy researchers are beginning a move away from the dominance of the p-value, into tests that suit human cohorts, where clinical significance may be different from scientific statistical significance? In a clinical situation, the diversity of individuals means that what may work for one patient may not work for another seemingly identical problem. This may be reflected in these newer ways of data analysis. This may also indicate the emergence of better clinical research questions, where the audience for the research is not as concerned with statistical significance, knowing their diverse patient populations, but interested in clinical significance and likelihood instead.

I have also conducted a year-by year analysis and have included it as Appendix E: *Physiotherapy* Journal Year by Year Analysis.

3.2.6 *Physiotherapy Practice and Research* Journal: 2013-2017

Having examined and analysed the official journal of the British Society of Chartered Physiotherapists, *Physiotherapy*, I also wanted to consider the Irish equivalent journal, which is *Physiotherapy Practice and Research* (PPRJ).
Physiotherapy Practice and Research is the official journal of the Irish Society of Chartered Physiotherapy (ISCP), and is a younger journal compared to *Physiotherapy* and operates on a smaller scale. It is currently on Volume 42 in 2021, with back issues online to Volume 30 from 2009. It is probable that Volume One dates from 1979, but I cannot verify this (IOS Press, 2022). It Physiotherapy Practice and Research is the ISCP's peer-reviewed clinical journal, published biannually in June and December. It identifies itself as an international, peer-reviewed journal that '*aims to advance physiotherapy practice and research through scholarly publication'* (IOS Press, 2022). With a clinical focus it publishes material in order to '*improve the evidence base for physiotherapy and assist physiotherapists in the management of their patients. Contemporary physiotherapy practice incorporates a diverse range of activity and the journal aims to support physiotherapists, and publish material, from all areas of practice, be that the clinical setting, education, research or management.'* (IOS Press, 2022)

According to the website of the Irish Society of Chartered Physiotherapists and as is visible in the journal issues, the editorial team headed by Dr Orlagh O' Shea from Royal College of Surgeons in Ireland School of Physiotherapy, welcomes submissions in the form of original research papers, critical reviews (systematic or state-of-the-art papers), case studies, editorials, expert commentaries and book reviews. Letters to the editor are also welcome and it occasionally commissions focussed or clinical reviews in areas of interest. Physiotherapy Practice and Research also aims to foster research capacity within the profession and as such supports and encourages submissions from new researchers. It has a wide range of authors and is an established avenue for research publications from Ireland's six physiotherapy schools in UCD, TCD, RCSI, UL, UCC and UU.

Every member of the Society, which is the vast majority of those eligible to become a chartered physiotherapist in Ireland, gets a free hard copy of each issue and can access the archive via the membership website. For this reason, it is seen as an influential journal, one that every chartered physiotherapist in Ireland is familiar with. It is therefore interesting and

useful to examine the type of research it publishes, promotes and disseminates to its members in Ireland.

Following on from the UK journal analysis, I wanted to see what Irish physiotherapy research looks like in terms of knowledge types it represents, its epistemological preferences and the ideological stances it takes. From this exercise I intended to display what evidence is presented as valid and useful to the reader, the Irish physiotherapist. To that end, I have conducted an analysis of *Physiotherapy Practice and Research* over the 5 years from 2013-2017. The data analysis followed the same format as for the *Physiotherapy* journal; including only musculoskeletal original research (MSK OR), excluding non-original research, such as commentary, letters to the editors and debate papers.

The three areas of focus were also identical: Research Design and Methodology utilized, Outcome Measures presented as Evidence, and Data Analysis Strategies employed.

3.2.7 *Physiotherapy Practice and Research* Overall Findings

3.2.7.1 Element 1: Research Design and Methodology Type

From a total of 83 studies published, 38 (46%) were MSK original research.
Of those 38 studies, 31 (75.6%) used wholly quantitative methodologies, 4 (9.7%) used mixed methods and only 3 (7.3%) used qualitative methods. See Table 3.6 and Figure 3.8

Table 3.6 Research Method Type, MSK OR *Physiotherapy Practice and Research* 2013-2017.

	2013(n)	2014(n)	2015(n)	2016(n)	2017(n)	Total n(%)
Quantitative	5	5	8	7	6	31(76%)
Mixed Methods	1	1	0	1	1	4(10%)
Qualitative	1	0	1	0	1	3(7%)

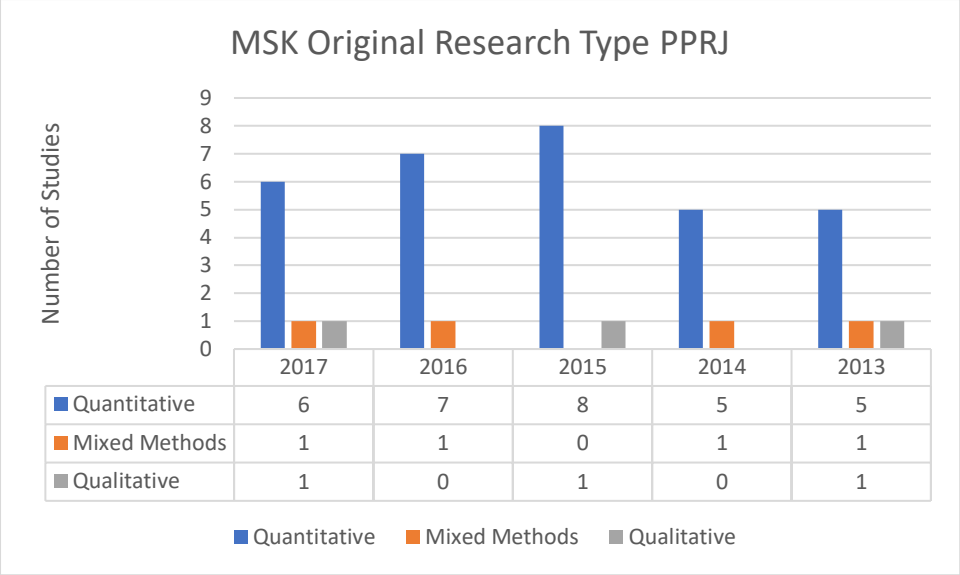

Figure 3.8: MSK Original Research Type 2013-2017

3.2.7.2 Element 2: Outcome Measures Breakdown

From a total of 100 OMs used, 51 were Objective Measures, 28 were PROMs, 10 were Researcher-Reported Scales, 6 were Surveys and 5 were Semi-Structured Interviews. No Focus Group Data or Observations were used as Outcome Measures in this journal during this period. See Table 3.7 and Figure 3.9.

Table 3.7 Evidence presented in the form of Outcome Measures in *Physiotherapy Practice and Research* MSK OR between 2013-2017.

Evidence Presented	**2017(n)**	**2016(n)**	**2015(n)**	**2014(n)**	**2013(n)**	**Total n(%)**
Objective Measure	13	11	12	7	8	51 (51%)
Researcher Scored Scale	1	1	4	3	1	10 (10%)
Patient Reported Outcome Measure	3	3	5	8	9	28 (28%)
Survey	1	1	2	2	0	6 (6%)
Semi-Structured Interview	2	0	1	0	2	5 (5%)
Focus Group	0	0	0	0	0	0 (0%)
Observation	0	0	0	0	0	0 (0%)

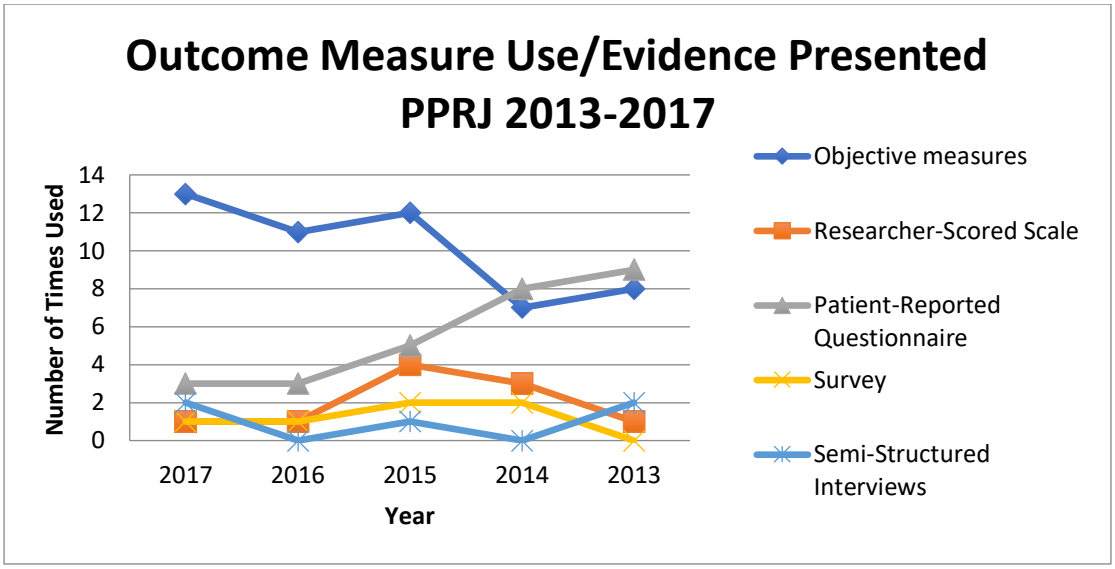

Figure 3.9 Evidence in the form of OMs used in *Physiotherapy Practice and Research* 2013-2017

3.2.7.3 Element 3: Data Analysis Breakdown

From a total of 68 different data analysis techniques applied to the data, Associations, Comparisons of Means and Descriptive Statistics were evenly split. Qualitative Transcript Analyses were only used 7 times, or 10% of the time. The 'Numbers-Other' category was least utilized. In the numbers versus words considerations, analysis with and through numbers accounted for 90% of the data analysis techniques used in this journal from 2013-2017. See Table 3.8 and Figure 3.10.

Table 3.8: Data Analysis Strategies for MSK OR in *Physiotherapy Practice and Research* 2013-2017.

Category	**2017(n)**	**2016(n)**	**2015(n)**	**2014(n)**	**2013(n)**	**Total n(%)**
Numbers Descriptives	2	4	5	5	2	18 (27%)
Numbers Associations	5	3	6	3	3	20 (29%)
Numbers Comparisons of Means	2	5	5	3	4	19 (28%)
Words Qualitative Transcript Analysis	2	1	1	1	2	7 (10%)
Numbers Other	2	1	0	0	1	4 (6%)

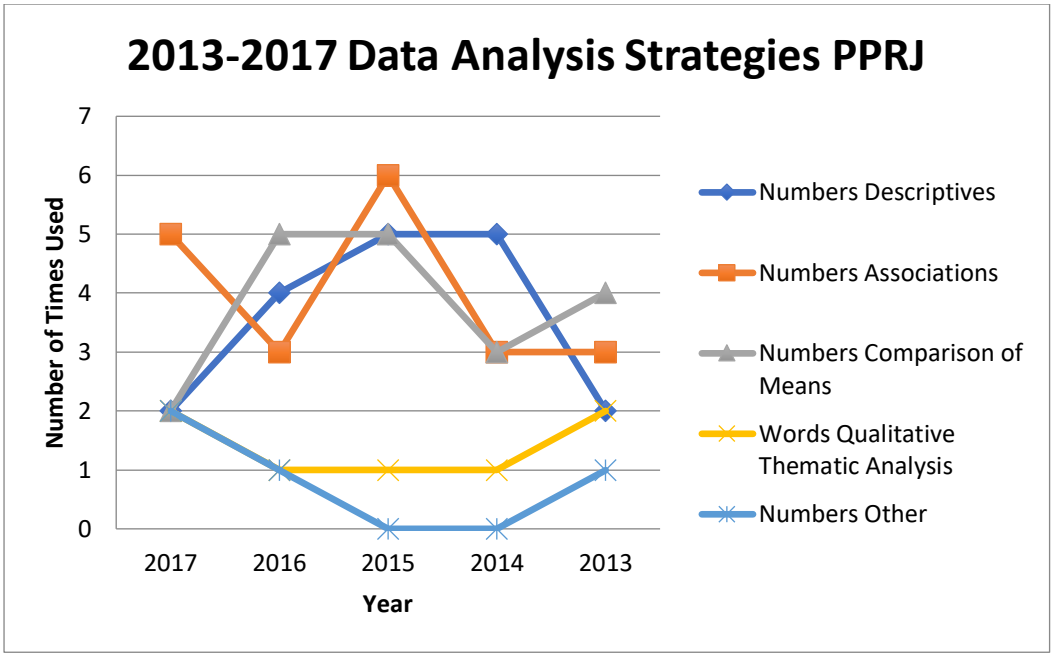

Figure 3.10 Data Analysis Strategies between 2013-2017 in *Physiotherapy Practice and Research* MSK Original Research.

For year-by year data please see Appendix F: *Physiotherapy Research and Practice* Year-by-Year Analysis.

3.2.8 Trends Visible in the Analysis of PPRJ

This exercise has been very useful to see how the MSK OR in this journal is framed for and presented to an Irish audience. The dominant type of methodology is a quantitative one, with the researchers measuring their participants. As with many sciences-led research studies, those participants are referred to in the article text as subjects. Those subjects are usually patients, and a lot of the measurements are objectively measured with a device like a dynamometer which measures muscle strength, a tiltmeter or goniometer which measures joint range of motion, a distance measurement device for measuring tiny differences on a structure in an MRI picture or measuring distance achieved in a functional hop or jump. An EMG machine is employed to measure muscle activation, injuries are counted, stopwatches are used to measure the time to perform a task, or time to fatigue, or balance time. Medical records are checked for time to discharge, BMI is measured, Instances are recorded if orthopaedic tests reproduce pain.

The other dominant outcome measure seen over the past 5 years is the Patient-Reported Outcome Measure (PROM). There are very many different ones, all devised for specific populations of patients as a way of measuring their function, their pain and their ability or

disability. Examples are numerous, including the Pregnancy Mobility Index (PMI), Roland Morris Disability Index (RMDI), Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Brighton Score, and Tampa Scale of Kinesiophobia. For all of these outcome measures, as with what I saw with the *Physiotherapy* Journal analysis, the patient fills in a questionnaire, usually a Likert scale, which devises a score, or allocates them to a category for statistical analysis.

There were only 3 fully qualitative studies published in the past 5 years in MSK OR for Irish chartered physiotherapists. This is reflected in the low use of semi-structured interviews as a means to gather data and information in physiotherapy research. Focus groups are not visible at all as a means of collecting evidence. The other branches of physiotherapy (neurology, respiratory, paediatrics) are not publishing qualitative research either, save for a couple of examples every other year.

3.2.9 Literature Analysis Conclusions

3.2.9.1 Re-Cap of Main Findings

In *Physiotherapy*, 120 total MSK OR studies included 84 (76%) quantitative, 18 (17%) qualitative, and 8 (7%) mixed methods designs. In *Physiotherapy Practice and Research* there were 41 MSK OR studies included and 31 (75.6%) used wholly quantitative methodologies, 4 (9.7%) used mixed methods and only 3 (7.3%) used qualitative methods. In *Physiotherapy*, PROMs (n=120) and Objective Measures (n=113) are the most common forms of capturing data, being used more than five times more often than the third type of OM and when combined, are presented as evidence over 3.5 times more often than the sum of all other measures. The qualitative OMs that are interviews, focus groups and ethnographic observations together totalled only n=26 (8.3%). In *Physiotherapy Practice and Research*, from a total of 100 OMs used, 51 were Objective Measures, 28 were PROMs, 10 were Researcher-Reported Scales, 6 were Surveys and 5 were Semi-Structured Interviews. No Focus Group Data or Observations were used as Outcome Measures in this journal during this period.

In both journals, the data analysis techniques fit mostly into the three categories of statistical analysis of; associations, comparisons of means or descriptive statistics. Data analysis with and through numbers was the preferred method 88% of the time in *Physiotherapy*, and 90% in *Physiotherapy Practice and Research* from 2013-2017.

3.2.9.2 Knowledges and Epistemologies Visible.

For this particular sample of MSK OR in these two journals, the research in the revolves around a quantitative objective research design and methodology. This type of research mirrors a positivist approach to knowledge. Knowledge created this way is entrenched in biomedicine and is interested in developing propositional (Eraut 1985) or codified knowledge. This type of knowing about what we do in our work, does not put much emphasis on depth of understanding, but rather on repeatability, validity and reliability of the research testing, with very little room for the full extent of the patient and physiotherapist experience. The institutions of scientific research are strong, and the room for interpretivism in this sample is very small. We spend a lot of time in one-on-one situations with our patients, talking to them, guiding them, listening to them, touching them, coaching them and thinking about them. Why do we not reflect that in our research? Qualitative-derived evidence for consideration in practice does not appear very often in this particular sample in these journals. Evidence that is visible in these journals from MSK OR only seems to come in the form of statistically significant X is better than Y, or more likely, X is no better than Y or the control, so neither is advocated as being particularly useful in your practice.

There is a dominance of one way of doing research that is obvious from this documentary analysis exercise. The MSK OR published in both of these journals is interesting, useful and very well conducted. I do not mean to undermine it, rather argue that it represents only a very narrow aspect of the physiotherapists' scope of practice and does not lend itself to easy translation into EBP for the clinician. The E, evidence, in EBP seems to only mean one type of knowledge, while knowledge that could engage craft knowledge (Higgs & Titchen, 1995), practice knowledge (Higgs & Titchen, 2001) and practice wisdom (Higgs, 2012, Higgs, 2019) remain absent. It is difficult to describe tacit, intuitive, personal and craft ways of knowing in physiotherapy practice. It is even more difficult to capture those ways of knowing. This difficulty with capturing and describing these other ways of knowing may explain the relative absence of anything other than technical scientific methodologies. Or there may be an inherent bias in favour of generating knowledge that positions physiotherapy firmly in the sphere on medicine and science. The power of the EBP movement may work to coerce researchers into appealing to the normalcy of medico-scientific research practices. Following epidemiology gold standards and routinely seeing them on top of the evidence pyramid makes the physiotherapist researcher conform and

discipline their research to those standards (Crosbie, 2013). As the Episteme is situated firmly in EBP, the propagation of other ways of thinking, researching and practicing is limited (Foucault, 1972).

I wonder if research ideas and questions fall away because they do not fit the model being presented in these particular journals? Is there a cache of research that never gets done because there is no way of conducting it within the norms established and reported on in these journals? Subjectivity and reflexivity in research study design does not appear in the exercise that I conducted, while suggests that it must appear elsewhere. There are many physiotherapy journals and many more in the fields of sports medicine, medicine, movement, health and wellbeing. Analysis of more sources would be very useful to give more context, to specifically seek out sources of non-propositional knowledge and to acknowledge the scholarship of tacit knowledge but was outside the scope of this enquiry.

Chapter 4 – Epistemology in Physiotherapy Literature: Contenders for Status as Legitimate Knowledge

4.1 Introduction and Context

There are different contenders for knowledge claims in physiotherapy, from the propositional domain as well as the non-propositional domain of experiential and craft knowledge, much of which is tacit. In the current climate to be a contender for acceptance as legitimate knowledge in physiotherapy, that knowledge will invariably be appraised by the amount and nature of evidence available to support it and justify it as a legitimate belief. The requirement for evidence leads to evidence-based practice (EBP), a concept in physiotherapy that has become dominant in the last two decades and is accepted in the profession as being logical, useful and indicative of respectability. Evidence based practice uses evidence to inform decision making for the practitioner, providing structure and focus about the most appropriate therapy choices (Veras et al, 2016). Many physiotherapist clinicians do not question EBP, accepting it as a positive force to improve quality of patient care, striving to take us forward as a profession and developing our practice for the better (Herbert et al, 2011; Scurlock-Evans et al, 2014). The existence of EBP is a cornerstone of all professional identity (Hoyle, 2001), by no means unique to physiotherapy, but the legitimacy and science identity is strong in this profession (Nilsen & Bernhardsson, 2013).

Foucault's Archaeology of Knowledge (1972) focussed attention on how human knowledge is locked in an intimate relationship with power. In this book he encourages attentiveness to how knowledge is collected, the conditions that give rise to knowledge, and how the knowledge-power duality changes over time. Physiotherapy knowledge is based on knowing how to help our patients recover from injury and illness and navigate through disability with physical treatment and rehabilitation. Borrowing from Foucault's archaeology of knowledge (1972), how we go about gathering this knowledge and validating it in current times may be a direct result of dynamics of power in the allied health field. Foucault's archaeology is concerned with describing the transformation of the conditions that determine what counts as knowledge, for example, what is legitimate and scientific enough to be considered as part of the body of physiotherapy knowledge. As physiotherapy seeks information on useful treatments, research, testing, and evidence gathering is conducted. This process of evidence gathering is considered to be hugely beneficial for patient care and in the

profession generally (Herbert et al, 2001, Foster et al, 2001), helping to '*progress the profession's approach to developing, using and promoting research and its contribution to generating new evidence, knowledge transfer and service improvement' (*CSP, 2022). EBP is the concept that shapes knowledge formation across many different disciplines. As discussed earlier, having a scientific body of knowledge that is validated academically is a condition of the professionalisation process (Hoyle, 2001; Houle et al, 1987). If the conditions that determine what counts as knowledge can be analysed, then the pursuit of professionalization is one of the reasons EBP has been elevated.

EBP is entangled in certain epistemologies, both explicit and implicit, tending to represent a way of finding and demonstrating truth in physiotherapy. The following section intends to explore the ideological development of EBP, and the types of epistemologies it represents as well as the structures of power it springs forth from and reproduces in the profession. I have organized different contenders as legitimate sources of knowledge into those that can lean into evidence for justification and can become propositional and those that do not or cannot.

4.2 Knowledge Supported by Evidence

4.2.1 Historical Contexts of EBP

It began in medicine. Evidence-Based Medicine (EBM), though appearing occasionally in medical literature in earlier decades, is a term associated with a movement that began in the early 1990s (Guyatt, 1991), and can be defined as "*the process of systematically finding, appraising and using contemporaneous research findings as the basis for clinical decisions*" (Evidence-Based Medicine Working Group, 1992). EBM was developed to be used as a tool for doctors, necessary for them to improve their decision-making. It was intended to help medics move from expert opinion and anecdote, seen as unreliable and potentially dangerous to patients, towards interpreting and utilizing evidence in the context of different individual patient's problems, seen as providing better and safer outcomes for patients. The idea is that research, especially the strong rigorous studies, produces evidence and the practitioner can use this evidence as a guide to inform clinical decisions and practices (Guyatt et al, 1992).

The movement towards EBM has grown exponentially since the early days and EBM is now taught throughout the world's medical schools. EBM was driven by a group of medical epidemiology researchers, the most recognizable being David Sackett (Sackett, 1995; Sackett

and Rosenberg, 1995; Sackett et al, 1996; Sackett et al, 1997). Epidemiologists blend medicine and science to study disease characteristics in large defined populations and are focussed on risk factors to public health. They use large subject numbers to detect incidences and prevalence, tracking disease in populations using big data sets. In an attempt to provide strong critical validation of research, the randomized controlled trial (RCT) and the systematic review were promoted as being the tools of greatest value in medical investigation. Coupled with objective measurement of large cohort numbers, RCTs use statistical analysis to evaluate the effectiveness of a treatment technique or approach. This particular methodological approach to research fits well with the epidemiology background of these early proponents like Sackett. They felt strongly that this type of research should be used in medical decision making.

> *Because the randomized trial, and especially the systematic review of several randomized trials is so much more likely to inform us and so much less likely to mislead us, it has become the "gold standard" for judging whether a treatment does more good than harm.* (Sackett et al 1996:72)

From EPM came EBP, evidence-based practice; *'the integration of best research evidence with clinical expertise and patient values*' (Sackett et al, 1996:71). EBP filtered into the allied health professions, such as physiotherapy in the late 1990s, the purpose of which was to align with the medical model of legitimizing management choices for patients in the evidence, and base clinical decisions on evidence. EBP for physiotherapy is described as "*open and thoughtful clinical decision making*" which integrates the "*best available evidence with clinical judgement*" (Haynes et al, 1996) and the patient/ client's preferences and values, in order to realise outcomes for patients and their quality of life (Jewell, 2014:12). For the physiotherapist, this means choosing the best treatment for the specific problem and administering it based on what the evidence says about the correct amount of volume and duration, frequency and pressure. Definitions of EBP leave room for clinical expertise and judgement from the therapist, but the search for the 'evidence' portion of EBP has become important (Guyatt et al, 2008). Since the introduction of EBP around the turn of the twenty first century, physiotherapists have increasingly been using current research-based information for their clinical reasoning and decision-making in the care of individual patients (Law, 2002; Rushton et al, 2011). This is seen by some commentators as a paradigm shift, having led to the introduction and adoption of a whole set of new values, techniques, and

beliefs in physiotherapy distinctly different from those present before its introduction (Kerry et al, 2008; Van Trijffel et al, 2019).

As a result of the changes coming from medicine, commentators have acknowledged the growing pressure on physiotherapy to embrace EBP (Grimmer-Somers, 2007; Dannapfel et al, 2013). It is seen in a very positive light, seeking to improve the physiotherapist as a practitioner, because engaging with both research and the resultant clinical findings can enhance the proficiency of physiotherapists' clinical practice and help prevent the misuse, overuse or underuse of healthcare services (Kumar et al, 2010), ultimately improving the quality of patient care (Herbert et al, 2001). Within the context of how EBP became a marker of professionalisation it is justified as a paradigm of thinking. It provides many logical benefits including '*the only potentially unbiased effects of therapy - those derived from carefully conducted clinical research'* (Herbert et al, 2001: 201). Developing a robust evidence base to inform patient care is seen as an ultimate goal (Rushton et al, 2011) for physiotherapy, and the profession has willingly and quickly adopted EBP.

It is important to consider what physiotherapy was like before EBP. As I have written in chapter three, physiotherapy developed historically from three fundamental pillars of massage, electrotherapy and exercise therapy. If one stood back and analysed physiotherapy practice pre-EBP, one would see a lot of assessment and treatment methods that emerged, became mainstream, and were passed on. The utility and success of early methods would have been based on patient testimonies and opinion grounded in subjective and visible improvements. Exercise therapies, from the old medical gymnastics pillar may have seen gains and successes over longer periods of time, but large-scale research conducted in a systematic way was not conducted, yet. The first critical questions likely came from a place of wondering if we can say for sure that our preferred techniques work? Attempts to quantify improvements in function and subjective patient experiences post-treatment were set in motion.

Research in physiotherapy started to adopt the EBM structures and ask questions about the utility of physiotherapy techniques, practices and approaches, seeking evidence to help to inform decisions on treatment utility. There have been some large shifts in patient and condition management because of the evidence, for example cerebral palsy treatment using exercise (Fowler et al, 2001; Novak, 2014) and acute low back pain and bed rest, (Wadell et al, 1997), which have contributed to patient outcomes for the better. Through these methods

of enquiry and self-analysis for the profession, we find a research spotlight on all aspects of physiotherapy practice. This is the main change that has occurred in the profession as EBP evolved into the driving force that it is now, a paradigm shift (Kuhn, 1972; Kerry et al, 2008) from older ways in practice to EBP.

The shift brings Foucault's work on the Archaeology of Knowledge into focus. Archaeology is what he named the methodology he used to identify 'Epistemes'. Foucault's Episteme is

> *something like a world-view, a slice of history common to all branches of knowledge, which imposes on each one the same norms and postulates, a general stage of reason, a certain structure of thought that the men of a particular period cannot escape*. (Foucault 1972:191)

The dominant structure of thought in a society, in this case medicine with physiotherapy following, has changed or shifted from one structure of thought to another. Foucault's Epistemes were long multi-century eras of history where large changes in knowledge production happened because of the particular conditions of the society (Foucault, 1970). While the new Episteme allows new discoveries to be made, it limits and stops other ideas from emerging. While the shift within medicine and physiotherapy has occurred over a much shorter timeframe, I argue that with EBP we have entered a new Episteme. Combined with clinical judgement, using evidence to inform medicine and practice in physiotherapy has become the dominant episteme, the 'how to think' of our time. Deleuze's concept of common-sense also comes back to my attention for consideration here. While common sense is valid in daily contexts, Deleuze argues that in practice it results in a continuous effort to neutralize unorthodox thoughts (Deleuze & Guattari, 1995), and it is associated with inertia and 'weary thought' (Deleuze & Guattari, 1987). It simulates the question; is EBP the new common- sense? What did we let go of in order to embrace EBP, and did we lose anything in order to take it on? I will now consider different models of health philosophy available to the physiotherapist in order to understand what may be gained or lost.

4.2.2 Health Concept Philosophies

The episteme of basing practice on evidence that underpins medicine and by extension physiotherapy may be understood by examining how we approach health, ill health and wellness. There are different philosophical approaches, one of which is a biomedical approach. There are other approaches, the biopsychosocial one being another which

incorporates biomedicine with the psychological and social contexts of each patient. There are other more holistic models in the literature and in use, which I shall outline.

4.2.2.1 The Biomedical Model

Evidence Based Medicine (EBM), despite its adoption, accepted logic and usefulness has attracted debate and criticism (Goldenberg, 2006; Little, 2003; Mykhalovskiy and Weir; 2004; Greenhalgh et al, 2014). The main critique is its simplistic biomedical viewpoint. A biomedical approach to health focusses purely on biological factors and does not account for psychological, social or environmental influences (Sheridan & Radmacher, 1992). This approach to healthcare has dominated Western medicine (Wade & Halligan, 2004; 2017), simplifying health into the causes and effects of disease presentations. Interestingly it goes against the WHO's long established definition of health which is much more holistic (WHO, 1948).

Research that generates evidence for integration by medics will mostly utilize biomedicine, resulting in EBM being determined by and dependent on this approach. A good example of critiquing biomedical EBM is found in a discussion following a medical study about guidelines for asthma and angina. Eccles (2002) examined the use of evidence-based guidelines for use in general practice for angina and asthma and found that most GPs did not find the guidelines useful and thus did not use them, resulting in no effect on management or outcomes for patients. Debate in the aftermath of this article's findings highlighted flaws in much of the premise of EBM (Barton, 2002; Lipman, 2003a; Eccles et al 2003). Lipman (2004) wrote that

> *the reductionist assumptions underlying the construction of evidence-based guidelines from systematic reviews lead to inflexible recommendations on the management of disease. Anthropologists and sociologists make an important distinction between scientifically defined diseases and the culturally constructed experience of illness*' (Lipman, 2004:163).

This distinction between illness and disease is crucial. Patients present with symptoms and illness whereas these EBM guidelines address the management of particular diseases. EBM assumes and accepts that pathophysiological processes underlying disease are real, universal and objective (Lipman, 2004), which may be discovered through observation and experiment and changed by pharmacological, surgical or other interventions.

The EBM assumptions highlighted above align with a position of positivism where observable evidence will produce defensible 'facts' which are derived from scientific method, and only these can make legitimate knowledge claims. Following this way of thinking, if a controlled experiment or observation demonstrates a certain outcome, then not only are the findings 'true' and objectively real, but the outcome is also universally generalizable and would be reproduced if the study was repeated. This aligns well with the concept of a justified true belief required for propositional knowledge (Grayling, 2003; Niederrer & Townsend, 2014). A medic utilizing the 'disease', or biomedical approach works out of positivistic epistemologies or a Cartesian/Newtonian one that regards the scientist researcher as an uninvolved observer of nature (Herman, 1992; Marcum, 2008). Their medical decisions informed only by evidence from the biomedical viewpoint are likely to be based on fact, objective reality, measurement, precision, the minimization of bias, and the notion of reproducibility (Guba & Lincoln 1994). As outlined above, the positivistic epistemology represents knowledge sourced only through scientific discovery produces 'scientific evidence' for use with patients to achieve high standards in clinical care. It facilitates medicine and by extension, physiotherapy, to use a straightforward cause and effect logic as biomedicine is an epistemology of objective knowing (Marcum, 2008). Cause and effect logic then feeds into the notion of 'causality' and causal evidence- something desirable as certainty and confidence in our knowledge is important in patient care, for many reasons.

The success of scientific medicine has emphasized disease, using the biomedical model, which has tended to invalidate the individual's experience of illness (Heath, 1995). Medicine has become too narrowly focussed on the body, on bodily diseases, on technology for detecting and manipulating somatic diseases. Neglecting, therefore, other aspects of being human (Bolton, 2020). Wade & Halligan (2004) also critique the biomedical model as a positivistic epistemology. They suggest that there are three assumptions that this model makes: (a) all illness has a single underlying cause, (b) disease (pathology) is always the single cause, and (c) removal or attenuation of the disease will result in a return to health. While the biomedical model has been associated with huge improvements in patient care, there is much in healthcare that it cannot explain; like illness in the absence of disease, long-standing pain and functional somatic syndromes (Wade & Halligan, 2004). The diverse presentations of illness and the preoccupations and worries of patients that go with them, are anything but unbiased, objective, static and reproducible. The uncertainties, mixed agendas

and complexities that exist in the multiple declared and hidden problems that patients bring to their GPs is illustrated in a reflective narrative of one session of 17 patients with one GP (Elwyn, 1997). Most of the encounters concerned the interaction between life events, anxiety, depression and physical symptoms. In no case was the task of the GP simply to make a physical diagnosis and prescribe an evidence-based treatment (Elwyn, 1997). The biomedical model does account not for that level of complexity, and nor should it, as it is not the solution to all issues, rather part of a set of tools used by the clinician.

In physiotherapy, the biomedical approach is common, not without criticism (Foster et al, 2003; Nicholls et al, 2016) and utilizes a tissue-based model in diagnosis and treatment. Tissue-based understanding of pain and injury suggests that the pain and dysfunction that a patient will experience are caused by damage to a particular tissue structure in the body, for example a ruptured tendon or fractured bone. It follows that once that tissue is healed, the pain and dysfunction will resolve, a good example of cause and effect. The biomedical approach views the body as a machine (BAM), a dominant discourse in physiotherapy training and thinking (Nicholls and Gibson, 2010; Nicholls et al, 2016; Nicholls, 2017; Setchell et al, 2018). Biomedical reasoning has been criticised for that affinity to the Victorian notion of the body-as-machine, as well as its presentation of the 'normal' body to be compared to (Clarke & Shim, 2011; Keshet, 2009; Slatman, 2014).

The GP and the physiotherapist in the clinical environment serve as interpreters and guardians at the interface between illness and disease, as well as witnesses to the patient experience of illness or injury. The physiotherapist, especially in private practice, spends time with the patient, developing and fostering a certain relationship and understanding with their patient. This gives physiotherapists scope to appreciate biomedical shortcomings, appreciating what it brings to the table as a tool for use but not the solution to everything, and go on to utilize other approaches. However, the physiotherapist may be like other medical practitioners, being much more at ease with the biomedical model and body-as-machine epistemologies than any other, (Roberts, 1994; Foster et al, 2003; Higgs et al, 2008; Nicholls and Gibson, 2010), seeing 'real' medicine as consisting of the management of 'real' disease (Dowrick et al, 1996). This view is rooted in disciplinary education and training, much of which is dedicated to discovery of pathology and diagnosis. In many ways the biomedical approach is easier and less complicated, suiting the simple traumas and younger patient populations. It may even be described as a default approach of the physiotherapist (Foster et

al, 2003). Setchell et al (2018) describe how, through disciplinary education, physiotherapy ostensibly sees the body in one piece, a body that moves as joints and muscles and as biomechanics: this body operates like a machine, is compared to a norm and has an ideal way of functioning. Danish research, (Praestegaard et al, 2015), examined physiotherapy private practice and describes how the physiotherapists used their '*clinical gaze'* to transform the patient into a '*medical object'*, to line up with their biomedical lenses, illustrating that it is a default approach.

The biomedical model of health philosophy existed long before there was any modern-day medico-scientific research, but the type and nature of the research conducted in a 'scientific way' reinforced the dependency on BAM and privileges this way of knowing the body.

4.2.2.2 The Biopsychosocial Model

The model that is most commonly described and prescribed to fill the gaps that the biomedical model cannot address, is called the Biopsychosocial (BPS) health philosophy model. Put simply, it proposes the idea that health and illness are the result of an interaction between biological, psychological and social factors. Engel (1977), over four decades ago, warned of a 'crisis in the biomedical paradigm' and proposed the biopsychosocial model. He outlined how the mind and psychological processes such as one's feelings, values and beliefs as well as social contexts, relationships, subjectivity and the subjective experience of illness contribute to wellness. As a consequence of exclusive focus via the biomedical model on somatic disease, the person as patient experiences a form of neglect, being ignored, not listened to, not responded to with sympathy, not treated humanely, or with compassion (Engel, 1977; Bolton, 2020). Engel's BPS model broadened the scope of healthcare focussing on the patient as a whole as a means to improve quality of clinical care.

While the biomedical model may be a default for many clinicians, and the go-to for simple traumas in younger patients, physiotherapists have an awareness and a deep appreciation for this model, especially when it comes to our patients with more chronic and complex presentations (Hill et al, 2011; Kamper et al, 2015). The BPS model takes account of aspects of injury, pain and illness that cannot be linked with tissue damage, but factors in the social and psychological aspects of a patient's life that contribute to illness.

The BPS model has been adopted in most healthcare fields, with less implementation in the more economically dominant and politically powerful acute medical and surgical domains (Wade & Halligan, 2017). Chronic disease and long-standing pain do not align with biomedical care systems, and so the BPS model may be a useful lens for the introduction of non-propositional knowledges. BPS factors in patient presentations are scrutinized using scientific research methods but suit a lived experience qualitative approach much better (Foster et al, 2003). There is a similar situation for physiotherapy, where application of the biomedical model to understand injury and disease will be useful and rewarding for acute traumatic cases, but once we cross into the realm of chronic illness and long-standing pain, the biopsychosocial model is more applicable (Kamper et al, 2015). In physiotherapy education, learning uses both models, though with a heavy and early leaning on biomedicine, followed by a layer of BPS understanding as the clinician develops with expert clinical reasoning, which is conceptualized as using the BPS approach to patient management (Huhn et al, 2019). In recent years, the BPS model of understanding healthcare is appearing more and to a greater depth in physiotherapy pedagogy, with early embedding of the BPS health concept (Bientzle et al, 2013; 2014).

While the BPS model is popular, it has come under increasing criticism, especially in the area of mental health/psychiatry. Ghaemi (2010) critiques it for its vagueness and lack of coherence '*the BPS [biopsychosocial] model has never been a scientific model or even a philosophically coherent model. It was a slogan whose ultimate basis was eclecticism."* (2010: 999). It is also described as lacking clinical utility (McManus, 2005; Bolton, 2020), and should be better understood as a paradigm rather than a scientific model (Pies, 2020), with significant conceptual underdevelopment (Van Oudenhove & Cuypers, 2014).
Another issue with BPS is the potential for one element to dominate the other two, and so the bio element, the biomedicine that it proposes to broaden resides within it and potentially dominates or infiltrates the other domains, with clinicians left to choose which level of analysis from which domain works best (Searight, 2016). This biomedicalization of the BPS translates to a situation when the psychological aspects of illness tend to be conceptualized as cognitive and behavioural, and when the social context is rarely mentioned, as is seen in research by Mescouto et al (2020). Engel himself criticised non-scientific, dogmatic analyses of what is wrong with medicine or healthcare and how to improve it (1980: 543).
He explicitly rejected approaches that he called variously "holistic" "humanistic" or "romanticism" medicine, characterizing them as *contrasted with science*, as *non-scientific*,

insisting rather on the scientific approach of the biopsychosocial model (Bolton, 2020; Bolton & Gillet, 2019). This suggests that the BPS does not venture far outside scientific approaches into more holistic health concepts, though there is an argument that a medical humanism exists within BPS that does encapsulate holism from the BPS approach (Bolton, 2020).

4.2.2.3 Other Models of Healthcare

The Socio-Economic Model (SEM) is another way of addressing health determinants. Developed in the 1970s and formalized as theory in the 1980s by Bronfenbenner (1977; 1986), SEM conceptualizes health broadly and focusses on the multiple factors that may affect one's health. These include intrapersonal, interpersonal, organizational, community as well as public policy factors. Viewing these factors as existing within nesting circles with the individual in the centre surrounded by various systems, the strongest influences on them and their health comes from the closest circle. SEM recognises that most public health challenges are too complex to be understood from a single level of analysis, and the multiple levels of influence on an individual's health outcomes should be considered and then targeted in health promotion initiatives. SEM takes into consideration the individual and their affiliations to friends and family, organizations like school, church and the workplace and the community at large. It is a popular model in health promotion research (McLeroy et al, 1988; Sallins et al, 2008; Robinson, 2008) and in agriculture safety and health intervention research and initiatives (Kilanowski, 2017; Lee et al, 2017). SEM is a Western approach to health that overlaps with the BPS model, conceptualizing the psychological and social determinants to health as interacting layers of influence on an individual's health and illness.

The BPS is only one of a number of healthcare models that conceptualize health beyond the biomedical one. An aboriginal health service was established in the 1970s by Indigenous Australians who were excluded from mainstream health services. The model they developed was explored by Khoury (2015) who describes it as a model that both contrasts with and provides an extension to biomedical curative paradigms. It claims health to be not just physical wellbeing of an individual but refers to '*the social, emotional and cultural well-being of the whole community in which each individual is able to achieve their full potential as a human being thereby bringing about the total well-being of their community. It is a whole life view and includes the cyclical concept of life-death-life*' (NACCHO, cited in Khoury, 2015: 477). This health philosophy draws on holistic views of health and illness and views many activities of life as contributing the health that would not necessarily be regarded

as pertaining to health according to most Western medicine. Social determinants of health are addressed with community development and by rooting individuals in their communities. Biomedicine has a place within this model, which is distinctly non-Western, but the scope of the NACCHO model is much broader.

Turcotte and Holmes (2021) use Deleuze and Guattari to deconstruct the biomedicalization of knowledge in occupational therapy (OT). They suggest that OT should not behave according to the terms established by biomedicine and the evidence-based discourse but should craft its own terms using subversive and delinquent practices, drawing from arts and crafts as an inherent part of OT, something they refer to as a 'nomad science' (2012:7). Nomads resist State apparatuses and embody resistance to norms. Whether nomad science is a philosophy of health I am unsure, but it is an interesting movement away from biomedicine. It seems that OT 'has always had problems explaining itself in reductionist biomedical terms' (Hubbard, 1991), and sees itself as using a more holistic model with a phenomenological view of the body (Bjorklund & Svensson, 2000; Bjorklund et al, 2006). For example, one OT model, The Model for Human Occupation, (MOHO) (Kielhofner, 2002) utilizes a top-down holistic approach to improve the health of an individual by understanding how and why meaningful activities are motivated, pattered and performed. The holism of person-centred practice, valuing the uniqueness of the individual is a key occupational therapy philosophy, and beyond physical, psychological and social wellbeing, spirituality is seen as another key dimension. OTs mobilize a patient's spiritual coping strategies in order to support and restore wellbeing and health (Jones et al, 2016). This lies outside of a biomedical frame, while allowing space for the physical, and incorporating many more aspects of health.

Physiotherapy will see many overlaps in practice with these other holistic healthcare models, and may claim something broader than BPS, but at least for now, for me, BPS is the main alternative to biomedicine.

4.2.2.4 Complexity Theory in Healthcare

Another way of appreciating the many aspects of health, illness and the complexity of patient presentations is via complexity theory. Complexity Theory was first developed and applied in the areas of physics, computer science, economics, biology and philosophy and has more recently been used to understand healthcare systems. Complexity may be defined in terms of

the interrelatedness of a system, which is relative, increasing in the number of components, the number of relations between them and the uniqueness of those relations (Kannamapllil et al, 2011). A complex system will have actors within it, free to act in ways that are not totally predictable, and those actions are interconnected so that the actions of one individual will change the context for other actors. For example, in a healthcare setting, clinical practice, research, education, CPD, organization and information management are interdependent and built around multiple self-adjusting and interacting systems (Plesk & Greenhalgh, 2001). Innovation, order, progress and transformation can emerge naturally from the interactions of a complex system because the actors are adaptive, systems co-evolve as they are embedded within other systems, and there is an inherent non-linearity, unpredictability and patterning. This can buffer the tendency to impose unrealistic expectations that one (a clinician) can know and control all of these contributors and influences (Stacey, 2001) to a patient's health. Complexity thinking *would see the patient as an embodiment of embedded complex systems (biological and disease mechanisms) and as an individual whose health is shaped by an embeddedness of other complex systems (social support, education, access to resources and services etc*) (Khan et al, 2018:195), and each patient's clinical complexity is a key factor in determining treatment outcomes (Deo et al, 2019). Thus, complexity theory may be a more accurate philosophical model for healthcare, moving beyond multidimensional and multifactorial linear thinking from biomedical and biopsychosocial approaches, in order to understand causality, dualism and participation in care (Borrell-Carrio et al, 2004). Recent literature has taken complexity theory and applied it to healthcare, conceptualizing healthcare as a complex adaptive system (CAS) (Khan et al, 2018), reasoning that traditional reductionist solutions to complex problems do not necessarily work. This is not new and Engel, in proposing the BPS, rejected the same reductionist approach to clinical practice

> *In doing so, he [Engel] directly laid the foundations of the thinking that now recognises the importance of complexity theory in medical practice and that illustrates that clinical phenomena are generally far too complex to be understood solely through the use of linear cause-effect models.* (Miles & Mezzich, 2012:210).

Context, something that is so important in the BPS model, can be understood with a complexity lens. Khan et al (2018), suggest that studying the system instead of the context may help to understand what is going on in a given situation, and that a complex system can anticipate the dynamic interactions between the individual's BPS systems and the complex layers of the health system (Kuziemsky, 2016; Woodruff, 2019).

Accepting that healthcare is in the age of transformation, driven by increased life expectancy, the chronicity of disease and not least by the globalization of infectious diseases, the probability of outcomes is constantly updated as new information is continually introduced. This is known as 'irreducible uncertainty' (McDaniel et al, 2009), which contributes to the non-linearity between cause and effect which manifests as the inability to attribute outcomes to actions, something that often plagues healthcare (Khan et al, 2018). This uncertainty cannot be eliminated, but healthcare problems can be classified according to uncertainty (Bar Yam, 2006). For problems with low uncertainty, there can be more standardization and thus greater efficiencies. This would fit with more linear thinking and research using objective processes. For problems with higher uncertainty, activities that encourage innovation production, relationship building, and trial and error solutions should be included (Khan et al, 2018) via an approach for clinicians called uncertainty absorption. This sees a clinician acknowledging the extent of the interdependencies and the numerous potentials as solutions instead of thinking there may be a 'right' one. Approaching uncertainty absorption in clinicians allows them time to process that uncertainty and unpredictability via shared sense making (Lanham et al, 2014, cited in Khan et al, 2018) in clinical dialogue.

Complexity theory is comfortable with the tensions between the need for consistency and evidence-based standards of care and the unique predicament, the contexts around it and the choices of each individual patient (Plesk & Greenhalgh, 2001). Some things will remain unknowable and complexity science says to '*try multiple approaches and let direction arise by gradually shifting time and attention towards those things that seem to be working best'* (Zimmerman et al, 1998, cited in Plesk & Greenhalgh, 2001: 627). This would see a pragmatic approach towards evidence and the shifts towards what seems to be working best in practice for physiotherapists. In short, using complexity theory thinking allows clinicians to see the patient as part of a broader greater set of systems, and proposes ways to deal with that complexity.

4.2.3 Knowledge Supported by Evidence in Pedagogy & Research

As discussed above, to be a contender as physiotherapy knowledge in the Episteme of evidence-based practice, that knowledge needs to be supported by evidence. EBP filters physiotherapy knowledge through its standards of scientific rigour and this process begins in

physiotherapy education. While education can be seen as a reflex of the labour market, functioning to develop workers and not necessarily thinkers (Giroux, 2010), physiotherapists need to think as they work. They rarely come across two of the same patients and so physiotherapy education sets out not to develop technicians following recipes but instead thinkers adept at clinical reasoning (Trede & Higgs, 2008; Huhn et al, 2019). Reasoning through different patient variables should incorporate many sources of knowledge using a BPS or other holistic model as a collaborative process between physiotherapists and their patients (Edwards and Jones, 1995) but may focus more on the diagnostic aspects of reasoning (Fleming, 1991) testing hypotheses as they go (Higgs et al, 2008). Physiotherapy education begins with a view of the body as one piece (Nicholls et al, 2015; Setchell et al, 2018) and fosters the biomedical viewpoint in the early stages, layering in holism and psychosocial aspects of pain and injury as the student develops into a practitioner.

EBP is a central and fundamental aspect of physiotherapy education nowadays. All of the third level physiotherapy providers in Ireland endorse EBP and actively structure their teaching around it. In physiotherapy course module outlines and programme learning outcomes, evidence-based practice is described as an integral part, as a positive force and as something their graduates strive for (for example, UCD, 2022). Physiotherapy education focusses on the skills required to interrogate evidence, for example via the Sicily statement (Dawes et al, 2005) which recommends the necessary knowledge skills and attitudes are incorporated into curricula based on a 5-step model, when perhaps more focus should lie with "*critically reviewing the foundations underlying what we consider 'evidence' in the first place*" (Reivonen et al, 2021:93). Because adherence to guidelines based on evidence is considered to be essential for the achievement of high standards of clinical care, EBP parameters become a lens imposed upon us, and by us onto our students, through which we see our world. EBP inhabits a place where educators strongly encourage students to think it is the best way to be a good physiotherapist and so techniques and practices are required to be justified to learners and backed up with latest scientific thinking. It is pervasive, difficult to critique, and it potentially becomes a weapon with which to critique others: the ones in the more alternative professions with no 'scientific evidence' to back up their ideologies and practices about human healing. Viewing EBP as an Episteme (Foucault, 1972) we can see how it has been adopted as a dominant way of thinking by this society at this point in history. It is the perceived wisdom of this era, embedded in the process of professionalisation (Flexner, 1915) that protects the professionals and the profession and may deprive some

physiotherapists of agency to choose their own practice pathways. Foucault (1977) argues that discipline is a mechanism of power that subtly regulates social actors' thoughts and behaviours. Discipline works, often through surveillance, by organising time, physical space and everyday activities of the actors within a society (Foucault, 1977). To borrow this concept for physiotherapy, the emergence of the Episteme of EBP may work to exercise a type of power through disciplinary means, for example the engagement of physiotherapists with CPD.

Pedagogy and research are intertwined, and the discipline of physiotherapy is no different. The process of professionalisation means that in order to become a physiotherapist a learner must complete a recognised programme delivered by a university, approved by a regulatory body. Most of the sites where evidence is gathered or produced are research institutions and universities. These sites and scenes are responsible for most of the research, earning grants, acknowledgements and other types of capital for their outputs, dissemination and research work. The quest for more evidence to inform disciplinary knowledge is taken up by researchers based at the universities. Hence, research sites hold power in the physiotherapy landscape as the profession strives for more scientific evidence for translation into practice to serve the greater public good.

A central focus of scholarship and research is to serve the cause of more EBP. The biomedical view is the easier aspect of the human condition to study, because measurement and cause and effect logic fit easily together (Lynch, 2018). Designing large scale medical research, once you can fund it, is relatively straightforward, and the scientific truth it will yield as evidence fits into the discourse that evidence gathering in this way is worthwhile. This equates to legitimacy, and thus come tangible gains such as better funding, higher social status and greater availability of jobs, hence more of the same. Biomedicalization that dominates research probably obscures and constrains other aspects of practice because the evidence in EBP has a large biomedical slant (Gibson, 2016). The journey down one path of clean standardized data has shut down a whole swathe of what physiotherapy is about. '*The evidence-based movement in healthcare has diligently focused on eliminating bias to discover 'truths'. Yet it has created systematic bias towards certain types of research questions being asked, groups of people included, and types of interventions researched and designed'* (Reivonen et al, 2021:85). This point, along with reductionism of the many moving parts and the adoption of epidemiological research designs means that large parts of empirical

physiotherapy research follows a path that is not in parallel with physiotherapy practice, resulting in the disconnection that I propose.

Kerry (2018) takes us back to a time before the evidence in EBP needed to be a product of highly scientific methodologies. He explores the idea of causation and causal relationships that physiotherapy uses to understand what works in therapy. He points out that those processes have changed over time, when understanding of what works was once a product of experience, or wisdom from a teacher. Now these processes are seen as insufficient. Harder scientific research to generate knowledge about causation are deemed to be better. Kerry argues that care gets de-personalised with the dominance of scientific methods of research, and we lose the person-centred model of healthcare with rigid EBP. He proposes that we need to progress our understanding of causation, using multiple research methods to explore complex context-sensitive causes found in practice.

Following a similar thought process, Setchell et al (2018) describe how EBP makes certain elements of physiotherapy more visible and how it lifts those elements to dominance, for example, in the numerous measures and procedures which are extensively taught in education programmes and are inescapable in the literature (Maher et al, 2004; Nilsagard and Lohse, 2010). EBP takes physiotherapy and presents it as an 'objective science' that specialises in movement (conceptualised narrowly to mean biomechanical movement), where joint angles are measured, steps are counted and patterns of movement or muscle activation are compared to a norm (Nicholls et al, 2015, cited in Setchell et al, 2018), something also visible in the journal's analysis in chapter three. Gibson (2016) describes physiotherapy as fitting into the dominant Western way of viewing healthcare, where the body-as-machine (BAM) discourse is prevalent, and the biomedical model is elevated to most important. As Setchell et al (2018) ask, *'what happens to the other practices that may be important for good care?*' (2018:2). This Setchell et al (2018) article shows that physiotherapy always already creates multiplicities of the patient's body and of the physiotherapist practitioner – it is just that some of them are rarely spoken about, explored or developed. Biomedicalization via objective research with positivistic leanings can only focus on the body as machine and the physiotherapist as a logical clinical reasoning specialist. Other knowledge sources and ways of knowing in practice are rarely engaged with (Setchell et al, 2018). When we consider EBP via the research processes that generate evidence it brings forward questions that Foucault (1977) poses: Whose rules, whose truths, whose voice?

4.2.4 Hegemony and Diversity in Knowledges Supported by Evidence

Foucault was interested in how we are moulded, normalized, disciplined, and subjectified by the unconscious rules of the Episteme that we are in (Foucault, 1972). Taking up this view, I am interested in how much space there is for epistemological diversity (de Sousa Santos, 2007) in the EBP movement or is there a colonization of the field by the monoculture of scientific knowledge from a biomedical and positivistic viewpoint. De Sousa Santos advocates for a replacement of monoculture by an "ecology of knowledges" in an effort to decolonize knowledge and power to begin a global resistance against capitalism. In a similar allied health profession, in occupational therapy, biomedicine has been described as committing epistemic violence on reformist ideals inherent in the profession (Turcotte & Holmes, 2021). The question of what legitimate and marginalised knowledge in physiotherapy is, has been asked more recently in physiotherapy commentary (Higgs, 2014; Nicholls, 2010; Nicholls et al 2015; Nicholls, 2019; Setchell et al 2018), a step in the decolonization process. The question of whether physiotherapy needs emancipation from biomedical dominated EBP in order to have the freedom to choose it again if it is seen as a good choice is an interesting one. Following on from considering the possible need for emancipation are Foucault's (1977) thoughts about discipline as a mechanism of power to regulate behaviour through subtle means. Because power via EBP is diffuse through physiotherapy society it may discipline therapists to conform and fit in with it, thus limiting the ability to form one's own identity (Foucault, 1975). The physiotherapists that I know seek to behave like good professionals, and so much of the disciplinary work is done internally, 'by ourselves, to ourselves'. Freedom from EBP or freedom to choose to practice with as much scientific evidence as possible would be ideal, if those choices were seen as equal and one had trust in the epistemologies from where they come. In order to draw upon these choices, one would have to be exposed to critiques of the foundations of evidence, more diverse knowledge forms and epistemologies in training, through CPD and via mainstream professional communication.

> If you can get people to accept something as the way that life and the world are organized and intended to be, they internalise it, see it as common sense (not necessarily the Deleuzian inertia) and don't recognise any other way of doing something. The notion of complicit bystanders during a colonization (de Sousa Santos, 2007; Donald, 2012) process may be of use to understand the dominance of the EBP discourse. A conscientization of how power works is necessary, and once it becomes visible, it can be questioned and more

difficult to wield on passive practitioners. *"The main point is not to accept this knowledge at face value but to analyse these so-called 'truth games' related to specific techniques that human being use to understand themselves",* Foucault (1988: I). Hegemonic discourse is one that enables the values of the dominant ruling cohorts such as the professional bodies and those that fund the research to be perceived by the population as a universal value, or the 'natural order of things'. In education and research, what gets prioritised for funding is a function of power and situations may arise where self-censorship will occur so as not to rock the boat. Peer review and editorial processes are examples of maintaining the status quo. In practice the hegemonic discourse places EBP as the norm. You don't have to agree with EBP, you don't even have to like it. All that is needed is for you to believe that there is no alternative.

4.2.5 Measuring for Legitimate Knowledge

Kathleen Lynch (2018) describes an Ireland that is focussed on the 'knowledge-based society' and as a result, research priority areas are not located in the arts, humanities or social sciences. I see this as a parallel with the physiotherapy knowledge models, where the science of the biomedical model, seeing the body as a machine, using the logic of cause and effect and reasoning through biomechanical and biomedical lenses are the dominant knowledges. They have become dominant partly because of their alignment with medicine, their validation by regulatory authorities and the educators of the professionals, they are simpler to understand, and crucially; easier to appreciate via measurement. The dominant worldview in this episteme is that measuring the body and analysing the numbers gives us the evidence we need for good clinical choices. Discrete units are designated as variables and are separated out from the body and the person and the context. This is problematic as numbers cannot carry the full meaning of the situation, they will undervalue the complexity and value-based decisions made in the process (Thompson, 1997).

Evidence is defined by the chartered society of physiotherapy as:

> *The available body of facts or information indicating whether a belief or proposition is true or valid'* and *'data on which to base proof or to establish truth or falsehood. Applying this to evidence-based clinical practice, it could be described as the available body of facts, information or data on which to base a clinical decision.* (Chartered Society of Physiotherapy 2022).

This does not exclude data in the non-numerical forms, but in reality, these types of data are much less visible in physiotherapy research that gathers evidence. It also says nothing about the patient, the context or the environment, elements that are difficult to put a numerical value on. Lynch speaks about 'The Quantified Self' (Lynch, 2014) and the concept of measurement as a virtue, both glorified and dominant. She writes about the global rise in psychometric and biometric measures, which have become endemic, allowing us to conceptualize ourselves and our patients through numbers. Her reasoning sees numbers as having the status of absoluteness and unassailability as an unwarranted truth in our society, that cannot be applied to narrative evaluations, rendering those types of analysis inferior and untrustworthy. Also lost is the attention to those aspects that cannot be easily quantified such as embodiment, emotion and social and cultural experiences (Bjorbaekmo and Mengshoel, 2016; Trede, 2012).

The evidence derived from a quantitative positivistic perspective may affect how we see our patients: as objects rather than as subjects or human beings, and the research that seeks to find scientific evidence is overwhelmingly acting on the patient not with them. The reductionism that leads to this type of evidence for translation into practice "*falls short of capturing the context, complexity and patient centeredness that characterize expertise in physiotherapy practice*" (Shaw et al, 2010:514). It also obstructs the subjectivities of human lived experience of injury. The lived experiences of patients within and outside of the physiotherapy setting should be addressed (Gibson and Martin, 2003), and these authors call on physiotherapists to "*conduct, review and disseminate high quality qualitative research*" (2003: 350). This aspect of the experience of injury may be explored in qualitative research, but it does not fit easily with measurement or the quantitative biomedical perspectives that dominate a lot of research. An editor of the *British Medical Journal*, in 2011 stated his opinion that qualitative research in his journal had almost reached saturation, and asked, "*How much more do we need to know about suffering*?" (BMJ, 2011; cited in Audrey, 2011). This epitomizes the dominant attitude towards the role the qualitative research has in generating evidence for EBP in my immediate work environment. It is faulted for lacking inter-observer reliability, absence of standardized measurements and its inability to accommodate inferential statistics (Gergen et al 2015), something that persists in the viewpoints of many of my colleagues.

A critique of measurement in physiotherapy certainly exists, summed up expertly by Setchell et al who point out that '*Privileging the logic of measurement over other ways of doing physiotherapy can be limiting because the body is not so easily known'*, (Setchell et al, 2018:9). Struhkamp et al (2009) also discuss measurement in physiotherapy and consider how the use of standardised outcome measures often over-simplifies the discussion and the enactment of independence or dependence. An outcome measure is a tool used to assess a patient's current status. Many of these outcome measures are elements of movement, strength or a functional status that can be objectively measured using a piece of equipment. Many more are 'patient reported', but reduced and simplified into Likert Scales, Yes/No choices or Strongly Agree-Strongly Disagree categorical answers to statements. Removing the person from their contexts and environments and drawing boundaries around a specific part of them in order to give it a numerical value sounds strange but is a typical procedure for physiotherapy research (Reivonen et al, 2021). Struhkamp and colleagues' analysis highlights that much more goes on in clinical practice than is revealed in scores on a scale.

Incorporating EBP into practice is straightforward in theory but not in practice. Van Trijffel et al (2019) capture this significant problem when they criticize the dominance of the design of the RCT as the gold standard, (which comes from epidemiological and pharmacological research), for providing data on the effectiveness and efficacy of physiotherapeutic interventions. They highlight the real world setting for patients with complex disabilities as existing outside the tightly controlled confines of an RCT. Research that does resemble clinical practice has a broader selection of patients, imposes less strict inclusion and exclusion criteria, compares an intervention against current best practice, as well as patient-reported outcome measures, (Merali and Wilson, 2017). There exists then in the physiotherapy literature, a sense that the traditional RCT does not serve our practice full of real people as patients (e.g Crosbie et al, 2013) and agreement that different methodologies are required to explore aspects of practice that are not aligned with biomedicine (Gibson and Martin, 2003; Shaw et al, 2010; Setchell et al, 2018; Reivonen et al, 2021). However, once research drifts into these more clinical real-world spaces and uses different methodologies, those studies are criticized and may be mistrusted as being biased because of the implicit lack of blinding of both the researcher therapist and the research participants, and because of the presence of subjective outcome measures (Ford and Norrie, 2016). This is somewhat ironic as the decision not to embrace the messiness of the real world is surely guilty of a much greater systematic bias against certain research questions (Reivonen et al, 2021).

Most commentators recognise that the scope and reality of practice transcends measurement in experience, assessment and in learning (Nicholls et al, 2020). This reality of practice can nonetheless be actively excluded by the hegemony of scientific EBP, the demands for measurable outcomes and performance metrics, and the predominance of empirical parameters as strategies driving research (Higgs, 2014). Practice, according to Joy Higgs, cannot just focus on the obvious, expected and easily measurable aspects. It is higher level attributes and capabilities of practitioners that makes these physiotherapists professionals, and many of these practice dimensions are either immeasurable or difficult to measure.

4.2.6 Hierarchies of Evidence

Scientific research utilizes a pyramid to provide a visual conceptualization of the hierarchy of evidence (Guyatt et al, 2008). This shows the reader what types of research designs and study methodologies are deemed stronger and how each one fits relative to the others, with research that can most accurately determine causal relationships at the top of the pyramid (Cowen et al, 2017).

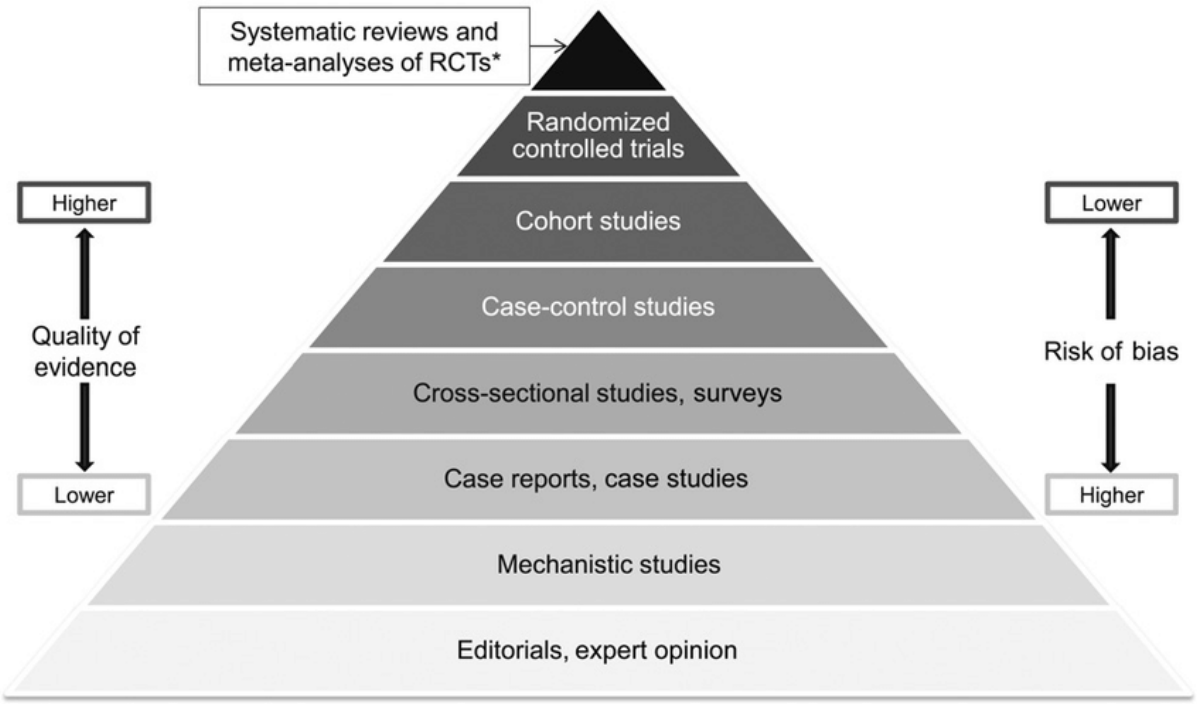

Figure 4.1: Hierarchy of evidence pyramid. The pyramidal shape qualitatively integrates the amount of evidence generally available from each type of study design and the strength of evidence expected from indicated designs. In each ascending level, the amount of available evidence generally declines. Study designs in

ascending levels of the pyramid generally exhibit increased quality of evidence and reduced risk of bias. Confidence in causal relations increases at the upper levels. *Meta-analyses and systematic reviews of observational studies and mechanistic studies are also possible. RCT; randomized controlled trial, (Yetley et al, 2016)

Physiotherapy research seems to have accepted and contributed to this view of evidence generation and subscribes to the notion that the higher the better (Crosbie, 2013). Funding of services is often rationalised based on evidence from this pyramid, (Reivonen et al, 2020) as well as recommendations for treatment approaches (Kerry, 2018). Crosbie (2013) points out that the systematic review and randomised controlled trial have become, in effect, the *sine qua non* of many contemporary physiotherapy PhD theses. He challenges this dominant way of thinking and generating knowledge, asking whether this is limiting the potential to produce original thinkers in physiotherapy. Crosbie points to the fact that different research paradigms are needed to explore the range and intersection of social, psychological and physical phenomena that concern health professionals. The rules of one research paradigm, the scientific one, dominate, whereas if physiotherapy scholars could understand and evaluate different approaches from within the rules of those paradigms there would be much more variety in physiotherapy research, (Herbert & Higgs, 2004), including more Practice Based Evidence (PBE), which will be discussed later. Crosbie argues strongly that by restricting the embryonic researcher's horizons to a limited definition of 'best research evidence' we are likely narrowing our focus too much and stifling the creativity of some of the budding physiotherapy researchers of the future. This resonates with Foucault's (1972) archaeology of knowledge again: attempting to describe the transformation of conditions within medicine, allied health and wider society that determine what counts as legitimate knowledge for physiotherapy. These conditions go beneath the consciousness of individuals and see the emergence of particular sets of rules and boundaries for how physiotherapy thinks and acts. An 'Episteme' shift to EBP allows for new knowledge to be generated, but also limits the genesis of other ways of thinking. Crosbie questions whether RCTs are appropriate for physiotherapy questions. He asks

> *Are we in danger of creating an environment in which clinical and academic physiotherapists are unwilling to go anywhere unless there is a narrowly defined body of 'evidence' to support them? If so, our collective research output will become less ground-breaking and our professional practice more robotic*. (Crosbie, 2013:70)

> *Perhaps physiotherapists should be prepared to invest in the scientific and theoretical basis of their professional practice before chasing evidence to support it.* (Crosbie, 2013:71)

This last point advocates for physiotherapists to spend time with epistemology and ontology, developing an awareness of where our profession lives on those spectrums of knowledge discovery, creation, interpretation and what truth is for practice, developing epistemic sophistication (Christiaan-Beenan et al 2018).

4.2.7 EBP as Identity

In the wider healthcare context, greater accountability and indicators of efficient use of resources are demanded by governments and private funders of healthcare. Assurances to satisfy those demands increasingly take the form of "evidence-based practice", standardized outcomes, objective ways to measure efficiency and service provision (Gibson et al, 2018). EBP is referenced as a reason to elevate physiotherapy to superiority and is used both as a legitimizer and as a way to wield this power. In identifying the conditions that give rise to the thinking (Foucault, 1972) in physiotherapy, EBP speaks to the identity as allied with medicine, and speaks to the claim on territory, especially in terms of protection of the title physical therapist/physiotherapist in Ireland, as discussed in chapter three. It is a power that functions diffusely in the background shaping our thinking, as well as a powerful tool for use in supremacy optics. That our practice is evidence-based is a way to distance our profession from the Others and embrace the essence of that professionalism (Hoyle, 1975; Houle et al, 1987; Levine, 2001). This power is facilitated by the State via CORU and brings perceptions of legitimacy. Physiotherapy now has the preferred-provider status in Ireland, which feeds a public discourse of physiotherapy being the most legitimate of the group. The sense of superiority this brings has been hard fought in the context of physical therapy versus physiotherapy over the years in Ireland (ISCP, 2016) and the physiotherapy community and regulatory organizations will hope for calm domination of the field into the future. Nicholls (2012) talks about this state sponsorship through legislation in New Zealand, where preferred-status professional silos are created, promoting "legitimate" approaches to healthcare, and how physiotherapy in New Zealand is on the right side of this equation. That is the case in Ireland too. The power to coerce, dominate and silence is true for the profession of physiotherapy against the Others, and the processes around professionalisation in the 20th century (Houle et al, 1987; McDonald, 1995) have allowed EBP to make it so.

4.3 Knowledges with little evidence, no evidence or conflicting evidence

4.3.1 Evidence for Manual Therapy

As discussed above, more often than not, we default to the study designs that will generate evidence from the top of the hierarchy, relying on the RCT and systematic review to inform us and generate our truths (Crosbie, 2013; Van Trijffel et al, 2019). This practice and reliance on the evidence gleaned from large scale RCTs has started to generate a lot of debate in physiotherapy, (Dijkers et al, 2012; Nicholls, 2017; Moffat and Kerry, 2018; Gibson et al, 2018; Setchell et al, 2018; Nicholls et al, 2020) not least because the findings from much of this research makes for uncomfortable reading for many experienced therapists. For instance, in musculoskeletal physiotherapy, hundreds of RCTs have led to the conclusion that only limited to moderate evidence exists for most prevalent interventions, especially those using manual therapy (Clar et al, 2014; Bokarius and Borakius, 2010) interventions, the exception being that there is strong evidence for exercise (Babatunde et al., 2017) and some limited evidence for combinations of manual therapy and exercise therapy when used together (Hidalgo et al, 2017). Indeed, two of the original roots of our profession, massage and medical electricity, are being side-lined as more evidence mounts for their lack of efficacy (Kroeling et al, 2005; Shah and Farrow, 2012; Bernhardsson et al, 2015; O'Keeffe et al, 2016). As outlined in chapter three, the physiotherapy profession originally grew from the Society of Trained Masseuses in London, and so since the dawn of the profession, touch-based manual therapy has been a fundamental part of physiotherapy identity. As we conduct research and amass evidence, these touch-based therapies are doing badly in the trials, showing that they are not as comparatively effective as once thought (Bialosky et al, 2009; Clar et al, 2014; O'Keeffe et al., 2016). Recommendations have followed to favour other methods like exercise therapy over manual therapy in the management of certain common musculoskeletal presentations that the practicing physiotherapist sees in daily practice (NICE, 2016). In the case of manual therapy what physiotherapists thought was happening as tissues were moved with the hands may not be the case, and so previously proposed mechanisms in traditional manual therapy are not borne through in the research. Lack of evidence is not the same as lack of effectiveness though, but lack of evidence does diminish perceived efficacy for many commentators and therapists reading the research outputs. These findings have led us to a situation where there is a call for more of the same strong scientific research to develop these truths and generate more evidence. It has also led to a situation where many are

calling for a different approach to physiotherapy research, how we generate data, analyse it and what we count as evidence. As we elevate our technical interests and strive for more secure propositional knowledge we may be forced into more reductionism, isolating aspects of function to measure, because the big picture with all the moving parts in our patients is so complex. The craft of practice, wisdom, intuition, tacit and personal knowledge require different avenues of inquiry and methodologies. As Toby Hall, a manual therapy advocate says

> *We try to make it [manual therapy] a science as much as we can but it's an art. And, when you see an artist who's good at their trade, you can just see the difference in the way that they help people…. and you see the way that they move their patients, and you see that the patient moves so much better because of their very careful positioning and their very considered approach with the patient. And that makes a huge difference to the patient* (Hall, cited in Remedy Physio, 2015).

Finding a way to capture that art, that considered approach and careful positioning unique to every patient is a very difficult task, but not impossible.

A biopsychosocial model of practice also tends to shift the emphasis away from touch-based manual therapy interventions and towards patient education, talking therapy and empowerment of individuals through active pursuits such as exercise and physical activity. This shift is away from passive treatment strategies towards active management strategies of treatment and care. Moffat & Kerry (2018) ask: 'So without touch, what is physiotherapy?' The identity secured in touch-based therapeutic spaces with our patients is definitely diminishing, disrupting the identity of physiotherapists who believe in, trust and align themselves with the value of touch-based manual therapy (Oostendorp, 2018; Karas et al, 2018). There is a certain irony that the medical massage root of the profession, the society of trained masseuses, went to great lengths to legitimize massage and align it with medicine and science, only now to see it devalued as science and medicine evolve. There is so much discussion about the role of manual therapy for physiotherapists, with therapists who are proponents of manual therapy now being described as clinical dinosaurs (Meakins, 2015) being accused of

> *having vested interests in peddling pseudoscientific treatments, and "quick" fixes for complicated musculoskeletal disorders and/or pain. The dinosaur thinks they are realigning subluxed joints or twisted thoracic rings, poking trigger points, or releasing*

> *fascia, muscles or even immobile kidneys, all these things are pseudoscientific and based on little to no robust evidence. (*Avemarie, 2018:1)

This resonates with the 'pot pourri' and 'fairy tale' treatment of Dara O Briain (BoreMeScience, 2009). This clinical dinosaur concept disrupts an old perception that manual therapy has always represented sound knowledge for physiotherapists and our patients, coming from traditional assertive ways of understanding what we do. Those who created the concept of clinical dinosaurs are the harshest critics of clinical manual therapists and propose that we stick to the evidence and base our practice away from manual therapy and towards exercise therapy via EBP. Scientific evidence is used to justify the abandonment of one way of knowing and doing and seeing ourselves, to another. This shift is reasonable as the benefits of exercise are clear, but if it is based only on evidence coming from quantitative objective positivistic methods, then it is easy to critique as unidimensional. Evidence from a variety of sources that capture lived experience, use qualitative designs and test craft aspects of knowledge may come to the same conclusions, and if so, would facilitate an easier shift for some.

4.3.2 Practice is not linear: practice knowledge borrows from many sources.

The human contexts that make every patient different mean the epistemology of the clinician may not find some of the evidence conceived and packaged as EBP, useful for practice. The 'E' in EBP is a crucial part of this discussion, as the vast majority of evidence is causal.

With the embrace of EBP as a way of knowing and doing, physiotherapy clinical practitioners are increasingly required to practice as scientists. They are expected to reason their clinical decision making, deliver their assessment, treatment and rehabilitation in light of best available evidence, and build upon their knowledge, skills and expertise to fulfil the professional responsibilities of CPD set out by governing bodies (ISCP, 2022; Higgs and Titchen, 1995; Dawes et al, 2005). Amongst fellow professional peers, practitioners also have to justify why they follow a particular treatment approach or favour one therapeutic modality over another. There is a constant demand to justify practice decisions and communicate judgements in a logical, coherent manner (Kerry et al 2008). The doing of clinical practice is never a straightforward application of evidence or linear logic (Edwards et al., 2004), yet how clinicians portray their work in discussion with patients or colleagues, or in official texts, is entirely in keeping with what is seen as customary health care practice. This may be an

example of physiotherapists being coerced into appealing to the normalcy (Foucault, 1977) of medical clinical practices, at least outwardly in how they portray their work to others.

Where then is the room for the other epistemologies of the clinician in practice? Or is there a layer of thinking and accessing of other knowledge that does not get broadcast? As treatment should not be standardized or routine (Hall, cited in Remedy Physio, 2015), but rather individualized for each patient by each practitioner then the information to broadcast is variable and never simple. Setchell et al (2018) examine the practice of physiotherapy and argue that as a practice it can "*subvert the ubiquitous reductive discourses of biomedicine*" (2018:165). Certain elements of the practice of physiotherapy are made less visible and are rarely discussed or researched because of their tacit nature or the simple fact that they cannot be measured, for example the effects of therapeutic touch (Patterson, 2007; Nicholls and Holmes, 2012; Moffatt and Kerry, 2018; Bjorbaekmo and Mengsheol, 2016). Rogers et al (2006) conducted some research with fifteen physiotherapists treating two or three patients and demonstrated that they predominately used 6 different types of touch in 33 different combinations, illustrating the complexity of manual therapy in practice, but giving an example of how the seemingly abstract can be made concrete. The demotion of the aspects of physiotherapy that cannot be objectified or measured feeds into an "othering" process of the craft knowledges (Higgs, 2014) that the physiotherapist in practice with patients under stress and in pain uses.

Setchell et al (2018) argue that all clinicians are aware that there is more to practice than mechanistic formulae and predictable care pathways. They cite Human & Cilliers's work (2013) on complex systems, where they use Derrida's concept of *undecidability* that is inherent in human relations, an undecidable being something that cannot conform to either side of a dichotomy. Setchell et al (2018) use this concept in physiotherapy to see the human body as being '*permeable and* (that which can*) defy the comfortable enclosure that forms the unseen, unspoken structures in place when the physiotherapist assesses and treats a patient',* (2018:178). For the clinician, thinking rationally and logically works well for diagnosing and treating particular bodies, but falls short when applied to the dynamics of life with all of its intersecting histories, contingencies, affects and connectivity (Howick et al, 2010). In other words, bodies always seem to find ways to escape their boundaries (Williams, 1998). I am aware that the use of the word boundary is complicit with a narrow biomedical framing that I wish to critique, showing that as a researcher I (and many others) need to escape my

boundaries, not the patient. Evoking the rhizome (Deleuze and Guattari, 1987) of networks of different types of knowledge beyond linear pathways of thinking may be a useful way of describing practice knowledge, especially with the qualitative multiplicities of emotion, motivation and sensation that are at work in a physiotherapy session.

4.3.3 Practice knowledge and Practice-Based Evidence

The conscientious physiotherapist striving to help their patients may examine best evidence and find that their patient, the circumstance or context does not fit with evidence-based recommendations. In the absence of evidence in how to deal with, for example, a multi-faceted biopsychosocial situation the physiotherapist may call upon different practice knowledge sources, including Practice-Based Evidence (PBE). This is a term found to a minor extent in the literature to mean evidence that concerns contexts, experiences and practices of healthcare professionals working in practice settings. For the physiotherapist in practice, it refers to the aspects of their work and care that they can see, hear and feel in real-life practice situations (Ahlsen & Solbraekke, 2018; Beenan & Castro-Caldas, 2017). From a more scholarly viewpoint PBE is used to refer to research conducted within the context of real-world practice, (Brownson & Jones, 2009), research conducted via research and practice partnerships, (McDonald & Viehbeck, 2007), and to innovations that emerge from practice, (Dunet et al., 2008). Lawrence Green is generally credited with introducing the phrase PBE; "*If we want more evidence-based practice, we need more practice-based evidence*" (Green & Ottoson, 2004). Gaps between science (evidence) and practice have been highlighted in many health professions and the blame, according to Green (2008),

> *falls variously on the stubbornness of the practitioners insisting on doing it their way, their hubris in believing they know their patients best and the smugness of scientists believing that if they publish it, practitioners will use it.* (2008:20)

Nursing practitioners Leeman & Sandaleowski (2012) suggest that if more evidence-based practice is desired, greater use must be made of qualitative inquiry to obtain practice-based evidence. This should be derived from the experiences and practices of healthcare providers and the contexts of healthcare provision. They conclude that qualitative inquiry has an essential role to play in incorporating more practice-based evidence into the evidence base for nursing practice, something which should also translate across to physiotherapy practice (Gibson & Martin, 2003). More recently PBE has been promoted to tackle chronic costly public health issues from the BPS domain (Amermann et al 2014), with some focus on

practical strategies on how to design research to support this movement towards PBE instead of EBP (Thorne, 2016).

4.3.3 Surfacing Other Knowledges in similar healthcare professions

Physiotherapy is not the only healthcare profession that toils with the task of identifying and articulating all of their forms of knowledge, where those knowledge sources come from and whether they need the bolstering of scientific evidence to be accepted as legitimate. Thomson et al, (2014), writing about the field of osteopathy describe a profession striving to know its place and where its knowledge comes from. Their analysis, as well as a paper by Thomson and Abbey (2017), mirrors a lot of what physiotherapy struggles with regarding the clash between different ways of approaching practice and the differing viewpoints from where osteopathic knowledge comes from. They identify a choice of practice pathways, between the technical and rational ones that typically '*see patients' problems as biomechanical, anatomical and physiological deviations from normal, which can be understood and managed using technical knowledge of examination procedures and treatment interventions'* (Thomson and Abby, 2017:1), and a 'professional artistry' view of practice as a practice pathway that '*sees patients' pain and disability as an expression of ambiguous, complex interactions between biological, psychological and social factors, and requires creativity and flexibility in constructing an understanding of the individual's experience'*, (Thomson and Abbey, 2017:1). In real life osteopathic clinical practice, it seems that an adherence to the pathway set out by just one paradigm will be problematic, and more practical or pragmatic solutions are necessary (Tyreman, 2008). This echoes the physiotherapy practice situation well.

McCurtain and Carter (2015) write about knowledge sources in speech and language therapy (SLT) and the way speech and language therapists in Ireland justify their decision making in practice, including why they may not stick rigidly to the evidence base. They lay out how EBP has taken hold in the profession of Speech and Language Therapy (SLT), but that the uptake amongst SLT practitioners is slow, provoking questions of why such an apparently reasonable – and scientific - model is struggling to find a place in clinical practice. Their findings suggest that the SLT practitioners are quite happy in the swampy lowlands, (Schon, 1983), where the scope and reality of practice is very hard to describe and practice situations "*are confusing messes incapable of technical solution and usually involve problems of greatest human concern*" (Schon, 1983:42). There was pushback from SLT

practitioners regarding the use of EBP which supports and argument by Oliver et al's (2014) that research should contribute to practice but should neither define nor lead it. McCurtin (2012) argues that research use at the clinical practice coalface rather than at the philosophical, theoretical or model level misses the point. This research suggests SLTs in Ireland see a real authority of practice evidence, concluding that that profession's practice is not well served by EBP and "*is deserving of models which better represent it*", (McCurtin and Carter, 2015:1149). There is an interesting difference between SLT and physiotherapy, possibly a reflection of physiotherapy's historical quest for legitimacy.

From nursing, Estabrooks et al, (2005) examined practice knowledge that is in use for nurses, in an endeavour to understand how clinicians' privilege various practice knowledge sources. They found four broad groupings of practice knowledge: social interactions, experiential knowledge, documents, and a priori knowledge. This was a good attempt to make visible the knowledge that can disappear underneath the disproportionate weight that proponents of the evidence-based movement ascribe to research knowledge which is invariably scientific. This concept of disappearing knowledge may be translatable to physiotherapy. Advanced nursing practice describes a process of layering in expertise (Benner 2000). This is described as adding reflexivity and humanity to practice, as Benner says; where breadth and depth are gained through experience, education, feedback and self-challenge. The nuance and finesse that are gained by the practitioner to do their job come from many different human interactions and understandings. There is a lot of practice knowledge in these layers, situated in the craft knowledge domain, but it is not easy to describe or measure and so is much less visible in literature and research compared to the knowledge that is situated in the propositional knowledge domain.

4.3.5 Physiotherapy in a category all of its own, bridging science and craft.

Identifying as a profession of medico-scientific practitioners serves physiotherapy well. It allows the profession much legitimacy and kudos to project to the public. There is more to physiotherapy practice than scientific ways of knowing though, as practitioners embrace constant change, transcend dichotomous questions and exist in practice contexts that are grey areas. They appreciate and interpret difference in their patients and as they spend time in one-on-one therapeutic alliances with each patient they go far beyond scientific evidence. Beyond science is craft and art (Hall, cited in Remedy Physio 2015), specific to physiotherapy. Exploring this further is the next section of this inquiry, Section 3- *Investigating Practice.*

Section 3 - Investigating the Practice

Section 3, *Investigating the Practice*, consists of three chapters. This section details my investigation of physiotherapy practice in Ireland. It presents my field work, the purpose of which was to identify knowledge and name epistemologies in use by physiotherapists as they practice. Some knowledge and epistemologies are those the physiotherapists say they use themselves, and others are extrapolated by me based on their responses to questions pertaining to their practice.

In chapter five, *Interview Methodology*, I outline how my chosen approach evolved and how it links with my epistemological perspectives. I present my methodological underpinnings and detail the considerations for the approach I took in designing, preparing for and carrying out the interview process, the procedures I employed and the approach to data gathering and coding.

In chapter six, *Re-Introducing D&G*, I re-introduce concepts from Deleuze and Guattari that I have found crucial for capturing the dynamism and complexity of practice, as well as interpreting and representing the epistemologies that were visible in the interview data.

In chapter seven, *Epistemologies of Practice, Views from the Field*, I present the main findings from the interview data and consider meanings that I have interpreted in the context of my research questions. Those interpretations and subsequent scrutiny focus on forms of physiotherapy knowledge that are visible in the data and being used by the practitioners, especially those that may not be represented in formal research-disseminated evidence. In this chapter I have used D&G's work to help me to think about praxis in terms of complexities, contradictions and multiplicities, and how people experience themselves as physiotherapist practitioners.

Chapter 5 - Interview Methodology

5.1 Introduction

As discussed in earlier chapters, physiotherapy is a broad and varied profession with different knowledge sources. I set out to know more about practice knowledge by exploring how physiotherapists in Ireland experience epistemology and the knowledges they draw from in their daily physiotherapy practice.

I intended to focus on the visibility, dominance and utility of different knowledges and epistemologies for private practice physiotherapists in Ireland and decipher if there are any hallmarks of the practitioner's epistemology. I hoped to be able to name them and highlight them as legitimate epistemologies of the practitioner. I also wanted to know how practitioners perceive evidence-based practice (EBP), what it means for them, how they use it and live (with) it?

Of the epistemologies that are represented in practice I wanted to find out whether these are represented in research and the subsequent EBP discourse and explore whether there is a disconnect between evidence that is produced by research for practice and the practice itself. I used interviews; conversations with physiotherapy practitioners to best capture the depth of their opinions, beliefs, views and understandings of their work.

5.2 My Epistemological Perspectives

Before I could begin the fieldwork portion of this research, I needed to be aware of my position as a researcher and understand how the alignment between my positioning and my methodological approach worked (West, 1996). Going back even earlier in this journey, before that stage of consciously developing awareness of my researcher persona I wish to give some background and context to how I got to the start point. The genesis for this research was emergent from an interplay between my direct experience observing real world evidence gathering for research projects at my place of work, my interest in physiotherapy practices and my growing scholarly interests through the Doctorate of Higher and Adult Education at Maynooth University. I have set out my assumptions, biases and lenses that

have been borne from my life in chapter one and in summary, I am an athletic therapy lecturer, physiotherapist practitioner, former athlete and frustrated researcher.

The process of designing this portion of the inquiry began with my philosophical assumptions, as well as my beliefs and the lenses through which I view everything, unique to me. These aspects all influence my study, and I am cognizant of surfacing and making explicit my awareness of these influences. It feels important that my worldview and epistemology must align with my methodological approach and the methods that I choose in order to achieve credibility and authenticity in my endeavours. As Gadamer (1975) puts it, a researcher cannot simply rid themselves of what they know and think. It is through historical awareness and past experiences that understanding is possible.

If epistemology was a continuum from positivism to interpretivism, I sense that I belong on the interpretivist side. The positivist paradigm where '*reality exists external to the researcher'* (Gray, 2013: 20) and is discovered through scientific enquiry is very prevalent in physiotherapy research, as I have discussed in chapter four. It can never tell the whole story as humans are relational, social and subjective beings, and thus the study of human behaviour needs to acknowledge these aspects of what it is to be human. The idea of objectivity in physiotherapy is often sought after, especially in physiotherapy research (see chapter four) and for me that makes sense for only a small amount of what physiotherapy does. Silverman (2000) claims that neutrality and objectivity is not possible in social science and not even desirable. They advocate for research to be openly value-centred instead of pretending to be value-free. I agree and as it is very easy for me to see the shortcomings of positivism; it does not represent my epistemology.

I like the idea of following the data towards a theory, which is a strategy used by many researchers across different paradigms and one I see as interpretivist, but I can also see how the physiotherapist constructs versions of their patient in an attempt to gain insight and empathy. In my practice I see how the patient constructs their injury or problem, telling themselves a story about themselves and their body, something that is very prevalent in navigating a way through injury and on to recovery. Many different physiotherapists will listen to a patient's story/history and observe their body movements but interpret them differently; the variations in interpreting say at least as much about the interpreter himself or herself as they do about the patient. *'There is no absolute truth…. we all believe what we see*

from our perspective', (hooks, 2010, p.50). Interpretation is a key aspect of the physiotherapist's life and as such is a key aspect of mine. As researchers we do not have access to another's experience but deal with ambiguous representations of it (Reismann, 1993). As physiotherapists we witness our patients' experiences and try so hard to transform the ambiguous representation into understanding and action to therapy in practice. This resonates with the idea that meaning is created by social actors together, where reality is socially and experientially based (Guba and Lincoln, 1994), something that is also a good description of practice.

I have come to the point where I understand that who I am as a practitioner, teacher and researcher influences how I approach this task. I also accept that understanding these aspects of myself has a part to play in this study. Scholar practitioners use inquiry in order to generate knowledge that is local and practical for themselves and their immediate communities, as well as knowledge that can be useful to wider communities of practice and for researchers and policy makers (Horn, 2002).

I am a practising physiotherapist trying to understand as well as I can what the epistemological underpinnings of physiotherapy are, and so I come to this task as a practitioner and teacher, rather than as a philosopher. My scholar practitioner position mediates between practice and theory though disciplined inquiry, placing value on practical and indigenous knowledge as well as formal and technical knowledge (Jenlink, 2002). I use whatever will help me to understand the complexity of the patient, the therapeutic space and everything that goes on in the clinical encounter, making use of a number of different lenses to help me with this task. Foucauldian concepts have helped me to illuminate elements of power and discourse which I mostly use in the previous section but are useful for this investigation of practice also. Deleuzian concepts of the rhizome, common sense, difference and multiplicity which help immensely in my thinking about praxis also helped me to reconceptualize the binary of research and practice and that of propositional and craft knowledge. For example, the concept of rhizomatic thinking is based on the idea that everything is connected, that there is a flux of continuous change as things morph, change and move in different directions at once. As many different ideas and thought patterns come together, they create different meanings that can be interpreted in a multiplicity of ways.

To summarize, the complex world with multiple perspectives through which it can be seen makes sense to me. I also think it suits the physiotherapist interacting with their patients

who are located within many varied social and environmental contexts and experiencing pain. I am a practitioner, out of my depth from a philosophy viewpoint. I inhabit interpretivist epistemological stances, with appreciation of how constructivism generates knowledge in physiotherapy practice. I have used concepts from Deleuze & Guattari and Foucault to help me to interpret practice epistemologies and I have designed this research using interpretive methodologies.

5.3 Methodological Approach

5.3.1 Interview Methodology

This piece of empirical research is a qualitative exploration of physiotherapist perspectives and experiences. As Noor (2008) points out the choice of research methodology is based upon the type and features of the research problem. In considering how to best capture the views of physiotherapists in private practice in Ireland I scrutinized possible approaches outlined by Creswell and Poth (2017), Creswell and Creswell (2017), and Sauro (2015) as they advise in the best ways for qualitative inquiry. I also considered what Clarke & Parsons (2013) advise the educational researcher using the rhizome as a methodology to do

> *Start in the middle…recognise their embeddedness, allow research to lead them, accept that attempts to synthesize are never finished, listen to those before them and on the margins, and give themselves to a life of becoming, thus 'breaking' the binaries that can capture or stifle their attempts to be educational researchers constructing symbolic selves. (2013:35)*

I considered narrative inquiry as a methodological approach, building the persona of a physiotherapist navigating the EBP spaces, but after some thought I felt that this did not capture everything that I needed, because I would like to speak to quite a few different physiotherapists. I also considered ethnography, especially focussed ethnography, (De Chesnay, 2012), using in-depth interviews with key members of the culture under study, using specific data relating to a narrow research question. It did not fit as I am not fully an insider, not doing the same type of work in private practice and I did not use observation as a research method.

Phenomenology was another approach that I considered, especially interpretative phenomenological analysis, being relatively popular in medico-scientific qualitative research. Concentrating on the study of consciousness and the objects of direct experience it seeks to find what is hidden behind people's experiences. The researcher strives to comprehend the

mind-set of a person and language, which mediates their experiences of the world, in order to translate her or his message (Freeman, 2008). As a phenomenologist I would try to understand the meaning my participants place on EBP, how they navigate their daily work as practitioners using different knowledge, and report how individuals participating in the study view their experiences differently (Moustakas, 1994). The phenomenologist 'brackets' preconceptions (being cognizant of them) and allows phenomena to speak for themselves (Pietkiewicz and Smith, 2012) during the interview conversations. Interpretive Phenomenological Analysis (IPA) was a methodology that I moved on from as I felt that there was still an incompatibility between pure hermeneutic IPA and how I intended to involve myself in the interview conversations as an interested and subjective co-participant and how I intended to follow the data towards meaning via my interpretations. I felt that true IPA would be restrictive as it mirrored the desire to produce evidence that I wanted to avoid.

The interview is '*a process during which meanings and insights are not only brought forth or uncovered but also sometimes produced or generated*' (Ryan, 2015:124). My approach was to interview physiotherapy participants to ask them about how they know what they know to do a good job and how they interact with and view EBP. My intention was to interpret epistemologies that they draw from in daily practice. After careful consideration, I decided to draw upon the rhizomatic methodology of Clarke & Parsons (2013), using a qualitative approach of simple descriptive thematic analysis where I organised and conducted interviews with physiotherapy practitioners and undertook a thematic analysis of the interview data using NVivo.

5.3.2 Interview Methods

5.3.2.1 Sampling and Inclusion Criteria

I invited chartered physiotherapists in full-time private practice from the Leinster and Munster areas to participate in the interview process. The criteria I used for inclusion of participants were that each person should:

- Be eligible to be a member of the Irish Society of Chartered Physiotherapy and eligible to be accepted onto the state register of physiotherapists as regulated by CORU. The qualifying criteria of both of these memberships or statuses is successful graduation from a recognized physiotherapy programme.

- Work at least 80% of their working week as a physiotherapist in a private practice in Ireland.
- Specialize in Musculoskeletal or Neuromusculoskeletal aspects of physiotherapy.

I invited each physiotherapist based on their work status in private practice and emailed each of them individually to gauge their interest in the possibility of participating. Once they indicated that they would be happy to be included as participants, and once they fulfilled the inclusion criteria outlined above, I invited them to the next step of the process. Saturation was reached in the data after 12 interviews, and at this point I stopped recruiting and proceeded to data analysis.

5.3.2.2: Process of Informed Consent

The next step in the process was providing each participant with detailed information about the study, providing a chance to converse about the research proposal and aims and outlining the proposed interview processes with each person. Once each participant was happy with the details and mechanics of how and why I proposed to speak with them, each physiotherapist participant gave their written informed consent to proceed with the interviews. I invited each participant to suggest a location and a time for the interview at their convenience, being willing to travel to any location. The participants can be described as a convenience sample, some of whom I already knew, most of whom worked in either local practices or practices I had some professional links with. Those participants that I did not know were recruited via word of mouth, as contacts of the initial group of participants. As described above, all participants were recruited through the process of Informed Consent (See Appendix A) and volunteered on the basis that they could withdraw at any stage and/or redact all or portions of their interview at any stage.

5.3.2.3 Ethics Process

Ethical Approval was sought and granted by Maynooth University Ethics Committee (See Appendix C). It was agreed through the ethics process that there were no potential risks to participants and that the study was not likely to cause any discomfort or distress, either physical, mental or emotional. There was a minimal chance that a participant may have been offended or irritated by some challenges to EBP concepts, and so I prepared for such an eventuality should it occur by providing links to a counsellor, recommended reading and a

follow up one-to-one discussion session. This was not required as no participant had any negative repercussions from being interviewed.

As outlined above, participation was voluntary and based on informed consent. Interview participants had an opportunity to read the details of the study via a participant information sheet (See Appendix B) that detailed the aims, details and sequence of the study before taking part and were given clear opportunities to ask further questions about the study at any stage during the data collection phase (Creswell, 2009). No participants were coerced into taking part. Both the researcher and participants were members of the same professional organisation and viewed each other as peers. Participants were assured of confidentiality and anonymity; they were allocated pseudonyms and any identifying information was removed from the transcripts of the recorded interviews. Each participant of this research was informed openly about the purpose of this study and the research questions that were being investigated, as well as what information was to be used in the data analysis phase. They were given the opportunity to review the audio and written transcripts of their interviews for accuracy and to ensure that they could not be identified. Once they had reviewed their individual transcript, they were asked if they would like to redact any part of it, which resulted in one participant removing one line of his transcript relating to a place of employment.

5.3.2.4: Pre-Interview Processes

After attaining informed consent and ensuring confidentiality I used vignettes of EBP and insights from the documentary analysis in Stage 1 to spark interest and discussion. Vignettes are short stories about a hypothetical person, presented to participants during qualitative or quantitative research, to glean information about their own set of beliefs (Gourlay et al, 2014). They create a story that research participants can relate to and may encourage engagement and revelation of opinion and experiences (Hughes, 1998; Renold, 2002). I sent these vignettes and a series of likely topics about which we may speak in advance of each interview session. These can be viewed in Appendix D. The series of likely topics that would be included in the interview, or interview guide, comprised of the core research question and many associated questions related to the central question (Jamshed, 2014). Dicicco-Bloom and Crabtree (2006) recommend the use of interview guides, achieving optimal use of interview time and serving '*the useful purpose of exploring more systematically and comprehensively, as well as to keep the interview focussed on the desired line of action'*

(Diccico-Bloom, cited in Jamshed, 2014:87). My interview guide was not a set list of questions but rather a series of likely topics, such as physiotherapy knowledge, continuing education and research, evidence and politics/identity surrounding physiotherapy in Ireland. Many of the questions in each interview set out to explore where and how these physiotherapy practitioners get the know-how to be successful physiotherapists. The interviews were thus semi-structured, with room to explore participant views on any topic. The vignettes were very useful in focussing the conversation and helping the participants to access their opinions and beliefs, especially as some interviews were conducted during or after a busy day in the clinic, when my research topic may not have been a priority for their thoughts.

5.3.2.5: Interview Process

After each participant received the interview guide of likely topics and the vignettes, we agreed on a time and place to conduct the interview. I entered the field and initiated the conversations careful to remain open and reflexive, inviting each participant to describe their ways and means of achieving success with their patients. I asked about their world and ways of knowing in relation to evidence based practice. I was interested in co-creating a shared understanding of what they draw upon in their clinical reasoning and clinical decision making with their patients. Who I am as the researcher, interviewer, listener and interpreter were questions that played in my mind as I prepared and conducted the interviews.

I tried to heed Clarke and Parson's (2013) advice regarding rhizomatic thought, starting in the middle, letting the research lead me and listening to those on the margins. I was mindful to tune in with a critical self-awareness to my professional background, my views and my experiences before I could juxtapose them alongside the accounts of my participants and begin to interpret meaning. I endeavored to hear and see the interviews within my conceptual framework, drawing from the philosophical concepts from Foucault around different versions of knowledge, archaeologies of knowledge, epistemes and discipline to make some comparisons. The Deleuzian concepts of linear-rhizomatic, multiplicity, common sense and difference were also playing in the background as I listened and read. Higgs and colleagues' writings about craft and practice knowledge for physiotherapists formed some of my thinking as I listened and interpreted the words of my participants.

My pre-understandings of Evidence Based Practice and what Gadamer (1975) would call my 'prejudices' needed to be identified and made transparent so that I could remain open to all possible alternative meanings in my interpretations of interview transcript texts. Stenner (2017) speaks about trying to avoid a sanitized account of what was said by my participants, and rather instructs the researcher to use reflexivity to highlight how to use experience and insider perspective to obtain richer data. I strived to achieve these goals of neutrality but am acutely aware of how that objectivity is neither desirable nor possible (Silverman, 2000). As a chartered physiotherapist I am an insider for this research, though I practice very little privately and work full time in the public sector in higher education. As I do not rely on my ability to treat and rehabilitate patients at the coal face of private practice to earn my wages, I am also an outsider to these interviewees. I have become more tuned in to disciplinary research and the positivistic methodologies it relies on and with this acuity of perception I have become more passionate about bringing some value to a researcher who is visible in the research and patients who are participants with aspects to their recovery that cannot be measured or scored. These are the pre-conceived ideas and the biases that I bring, but that I have given due regard to via a process of reflexivity. I brought these feelings and viewpoints to the interviews and listened to what my colleague physiotherapy practitioner participants had to say. I adopted the position of interested and subjective co-participant rather than a detached and impartial observer.

Of the 12 interviews nine were done face-to-face and three were completed via video call for reasons of timing and convenience. Of the nine face-to-face, I conducted seven of them in the interviewee's place of work, their physiotherapy clinic. I travelled to Cork, Kilkenny and Carlow to speak with each participant. One participant was interviewed at a sports clubhouse after a work session in Kilkenny. One interview took place at a hotel in Carlow. Interview conversations lasted for between 41 minutes and 1 hour 50 minutes. I used an interview question guide (see appendix D) and allowed the conversations to deviate from it when interviewees followed different trains of thought that were interesting and related to the topic of practitioner epistemology. The vignettes (see appendix D) were brought along for each interview but used only if the interviewee was having difficulty in understanding the topic of epistemology. One interviewee picked up one of them and critiqued it as a way of exploring a topic at the beginning of the interview. One other interviewee looked through two or three vignettes as he spoke to me. In every other interview they were not discussed.

5.3.3: Data Collection and Coding

The interviews were recorded on an iPhone 7 between March and May 2019 using the application VoiceRecorder Pro v4.0.1 (Livebird Technologies). They were transcribed verbatim, read and re-read to check for accuracy and sent to participants for their approval as authentic and to provide an opportunity to potentially redact aspects of them. Once the transcripts went through that process with each participant and returned, I began the process of analysis of the data. There is a 'difficult and complex transition' from raw interview data to research data (Clandinin and Connelly, 2000) as the researcher tries to interpret experiences, and I found it so. Clarke and Parsons (2013) influenced my processes again at this point as I embarked on data analysis. Their rhizomatic methodology freed me up to let go of any tendencies towards an overly systematic scientific approach to the data and facilitated a more dynamic interpretative process in me. I was more open to a rhizomatic journey as I followed different interpretations and ideas, pursuing strands of meaning and potential concepts in different directions as I engaged with the interview data. This allowed me to access a richer level of interpretation. I utilized a descriptive thematic analysis of my interview data.

I had completed some practical NVivo training earlier in that year and had learned some of the basic assumptions and possibilities when using this application. I utilized it carefully and methodically with all of the rhizomatic strands that emerged in the data following a three-stage process of coding using NVivo 12.3.0 for Mac.

As each interview was complete I 'cleaned' the data and satisfied myself that my notes and transcripts were complete and understandable. I read each transcript very shortly afterwards and listened to the interview again during my daily commute getting an overall impression of the data as well as identification of key points, potential unique perspectives and unanticipated topics of interest. I then re-read the transcript asking what the data was telling me and as part of this initial data analysis, many different codes emerged from the data and some were identified in advance. I created nodes in NVivo and highlighted and arranged key quotes into these nodes. This was a process of open coding and I repeated these steps after each interview and for each transcript.

The second stage of my data analysis was that of Developing Categories where nodes from stage one were merged, collapsed or edited to form categories of meaning. In this stage

I looked at my interview data as a whole, beginning the process of identifying patterns and categories of meaning. I involved my supervisor at this point, seeking an alternative opinion on meanings as well as the importance of categories and key points. This process helped with accuracy and the resulting discussions regarding emerging patterns provided clarity for nodes to be merged or collapsed depending on my interpretations.

The third stage was Developing Themes, where the categories were further interpreted and distilled into themes. In this stage I re-evaluated the categories of meaning in the context of my research questions and interpreted which of them were the most significant key findings. The main research question 'Is the disconnect I experience between knowledge and epistemologies espoused and valued in physiotherapy research and those in use in practice alive for other practitioners' guided me. The overall key concept that came through and that I perceived to be most important was the idea of 'What is useful to know for the job of a physiotherapist in private practice in Ireland?'. From this overarching concept came themes, and for those that were deemed to benefit from additional analysis, subthemes were created. As the audience for the findings of this inquiry are physiotherapy practitioners, I chose to present the voice of the participants clearly and distinctly, through the inclusion of quotes throughout the data analysis.

Data and analysis from this element of the inquiry are presented in the chapter seven, *Epistemologies of Practice, Views from the Field*.

Chapter 6 – Re-introducing Deleuze and Guattari.

6.1 Reflexivity as I entered the field.

As I worked through the process of preparing for interviews, considering topics for discussion with participants, anticipating conversations and possibilities for analysis it became apparent that I was getting into something very difficult to describe. As I listened to my participants and sat back to interpret their words, I could see that the binary logics of propositional vs craft knowledge; EBP derived from research vs PBE derived from personal craft knowledge failed to offer me any valid language with which to understand the dynamism and complexity of practice. I grappled with how to capture their sentiments, how to do justice to their positions which were sometimes flipping between both sides of each binary. A new language and mode of thought was required, and I found it with concepts from Deleuze & Guattari. I realised quickly that the landscape of the epistemic field of the practitioner is a living entity that is actively evolving beyond my capabilities to describe it using lenses from Foucault that I employed in Section 2, *Archaeology of the Profession*. I felt that I was required to develop or draw on a language that could accommodate and name the complexities of practice, something that D & G has provided for me.

There were many months spent going back and forth in discussing their inclusion at this stage of the inquiry and considering if it was justified to go off on this tangent, which incidentally feels quite rhizomatic. I strongly believe that they bring something very potent that allows me to see practice and analyse it in a way that brings deeper meanings, and ways that I could not access without them. I have set out the D&G key concepts and terms that have helped me with this leap forward in my thinking when trying to do justice to descriptions of the epistemology of practice. These concepts are the rhizome, multiplicity, common-sense and difference and have helped enormously to analyze and appreciate the interview findings about physiotherapy practice.

6.2 D&G's Rhizome

In A Thousand Plateaus (1987), Deleuze and Guattari present their concept of the rhizome. In general terms, a rhizome is a botanical term to describe root structure of some plants as '*a*

continuously growing horizontal underground stem which puts out lateral shoots and adventitious roots at intervals' (OED online 2020) but can be conceptualized to mean much more. D&G's rhizome and rhizomatic thinking provide a fitting way of conceptualizing the complexities of physiotherapy practice. The rhizome has characteristics such as connectivity and heterogeneity; any point can be connected to any other no matter how similar. It can be ruptured or broken off at any point and will always start up again. Rhizomes have multiple entry points, there is no linearity from a beginning to an end point and a rhizome operates by variation, expression, offshoot. Following shoots can take you places in circles, down strands, dead ends and to unexpected destinations (Honan, 2007). The rhizome is conceptualized as a process though, rather than a structure. It allows us to question hierarchy and organization, and thus opposing rational approaches to knowledge and using the rhizome to think opens potentials for breaking different types of binary thinking (Clarke & Parsons, 2013). There is an abundance of biomedical cause and effect logic in propositional physiotherapy knowledge, and in the research methodologies that are privileged in the profession. Using the rhizome helps to see physiotherapy practice through multiplicities that arise with and in our patients and with and in ourselves rather than as a series of pre-planned rational standardized (Hall, cited in Remedy Physio, 2015) approaches. The rhizome morphs, redirects, moves in multiple directions at once, much like the physiotherapy practitioner.

'*The most classical and well reflected, oldest, and weariest kind of thought'* (Deleuze and Guattari 1987, cited in Clarke & Parsons, 2013:35) is how D&G describe binary thinking that emphasizes that which is stable and eternal. They contend that nature does not work that way: in nature, roots are taproots with a more multiple, lateral, and circular system of ramification, rather than a dichotomous one. If '*thought lags behind nature'* (Deleuze & Guattari, 1987:5), then it is possible that physiotherapy thought regarding research methodologies based in Western medical science as a way of generating evidence lags behind practice. This binary thinking is privileged in the knowledges of the north (De Sousa Santos, 2007), accepted without question yet, this thinking misses the point by limiting and decomplexifying in ways that disallow openness to what could be, (Clarke & Parsons, 2013). As Deleuze and Guattari (1987) say, "*Binary logic is the spiritual reality of the root-tree*" (1987:5). The rhizome and rhizomatic thinking are very different to the root tree and gives the opportunity to view everything as being connected, in flux and without the stability of hierarchy. Rhizomatic thinking can allow us to conceptualize a new freedom, to change the world in ways that do not seem possible. I feel there is something powerful in rhizomatic

thinking as potential to change the way that we generate our knowledge for evidence in physiotherapy.

6.3 Deleuze's Multiplicity

Multiplicity is another Deleuzian concept that can be useful to understand physiotherapy practice. Rejecting the One-Many dialectic Deleuze proposes multiplicity instead

> *Multiplicity must not designate a combination of the many and the one, but rather an organisation belonging to the many as such, which has no need whatsoever of unity in order to form a system. The one and the many are concepts of the understanding which make up the overly loose mesh of a distorted dialectic which proceeds by opposition.* (Deleuze 1994:182)

Instead of the opposition between the one and the many there is only the variety of multiplicity. In Dialogues, Deleuze (2002) states: "*In a multiplicity what counts are not... the elements, but what there is between, the between, a site of relations which are not separable from each other. Every multiplicity grows in the middle*" (2002: viii). It is in these spaces in between, where types of craft knowledge, like tacit understandings and intuition exist in practice. A good example of a qualitative multiplicity is a human emotion, something that cannot be counted or measured. It is virtual, subjective, and intensive; experienced in lived time; and differs in kind from another mood or emotion, (Tampio, 2010). "*Science accurately portrays one side of reality—the one that coheres into regular patterns that can be observed and catalogued. Philosophy's role, however, is to tailor concepts for purely unique events"*, (Tampio, 2010:2). If the human emotion is a qualitative multiplicity unable to be counted, then it will not be represented in physiotherapy propositional knowledge. The practitioner though, deals with and through emotion, negotiating with their patients through care, motivation and empathy. Besides living and working with emotion, the practitioner can also be a multiplicity when the flux of continuous change occurs in them as they interact with the body multiple of their patient. There will be different ripples or many-folds (Mol, cited in Setchell et al, 2018) that the physiotherapist practitioner shifts between as they work, dependant on what is happening in the clinical encounter and so, the concept of multiplicity is very useful to explain some of the complexities of practice.

6.4 Deleuze's Common Sense

Deleuze is not impressed by thinking that passively mirrors or represents the world. He suggests that most of the time we fail to really think, '*simply wallowing in the inertia of*

common sense' (Colebrook, 2020: 2). If inertia means a tendency to do nothing and remain unchanged, then Deleuze's conceptualization of common sense is as a form of representational thinking, where we are unable to conceive of difference in itself. It is problematic for Deleuze in that it conforms thought and action,

> *On the one hand … acts of recognition exist and occupy a large part of our daily life: this is a table, this is an apple, this the piece of wax, Good morning Theaetetus. But who can believe that the destiny of thought is at stake in these acts, and that when we recognize, we are thinking?* (Deleuze, 1995: 135)

Deleuze (2001) says that to destroy the pacifying and stabilizing intellect of common-sense, thought has to move beyond the logic of fixed terms. The acceptance of EBP as a logical common-sense approach to physiotherapy practice mirrors the weary thought associated with binary thinking (Deleuze and Guattari, 1987). Deleuze suggests that if we think of life as desire (Grace, 2009), we no longer have any single foundation or ground which we ought to obey. What something IS, is its flow of desire, but desire is not based on the lack of something, rather it is productive. The physiotherapy profession uses EBP, as it serves the desire for legitimacy. It also serves the scientific biomedical desire to be orthodox and moving in the same directional current as other dominant forces in society. Common sense is an interesting concept in physiotherapy, at face value it would be endorsed as useful and logical, much of what physiotherapy is, though the Deleuzian interpretation of it allows for a strong critique of the status quo approach.

6.5 Deleuze's Difference

The Same is privileged in physiotherapy research, like most of the Western scientific world and Deleuze worked to build an ontology of difference and overturn this privilege. The critique of science in *Difference and Repetition*, (Deleuze, 1994), is that a lot of scientific principles and thinking are based on the assumption that because things have been so in the past, they will continue to be so in the future. This causality is based on what Deleuze calls habit. It can be useful to look at scientific methodologies in physiotherapy that seek to establish causal evidence. Instead of working from this habit, if we could foreground difference, to find beauty in difference, to seek heterogeneity rather than homogeneity, to focus our desire toward the unfamiliar, the strange, the new in practice, would we be able to conceive of and access our practice knowledge in a deeper way? Would we be able to form more versions and better variations of craft knowledge? A Deleuzian aesthetic is predicated, at least in part, on change, movement, transformation, repositioning, shifting, flowing,

mutating, multiplying and generating, (Shaviro, 2007). Physiotherapy practice can be many of these things.

Chapter 7 - Epistemologies of Practice: Views from the Field

7.1 Presenting the Participants.

Twelve physiotherapists agreed to participate in this research and to be interviewed. They fit the inclusion criteria (chartered and CORU status, work most of their time in private practice and specialize in MSK: see chapter five) and their eligibility was satisfied. They varied in age, physiotherapy experience and level of postgraduate education, which was not pre-conceived or pre-planned but simply how the data broke down. I assigned each participant a pseudonym, that corresponded with the letter of the alphabet that aligned with the sequence in which I interviewed them. The pseudonym I allocated also matched their gender. For example, Participant One was a female physiotherapist for which the letter A was used, and her pseudonym is Anna. Participant Four, a male, was allocated the pseudonym Damian, and so on. The following is a brief description of each participant in terms of education, years of experience and where they work.

Table 7.1: Participant Detail

Participant	Pseudonym	Gender	Education	Years of Experience	Occupation Detail
1	Anna	F	BSc Physiotherapy UK MSc Sports Medicine IRL	20+	Clinic Owner Sole Trader
2	Belinda	F	BSc Physiotherapy UK MSc Sports Medicine IRL	20+	Clinic Owner Sole Trader
3	Conor	M	BSc Sports Medicine UK	20+	Clinic Owner Employer
4	Damian	M	BSc Athletic Therapy IRL MSc Physiotherapy IRL	5-10	Clinic Owner Employer
5	Eamonn	M	BSc Physiotherapy UK	5-10	Clinic Owner Employer
6	Fergal	M	BSc Physiotherapy IRL	5-10	Clinic Employee
7	Grace	F	BSc Physiotherapy UK	0-5	Clinic Employee

8	Hannah	F	BSc Physiotherapy UK MSc MSK (ongoing) IRL	10-15	Clinic Owner Employer
9	Ivan	M	BSc Strength & Conditioning USA MSc Physiotherapy UK	10-15	Clinic Owner Sole Trader
10	Jill	F	BSc Physiotherapy UK MSc Sports Medicine IRL DPT USA	20+	Clinic Employee
11	Keith	M	BSc Sports Science UK MSc Physiotherapy UK	10-15	Clinic Director
12	Luke	M	BSc Sports Rehabilitation UK MSc Physiotherapy UK MSc MSK UK	5-10	Clinic Director

As can be seen from Table 7.1, participants varied in years of experience, with Grace having less than 5 years, and Anna, Belinda, Conor and Jill have more than 20 years' experience working as a physiotherapist. Ten participants worked full time in private practice, while two; Anna and Jill also worked in education in addition to their private practice jobs. Three participants; Fergal, Grace and Jill were employees of a clinic. Three participants were sole traders, working in their own clinic by themselves. Four participants were clinic owners that employed more physiotherapy staff and two participants ran busy clinics as directors of services but were not owners of them.

7.2 Data Handling and Sorting

As outlined in chapter 6, once the interviews were transcribed and checked for accuracy, time was allowed for participants to check and potentially redact aspects of them. Once those procedures were completed, the next stage of coding was begun, informed by my field notes and research journal that I wrote over the period of conducting the interviews. A three-stage process of coding using NVivo 12.3.0 for Mac was utilized as part of the descriptive thematic analysis process. Open Coding progressed to Developing Categories and on to Developing Themes, and following that process of analysis, an overall concept of 'What is useful for the job of private practitioners of physiotherapy?' emerged. From that overall conceptual layer, 4 themes emerged. The themes are as follows

- Knowledge and Skills Useful for Practice,
- An Evolution in the Practitioner Approach,
- How is Research Useful for Practice?

- Physiotherapy Practice with Unique Tacit Understandings.

The following section outlines each theme, the findings associated with it and my analysis of those findings.

7.3 Interview Findings

7.3.1 Knowledge and Skill Useful for Practice

Ascertaining what types of knowledge these practitioners, a small sample of physiotherapists in private practice in Ireland draw from as they do their job was the focus of the interview phase of this inquiry. I was interested in what these participants had to say about knowledge that they use and is useful to them. This resulted in 'Knowledge for Practice' emerging as a dominant theme. Within this theme, I have identified four subthemes:

- Foundational knowledge as technical propositional knowledge.
- Exploring with others – the insights of colleagues and patients
- Caring as a type of craft knowledge useful in practice
- The place for intuition, useful or not?

7.3.1.1 Foundational Knowledge as technical propositional knowledge

There are the aspects of physiotherapy assessment, clinical thinking and clinical reasoning that are standardized across all universities and training sites. This type of knowledge, these ways of knowing how to be, how to act and to perform as a physiotherapist practitioner are basic components of assessment and treatment procedures found in the formal physiotherapy curricula at undergraduate and postgraduate levels. They give context to the start-point for physiotherapists in practice, a place from where to begin the navigation through the clinical encounter with a patient. Interviews explored foundational knowledge and whether it is useful in private practice.

As each practitioner outlined their standard approach and the shape of their usual clinical encounter during the interviews, and the similarities between them were striking. The physiotherapy student learns to structure assessment in a particular logical way moving from a 'subjective examination', asking questions about the problem and listening to the patient's responses, and progresses to 'objective examination' where the physiotherapist assesses

movements, and specifics of joints and tissues. A type of standard sequence that is typically followed was acknowledged in the data, where the physiotherapist follows technical lines of inquiry, focussing on the patients presenting complaint and assessing for deviations from a concept of a 'normal body'.

> "*I stick to a methodical sequence in my subjective and objective…that I would have picked up in University first of all",* (Ivan, Participant 9).

> *"So, I would still go through the very main subject headings of presenting condition ... history of presenting condition, past medical history, social history, family history, all the rest. In the objective the same, I would always start with inspection and observation, going to a movement exam, different types of movement exam, and then a battery of special tests*", (Jill, Participant 10).

This approach to assessment follows a standard sequence which is often logical and easy to learn in the early days. This standardized approach learned as an undergraduate is still useful for these private practitioners and utilizes the body-as-machine, (Nicholls & Gibson, 2010, Nicholls et al 2015) viewpoint. There is linear logic in this method, which illustrates how the physiotherapist uses standard propositional 'disciplinary knowledge' as they learn to see the body in this way from early in their education.

The way the physiotherapist in practice approaches the body is typically formed at undergraduate level and shaped at postgraduate level, according to some of the physiotherapists that I interviewed. While this physiotherapy-specific knowledge is dynamic to account for new developments, the participants in my study report it as providing a 'common-sense way' for the physiotherapist to perform history-taking, assessment, and basic treatment. Most participants had undertaken formal postgraduate physiotherapy education in order to progress their practice abilities, with a large focus on diagnosis formulation with more or " *a different level of assessment.*", (Luke, Participant 12).
Assessing to form a diagnosis comes from the biomedical health concept (Wade & Hellinger, 2014) which embeds the view of body-as-machine (Nicholls & Gibson, 2010) with the physiotherapist as mechanic to the mechanised body. Interviewees demonstrate that their fundamental start point for thinking as they practice is quite biomedical and uses cause and effect logic. This requires understandings of the body's anatomy, physiology and biomechanics, using it to assess for dysfunction and also in formulating how to treat that

body. To analyse this type of foundational knowledge with a Deleuzian lens, it is clear that it follows a linear logic, plotted points and fixed ordering with an enduring 'how to' sequence. Foundational knowledge for physiotherapy aligns to the root book and the arborescent where hierarchy and organization of thought dominate, and the rhizome does not fit.

7.3.1.2 Exploring with Others – the insights from colleagues and patients

Beyond the linear habits of structured assessment, every participant described collaborative peer learning and peer support as elements of their learning in and for their practice. There was strong agreement about the value of observing together, discussing, troubleshooting problems and contributing to potential solutions with colleagues. Utilizing a lead clinical specialist with which to discuss difficult cases, the value of setting aside time to explore challenges as a group, and the value of working as part of a multidisciplinary team were emphasised as invaluable tools for learning and gaining practice knowledge, much of which is craft knowledge. The image of the rational expert that is a key aspect of the popular image of the allied medical professional is undercut by what the interviewees say. The model of 'clinical reasoning' on the basis of established propositional or technical knowledge to which the rational mind has ready access is not one the majority appear to hold. Instead, participants present a model of collaboration and dialogue, of coming to know through an encounter with otherness. The value of this way of learning and adding useful knowledge for practice was emphasized by many participants. For example, "*Probably 80% of what I was learning was bouncing things off others I think in the initial stages*", (Luke, Participant 12).
Collaborative learning as a means of fostering practice knowledge is presented as accessing each other's practice experience and the wisdom of senior physiotherapists, types of craft knowledge (Higgs 2012; 2014; 2019). Anna illustrates this point when she shares,

> "*In private practice I would have worked as a fairly new grad physio I would have worked alongside experienced physio's, so whenever I had a difficult patient I would bring them in to have a quick look at them, or talk between patients or whatever*", (Anna, Participant 1).

The process of professional socialization that occurs as student physiotherapists develop a commitment to a professional career comes through from the data, as they learn the values attitudes and beliefs of physiotherapy (Richardson, 1999). Beyond the internalization of the specific culture of the physiotherapy professional community, the journey of professional development is also part of the dynamic process of professional socialization, where a

practice community is recognised and utilized as the physiotherapist student and novice graduate develop their knowledge and skills of clinical reasoning (Ajjawi & Higgs, 2008). The process of professional socialization requires relationships between peers, mentors and patients and the learning occurs via these relationships in clinical settings that are different, diverse and unpredictable (Elliot et al, 2021). Role models (Ajjawi & Higgs, 2008), mentors (Fitzpatrick et al, 1996, Miller et al 2005, Jensen et al, 1999, Bartlett et al, 2009), previous experiences (Howkins & Ewens, 1999) and reflection (Ousey, 2009) are especially important in cultivating the dynamic and very individual process of professional socialization (Sadeghi Avval Shahr et al, 2021).

The multidisciplinary team (MDT) which consists of differing professionals with whom to collaborate about possible treatment options and ideas was seen as useful for developing knowledge and skills for practice, as described thus,

> "*We have a team meeting every weekend, we have two psychotherapists working with us. And when you sit down in our team meeting and we talk about a client and they talk from the psychotherapy point of view, and we talk from a physical point of view, you see this total blend. I think working in that team, so that's a huge advantage. There are psychotherapists, they have no idea about the physical side. We're treating the same person*", (Conor, Participant 3).

These interviewees value knowledge that is constructed through dialogue between therapists in a professional context. All of the physiotherapist practitioners were very invested in this way of checking, questioning, exploring and being creative with potential solutions to their patients' problems. Learning together as a practice community and allowing exploration of possibilities invokes the rhizome (Deleuze & Guattari, 1987), seeking different entry points, other avenues, movement away from linear clinical reasoning logic. They add different vantage points for a problem and layer in other approaches informed by their peers. This is an example of construction of practice knowledge with peers through dialogue and creative practice. There is alignment with Patton et al's (2013) research on physiotherapy learning in the workplace where social learning (Rogoff, 1990, Vygotsky, 1978) and reflective and critical thinking (Schon, 1983, Dewey, 1933), are theories of learning that physiotherapists draw from, as is the practice of embedding themselves in a web of relatings to colleagues, (Kemmis, 2009), as well as patients. It also resonates with the notion of knowledge being relational and co-created through dialogue. This is a concept of relationality, where through a bond of solidarity, dialogical relationships should embody love, trust and humility (Freire,

1993:70-72). This would see the physiotherapists, through the act of dialogue and praxis (Margonis, 1999), in a comfortable and trusting environment, learning from each other and together. This practice of exploring meaning together may also help to deal with uncertainty absorption, a concept from complexity theory thinking where shared sense-making is conducted through clinical dialogue in order to process the uncertainty and unpredictability or patient presentations and treatment options (Lanham et al, 2014; Khan et al, 2018).

Learning from peers is not the only source of useful knowledge. Managing different patient presentations, treating large numbers over time and the cognitive engagement with each case is the experience of the physiotherapist in practice. Interviewees demonstrate a commitment to a pragmatic orientation to knowledge, seeing their experiences in the clinical encounter as a valid source of coming to know as a professional physiotherapist. Putting in the hours on the ground, collecting knowledge of what worked and what did not work in terms of treatment approach, storing experiences of interesting patients, challenging situations, making mistakes and simply spending time over the years thinking about patients were all classed as valid sources of practice knowledge. Accumulating large numbers of experiences of similarity, differences and diversity provided a rich quality to practice knowledge. For example,

> "*That whole spectrum...how do you do it and what do you do with this patient. I think you need numbers, and hours on the ground. At the coal face, yeah.*", (Conor, Participant 3).

And,

> "*The more experienced you get, the more patients you see, you're processing all the information that they're giving you*", (Ivan, Participant 9).

As something that cannot be replicated outside of actually doing, participants agreed that physiotherapy assessment, treatment, rehabilitation and the management involved in each clinical encounter means that 'doing' over and over, with refining adapting and tweaking as appropriate, in different patient contexts leads to knowing and knowledge, that is of great benefit for private practice and forms practice-based evidence (PBE) (Green, 2008, Green & Ottoson, 2004). Using repetition, nuanced with subtle refinements, to build experience as a type of practice knowledge resonates with Deleuze's ontology of difference. Foregrounding

difference allows a practitioner to repeat their assessments and treatments while appreciating the changes as sources of learning and knowledge. Interview data suggests that gathering experiences is crucial for developing practice knowledge, and in the repetition of these experiences physiotherapists may be appreciating difference and gaining knowledge from it.

Furthermore, biographical knowledge is likewise a strong epistemological resource as personal and life experiences of the individual therapist were regarded as strongly contributing to practice knowledge. This was summed up well by interviewees who described their own sporting and injury careers,

> "*So, I was always interested in that side of it because my experience in the fitness industry and being an athlete myself and having had surgeries and being through physiotherapists for years as a player, I would've always thought about that side of things. The questioning, the answering, the thoughts of the patient, the thoughts of the clinician. So, I suppose that would've guided me then when I started working. I would have been very interested in that*", (Ivan, Participant 9).

Similarly, interviewees who commenced physiotherapy education later in life felt that their mature student status was something that contributed to useful practice knowledge,

> "*Interestingly, life experience is something that I draw from. That's one thing that I would say and taking the university out of the equation. Experience has taught me a lot. Biggest factor is probably our experience and I say it's 30% experience and 30% the person you are. The rest of it is the things you've learnt*", (Luke, Participant 12).

Immediately there is a resonance with Higgs (2014), who identifies personal knowledge from life experience as part of the broader craft knowledges that are at work in physiotherapists' practice. Practice experience is validated as a common epistemology for these interviewees who utilize the breadth of life experiences from which to apply, integrate and make sense of their formal training.

7.3.1.3 Caring as a type of Craft Knowledge, useful in practice.

Propositional technical knowledge in physiotherapy manifests for the practitioner as learning things that you can do <u>to</u> a patient with the intention of helping them. There are many techniques, approaches, management strategies and referral options that may be adjusted for different types of patients all of which are embedded in a biomedical viewpoint and aligned

with the body-as-machine and physiotherapist as mechanic concepts. However, this analysis overlooks large aspects of the therapeutic relationship, and the intentions around care that the physiotherapist adopts. Interviewees spoke passionately about their interest in their patients, their striving to understand what is happening for their patient, they describe the way they care about their patient and what outcomes await them. The notion of caring came through from a number of the participants,

> *"I think also, making everyone that you meet know that you care about them. And that you care about their well-being, and that you care that you get a good outcome for them. But I think it's that element of care that we just care for people plays more of a part than the why we do what we do. I probably overthink or over worry about some of my more complicated patients and I want to get them better and I'm hoping that I can do something to improve their lives. Especially if they're very complicated and in a difficult situation*". (Belinda, Participant 2)

This is echoed by Damien when he shares,

> "*In a lot of cases, people just want to know that something's going to happen. They're going to be looked after. I'll, I suppose, set a quite clear thing, in essence, with those types of patients. I don't really care if you get better in my four walls, or in someone else's four walls. Just as long as you get better. And often, you just see people go, -sigh-. There's this relief or this drop thing, because one, it's the truth, and two, people tend to respond to that. I firmly believe that if you're a physio, and you didn't get into the job, or the vocation, you could say, because ultimately you have an inherent wish to help people, then I don't know why you're doing it*". (Damian, Participant 4)

Beyond the altruistic qualities in these quotes there are also the more basic and strategic reasons of getting the patient on board with treatment and rehabilitation plans. Switching to the patient's perspective will facilitate connections of care and this is also perceptible in these quotes.

Investing time and energy to find solutions, transcending signs and symptoms to get towards understanding of deeper lived experiences and pausing to listen and empathize are characteristics of the practice knowledge that was displayed by interviewees in this research. They were driven by creating connections of understanding with their patients, understanding

where they were in their lives, how they viewed their injury and themselves. These perceptions were considered very useful to the physiotherapist in deciding how to treat them.

> "*I think I would be naturally interested in people's stories and people. What's their story? I'm very poor with names, but if I see someone, I can remember their whole story.... that would stick in my brain forever. That would help an awful lot. Because a lot of times you're sitting there listening to stories and listening to people's perception of it, and really, you're trying to work out where they're coming at their view of their problem*", (Conor, Participant 3).

> "*And also, for me, one of the big things is, I wanna know the personality of the patient that I'm dealing with in my subjective assessment. So, one of the first things I'm looking for is to get an idea of, is this a very anxious individual? Is this an angry person? Is this a confused person? So, they're the things I know the textbooks don't tell me. But I was always thinking that way, even as a student*", (Ivan, Participant 9).

Conor especially had a lot to say on this topic as a physiotherapist with a lot of experience of patients with chronic pain and as somebody who has reflected on the qualities needed in the clinical encounter. The example he provides is worth quoting at length,

> "*I'm actually getting a feel for the person. I'm getting an intuitive feel for this person. I'm just working out are they worried about this thing, are they hypersensitive about this thing? Are they the opposite, are they totally blasé about something that could be quite serious, are they dismissive of it? I try and work out where they're coming from with this. I don't ask those questions straight out, and I don't have forms for measuring stress or measuring psychological impact and any of that. I do it intuitively. But it is something that from the very minute I'm thinking about what's going on with this person. His view of this injury, or what's happening". "I often sit there for an hour with their long histories. As in, when did this begin, right back to the beginning. And often these stories evolve to be very complex and very old problems. These are people in their 50s and you go back, and an incident happened in their 20s. It could be falling off a ladder, it could be something simple as that. That impacted their whole lives. And it's almost always some psychological overlay on this. Which came first, was the psychology there, is the anxiety and all these things there because of the actual injury, or did the injury not heal properly because of their anxiety and because there are other things"* (Conor, Participant 3).

There is a genuine interest and care visible in this data. Dahl-Michelson's research (2015) suggests that a curing intention comes from a biomedical perspective, whereas a caring intention comes from a social and relational perspective. As both are present and implicitly entangled, they cannot be separated (Dahl-Michelson, 2015). Caring and seeking to engage with issues relating to the whole person is holistic and relational practice. It does not fit reductionist simplified biomedical perspectives and aligns better with the craft knowledge domain. That said, curing and caring are not binary intentions and should not be separated thus (Dahl-Michelson, 2015), with physiotherapists likely holding both simultaneously. Finding a way to help your patient is manifested in learning more about them, and giving the time and energy to their story, which is a form of care.

The physiotherapist's communication, especially their use of language pertaining to diagnosis, goal setting and motivation has become a focus in practice, as research outlining its benefits has filtered through. Some of this is based in research that has been adopted in the physiotherapy community over the past 5-10 years and some comes from individual experience and practice knowledge. Participants considered how they describe aspects of injury, impressions they give for potential prognosis or rating of injury levels,

> "*There's an awful lot of sort of psychology involved in it, certainly with athletes who are very vulnerable people, how you present something to them and how you deal to them. Again, early in my career I would have been thinking I was doing spectacular treatments on them, and I was the one creating the environment to get them back on the pitch, and now I suspect what's happening is that you're just reassuring and letting them know it's okay to play*", (Conor, Participant 3).

They considered how they explain symptoms and frame conditions as crucial in how a patient will perceive themselves, their injury or condition and how they will deal with it,

> "*Be positive with somebody that young. Send out the wrong message then they'll mull it over and they'll think about it*", (Fergal, Participant 6).

Interviewees saw their communication in the clinical encounter as being crucial and displayed an investment in care through language choices as a valid source of knowing how to achieve good outcomes.

The role of communication between patient and physiotherapist is of critical importance, with a key point being that physiotherapists need to acknowledge the worlds that they co-create through language. In some instances, there may be a one-way conscious effort of communication from the physiotherapist upon the patient, reflecting the biomedical linear cause and effect approach that dominates propositional knowledge. Drawing from my own practice I am aware that for example, if I say the wrong thing, it can have a detrimental effect. If I use the right words, I can help my patient. Research outputs regarding words that heal and words that harm (O'Sullivan 2005, 2012) may result in a transformation of therapist-patient communication into a formula of learnable propositional knowledge. This interview data suggests that real life clinical encounters cannot be simplified in that way but are a socially constructed two-way dialogue that can never be formulaic thus becoming a craft and personal knowledge.

Through communication many participants identified empowering and motivating their patients as a key aspect of what they do, a key skill that is useful for the physiotherapist in private practice.

> "*For me it's about empowering the patient and I find that if you get too drilled into a method, then they are reliant on you. And my job as a physio, as far as I am concerned, is to empower the patient to understand how their body works and give them more skills to be better. (Some patients can be) a little bit trickier to empower, because sometimes they don't want to be empowered, they just want to be minded. And that's okay. But for me then it's about well let's try and space out the amount of minding you need. So, they have more control of themselves*", (Belinda, Participant 2).

There is care on view here again, grounded in relational understandings between the practitioner therapist and her/his patient, where a safe space is established in order to interpret signs and symptoms and translate them into meanings, together. Caring for the patient with psychosocial elements to their physical problems requires craft knowledge. The physiotherapist who uses their personal knowledge from life experience and engagement with

patients, and can utilize practice artistry and wisdom (Higgs, 2012, 2014, 2019) will have success. These traits were visible in these participant physiotherapists.

7.3.1.4 The place for intuition as useful or not?

Finding a place for therapist intuition and judging its relevance in practice, where clinical judgement is based in a version of Higgs' (2014) practice artistry may be at odds with some expressions of the physiotherapy profession (Grimmer-Somers, 2007). Interviewee participants, however, could recognise their own intuition in some contexts and gave examples of when and how they use it to make decisions about treatment choice or timing of a particular treatment based on nothing other than an instinctual understanding that it is the right choice at that moment. This suggests a level of comfort with trusting their own judgement in situations where it is not possible to explain rationales for treatment or being able to root practice in formal evidence. Interestingly, the participants who were tuned into their own instincts were those who were older, had more experience as practitioners and had seen treatment techniques come and go from favour.

> "*'Do you know what? I'm going to do this. Don't ask me why I'm doing it, I just have a gut feeling that this is going to be something that might help and it's based on all people I've treated before and it's not based on anything I've read or had proven'. So sometimes it's instinct*". (Anna, Participant 1)

Intuition is endorsed by many participants, although claiming it as a source of knowledge was not comfortable for these participants,

> *"Sometimes you're guided to do something that's, you might describe it as instinct or a gut feeling of where you should focus your attention. 'Cause you obviously might have four or five potential things that you could do and you have to choose one of them. And that's instinct, you could say, but I would say it's probably more, your brain is processing things and guiding you based on how it's considered everything*". (Ivan, Participant 9).

Instead of their intuition participants saw years of hard-earned craft knowledge, techniques honed through trial and error and 'tested' in the real world of practice.

While trying to identify useful knowledge and skills for physiotherapy private practice, the idea that clinicians who excel in their practice may succeed because of their intangible abilities, came through "*I do think it sometimes is people are just better. They have this ability ... Everyone's different*", (Luke, Participant 12). As these intangible aspects of practice know-how emerged in conversations some interviewees acknowledged intuition while also resisting it as a valid epistemology. Instead, intuition was reframed as learned understanding from experience

> "*I'm actually getting a feel for the person. I'm getting an intuitive feel for this person….So during that conversation I'm trying to work out exactly what's happened. And I think that is probably intuitive. But if you're doing this every day for 25 years, you learn it. I don't know if it's an innate thing*", (Conor, Participant 3).

Or reframed as excellent communication skills,

> "*I think, you know, outside from clinical reasoning, I think it really comes down to, I think you could call it intuition, but I think it's communication, really. I think, in being a good communicator, you can pretty quickly work out what type of person that patient is. You know? So, I think, if that's using your intuition, okay, then I think it's pretty important. You're basing the intuition on lots of things, skill set and knowledge and all that kind of stuff. If they aren't adequate, well then, your intuition is going to be pretty poor*", (Damian, Participant 4).

This suggests intuition becomes ingrained in other skills and techniques and not necessarily something that is separate. Where there was resistance to intuition being accepted as a valid epistemology, it manifested as conceptualizing intuitive practice as the antithesis to evidence-based practice.

> "*The point he was making was, again, let's not be a slave to the hierarchies of evidence, but let's start to trust some of our clinical intuition, you know*?", (Keith, Participant 11).

Interview data analysis suggests that there is a tension between intuitive personal knowledge and being able to ground those decisions in some evidence.

Working from intuition exists as a valid epistemology to some extent for physiotherapy practitioners in Ireland, though it is not something that is very visible. For some interviewees it held tension with propositional knowledge (Higgs and Titchen, 1995) and truths that have been derived from research findings and backed up with evidence. The craft knowledge domain of Higgs (2014) is reflected in this intuitive epistemology, and what she describes as patient-physiotherapist communication, intuition and imagination. These are types of implicit knowledges from complex practice situations are likely to be more personal, emotional and dependant on context (Clarke & Wilcockson, 2002; Green & Wood, 2013; Kienhius et al, 2008). The younger participants identified less with their gut instincts than the older more experienced physiotherapists. Some participants qualified intuitive practice as the instinct of the expert in standard physiotherapy disciplinary knowledges, when confronted with complexity, not knowing or not fully understanding is allowed. Intuitive knowledge is a way of trying to name the understanding of the spaces in between. This is where the qualitative multiplicity (Deleuze, 2002, Tampio, 2010) exists; virtual, subjective, intense.

Interviewees subscribe to the idea that the effective physiotherapist practitioner is flexible and has the ability to morph into different versions of themselves based on the individual presentation before them,

> "*For me, good physios actually have to morph, depending on their immediate clinical environment and their immediate clinical patient,*" (Keith, Participant 11).

Perhaps this is driven in some part by intuition to switch between different epistemologies which overlap, are interdependent and often unconsciously adopted. Consciously changing approach is seen as a skill of a successful physiotherapist in private practice. Picking up on signals from the patient and adapting as a tactic to deliver treatment, coach the patient, motivate them and go about the aspects of treatment and injury management that are required for successful outcomes.

> "*It's the one thing that I think, gives me most success with patients, is, okay, if I've got an angry patient in, that will affect the way I talk to that person, the questions I ask. If I've got a very anxious patient, again it will affect, okay, I need to be careful on how I describe their condition. That's what makes you more or less successful as a physiotherapist. How good you are at reading personality types and recognizing how to manage those personalities through their rehabilitation*", (Ivan, Participant 9).

This data illustrates how the physiotherapist practitioner tunes in to their patient, understanding how the psychological connection between them will determine a good portion of the outcome for her/him, reinforced in the following quotes,
"*I really do believe that developing the ability to connect with your patient, you're winning already*", (Ivan, Participant 9).

"*But their* [some physiotherapy colleagues he knows] *connection with their patients is a real difficulty for them and often they won't get the results they should get because they are just not able to psychologically have that connection with the patient*", (Luke, Participant 12).

Knowing what will help your patient is borne from the social situation and the therapist-patient relationship that is embraced for the clinical encounter. Understandings that have been constructed through dialogue (Freire, 1993) and the use of craft knowledge from intuition and care are seen here as valued epistemologies for practice.

There is also clear evidence of the physiotherapist adapting their persona and role here. "*Yeah. I do think we need to be plastic in a way and be able to adapt our assessment and our treatment and our management*", (Jill, Participant 10). If it goes deeper than simple adaptation, it mirrors the rhizome as behaviour in practice. If practice is rhizomatic, it is not linear or singular, but something without a clear structure. To practice with a rhizome is to unveil many ways to approach a thought or activity of practice. It provides a way to show that everything can be multiple and interrelated. The rhizome morphs, redirects, moves in multiple ways at once (Clarke & Parsons 2013), as these practitioners are doing.

The best practice examples of the shifting positions of the physiotherapist relate to passive manual therapy versus more active patient-led management. These examples illustrate the challenge for the clinician navigating through EBP while serving various needs of patients and business. All participants described their philosophy as being aligned to the concept of active management as the best option;

> "*We're trying to not get people dependent on us as therapists*", (Eamonn, Participant 5).

> "*So, yeah, I think that ... that creating an autonomous type of patient where they're less dependent on you as a clinician, that would be my goal*" (Ivan, Participant 9).

They also understood that patients attending the physiotherapy practices of Ireland expect hands-on touch-based manual therapy, expect to have their tissues manually moved and expect to be touched by the therapist, at least for some of their appointment time;

"*I think we're probably driven a bit by people expecting us to do certain things. They're expecting us to put our hands on them*", (Fergal, Participant 6).

"*They come in looking for a mechanical treatment. Like they're bringing a car into a garage to be fixed*", (Ivan, Participant 9).

While completely avoiding manual therapy is practically impossible,

> "*If I was to bring somebody in for half an hour and just talk to them that wouldn't be a good outcome for me I suppose",* (Fergal, Participant 6).

> "*But if you're spending a lot of your time doing that, and you're not getting them down the treatment bed, the business model would suggest people aren't gonna be happy with that. And I've had feedback from patients at times saying, 'When are you gonna do the physio?* "", (Ivan, Participant 9).

There was a sense that touch therapy made patients feel better, even if it was only short lived, and that was the buy-in or elemental foundation for the rest of the treatment session. The tension between navigating expectations-led therapy and therapist utilizing latest evidence in the session was alive in the data. Providing a service knowing that a patient wants while knowing what will work are all aspects of useful knowledge for practice in the private sector. The interviewees suggest they can navigate the tensions between desire for treatment that may not be effective in the long term and treatment but that satisfies their patients expectations.

Practices are businesses in the private sector of the economy. The patient will act in a neoliberal way, choosing their therapy, therapist and clinic using rational choice and economic calculations based on the market in their area (Praestgaard et al, 2015). The physiotherapist cannot avoid this, and if the patient is paying for the expectation of manual therapy, most physiotherapists will go along with that choice. As Moffat & Kerry (2018) ask: "*How are physiotherapy practitioners to address the issue that our emergent 'evidence base'*

does not necessarily align well to consumer preference?" (2018:187). These interviewees address the issue by holding both positions simultaneously, conflicting as they may be, they are comfortable to use their clinical judgement and practice participative therapy with their patients who have agency. Holding positions that conflict with each other breaks the binary rational thinking that permeates physiotherapy disciplinary knowledge and opens up to rhizomatic (Deleuze & Guattari, 1987) practice.

7.3.1.5 Useful Knowledge for Practice Summary

These physiotherapist practitioners hold different positions, dealing with many different scenarios at once. They draw from basic propositional knowledge, keeping the usual structure of assessment that they learned in college. They then use their colleagues, utilize practice-based evidence generated through experience accumulated with different patients, and break away from linear cause and effect to participate with their patients in a profoundly relational communicative way. They care for their patients and listen to their stories before deciding on bespoke treatment. They are not quite sure if they use intuition or if it comes from years of practice wisdom. But they always go beyond biomedicine, beyond linear, beyond binary into the rhizome (Deleuze & Guattari, 1987).

7.3.2 An Evolution in the Practitioner Approach

Evolution of one's practice was a strong theme that emerged from the interview data. Interviewees saw the novice physiotherapist begin with a limited set of resources and progress their thinking and how to approach treatment via different means. Some of these changes would happen naturally as the novice grows older and gains contexts from life. Other changes to preferred clinical approaches linked directly to research dissemination and some through processes of early professional socialization and continuing professional development. Furthermore, a change in focus was described, from targeted and zoomed in to holistic, and from pathology to person, all the while generating practice knowledge via experience and reflection.

Within this theme there are three subthemes:

- Getting better – engagement with CPD
- CPD as Guru-disseminated knowledge to evolve practice
- Zooming out to get better

7.3.2.1 Getting better – engagement with CPD

CPD is one of the touchstones of being a profession (Houle et al, 1987) and for these physiotherapy practitioners it is a large part of their professional lives. There is no doubt that further education, training and short courses are fundamental means for the physiotherapist in practice to access more knowledge, different knowledge and deeper understandings. Continuing professional development (CPD) courses over the years hold value and were identified as drivers of change, for example;

> "*Yeah, it certainly changed my approach more than any other course did. But then, I suppose, all the courses I did have changed how I practice little by little and over time*", (Anna, Participant 1).

Interviewees strongly believed that there is always more to know, more knowledge to access, and that useful knowledge for the physiotherapist practitioner can be found in formal courses teaching theory and skills. CPD activity was identified as a normal activity, part of the identity of the practitioner in this field,

> "*Any physio that I've ever worked with would be fairly good at doing one or two courses a year. And I think that's really important because I think we need to stay informed at the evidential level and we need to question things that we do ... and things move, yeah*" (Jill, Participant 10).

The idea that CPD is an essential part of not being left behind was highlighted by Eamonn who described how the National Institute for Health and Care Guidelines (NICE) for treatment of chronic low back pain changed over the 5 years he had been in practice, "*So CPD is essential, and when I came out [of university] the NICE guidelines for chronic lower back pain was acupuncture, and that's changed in the last two years, so it changes, so if you're not on top of it…*", (Eamonn, Participant 5). There is an acceptance of needing to continuously engage with new ideas and new research. Underpinned by a perception of knowledge as dynamic, transitory and fluid, interviewees strongly subscribed to the need for engagement with new knowledge suggesting that these practitioners did not want to sit and work with the knowledge and skills that they already had, but instead wanted to tune in to anything that can make them better, more knowledgeable, more skilful.

The types of formal physiotherapy CPD that are available and seen as useful have changed over the years, with changes driven by research findings as thinking adapts on the back of newer evidence. The participants who were in practice for 20 years could look back clearly on the types of CPD that was available in the musculoskeletal world when they were novices, and all remember the emphasis on a core number of manual therapy courses that were derived from the theories of recognisable names in physiotherapy. More recently, as the evidence for their effectiveness has begun to wane in the literature (Rabey et al, 2017, Reid et al, 2017, Mintken et al, 2018), there is a lot less emphasis, and indeed criticism (Meakins, 2015) of the continued use of those techniques. Early career engagement with CPD was the same for each of the experienced interviewees;

> "*Back at the beginning I'd would have done a lot of manual therapy, musculoskeletal assessment, musculoskeletal treatment. So, a lot of assessment and treatment and initially I did Cyriax training which is sort of a very formal approach to how you assess and treat patients"*, (Anna, Participant 1).

> "*The early days, it would have been very course focused. So, you would have been driven to do some of the MSK courses at the time. The Cyriax and Maitlands and Orthopedic A, B and C, or whatever that was. It was almost like you had to do those if you were going to do MSK. They were really vital bits*", (Belinda, Participant 2).

It was interesting to hear how some of the early teachings had been 'thrown out the window' as interviewees made changes in their practice, not necessarily because of poor results, but

more because they were influenced by the research findings demonstrating poor long-term effects. Interviewees see their disciplinary knowledge as dynamic, fluctuating and possibly unstable. Theories and approaches they learnt a few years ago are likely to be eroded and changed in the future as evidence is gathered. They accept this as a normal aspect of this profession, where doubt and uncertainty exist, (Van Trijffel et al, 2019) and deal with the uncertainty by engaging with CPD, attempting to keep abreast of the changes.

There seems to have been a move away from manual therapy courses as CPD which were a large foundation for the older physiotherapists but have much less focus for the younger practitioner interviewees. There was a feeling that while moving on with new information and leaving behind some of the old thinking is appropriate, there should be caution about completely abandoning some of the old ways,

> "*Just because something hasn't been proven by evidence to be effective doesn't mean that there's something wrong with it. Sometimes our ways of testing if something is effective is the flaw. Not the treatment.*", (Anna, Participant 1).

Interview data identifies how these physiotherapists are encouraged to be on board with the changes seen through research and be up to date, something they are happy to do if it makes them better practitioners. But they also see that 'hands-on' is a large part of physiotherapy identity, being taught and used since the beginning of the profession. It is seen as having benefits, and dismissing it completely is considered to be foolish. *"Benefits from exercise therapy outweigh some of the stuff that we get from manual therapy. But why is it one size fits all and why is it one or the other? Why can't we combine the best of both to get the optimal outcome for the patient?"* Luke, Participant 12. The first 100 years of physiotherapy saw manual therapy as a large part of physiotherapy identity; being ideologically synonymous with healing this was the early common-sense, which may have led to inertia (Deleuze, 1990). The inertia was challenged by testing the efficacy of those manual therapy techniques using methodologies of scientific rigour, resulting in manual therapy beginning to lose its place in physiotherapy identity. EBP may be considered a new common-sense, a new form of representational thinking (Deleuze, 1990). These practitioners though have not fully let go of an original common-sense in favour of the newer version. They are rejecting the either-or of manual versus exercise, passive treatment versus active management, and evidence for versus evidence against. They reject the binaries and ask for the freedom to see and work in the spaces between, where there is a place for manual therapy depending on the context. There is

rhizomatic thinking here and it illuminates the multiplicity (Deleuze & Guattari, 1987, Deleuze, 2002, Clarke & Parsons, 2013) of the physiotherapist in practice.

7.3.2.2 CPD as Guru-disseminated knowledge to evolve practice

There is a particular aspect to physiotherapy CPD, in that certain disciplinary topics have specific identifiable researchers and clinicians who become synonymous with that aspect of practice. There were old-school clinical manual therapy teachers like Brian Mulligan and Geoff Maitland, referred to now by some commentators as the gods of the clinical dinosaurs (Meakins, 2015, Avemarie, 2018), but there are also modern ones, embedded in research and debate today. The present-day experts skilfully present research findings and their interpretations of them, which are accepted and adopted as the new wave of physiotherapy knowledge. Almost all participants referred to these identifiable people as 'gurus' because they have become synonymous with particular topics and they accepted them as specialists. Many of the participant practitioners can quote their research, have heard them speak at conferences, follow their work on social media and keep up to date with their thinking. Interview findings suggest that 'guru-following' is a legitimate way of gaining knowledge and knowing what to do as well as how to improve as a practitioner. To qualify for this legitimacy the guru must have a background in medical, scientific or physiotherapy education, ideally to PhD levels and fit the required calibre; having followed the structures of acceptance in the world of science, evidence and dominant Western ways of knowing. Practice knowledge disseminated via gurus and adopted by practitioners originates from the same stream of knowledge generation as research-derived propositional knowledge. When so much knowledge in a profession is generated and scrutinized using these western scientific standards, it asks a question about the likelihood of epistemicide (De Sousa Santos, 2007), and if there is subordination of other ways of knowing.

Interview data shows how the participant practitioners spoke passionately about their ongoing learning via 'guru-following'. They identified researchers and practitioners that have come to be associated with topics such as pain physiology, aspects of treatment or rehabilitation, or specific joints or regions, like the hip or lumbar spine. All but one participant spoke about the individual expert (guru) themselves, or the course/programme they are associated with. In all, there were 36 mentions, many of the same names, with Peter O Sullivan the Australian physiotherapist associated with pain perception and non-specific

low back pain mentioned by 8 different participants. Being able to trust a guru and actively following their work sounded thus;

> "*There's some great people like Lorimar Moseley and Peter O Sullivan and knowing who those key people are in those areas, I think that's for me where I draw on. I go looking for the clinical perceived experts and listen to what they have to say and figure out how to apply it*", (Belinda, Participant 2).

> "*I think there would be a couple of good researchers, who produce good work, and although it's not a meta-analysis, as I said, but you could probably rely on the work that they've put out*", (Damian, Participant 4).

The guru was seen as having skill in communication of ideas and findings from research, which along with a charisma was part of their attraction to these interviewees, "*And those type of speakers would definitely ... They nail it. They explained it very well. They changed how you walk out thinking*", (Conor, Participant 3).

As outlined above, guru-following as a method of evolving your practice came through strongly from the data. Analysis of this method of knowledge formation sees acceptance of a person with charisma via their personal craft knowledge, who is immersed in the disciplinary propositional knowledge of the profession. The guru gains this knowledge through research and engagement with evidence, thus achieving authenticity and believability, but also layer their interpretation and clinical judgement on this evidence, before disseminating it to the practicing physiotherapist. Interestingly, this layer of interpretation and judgement can be interpreted as a form of their craft knowledge. As the old guru's ideas are dismissed (Meakins, 2015, Avemarie, 2018), a new wave of more evidence-based gurus is lined up and followed. In analysing this I suggest there is an element of uncertainty about physiotherapy identity with an awareness of the chasms of not knowing that inhabit the profession. This leads to a search for answers, and so gurus and their ideas are fit into spaces that may explain some of the aspects of physiotherapy practice that are full of questions.

7.3.2.3 Zooming out to get better

In appreciating how participants describe their journey towards becoming a better practitioner beyond the guru and the CPD, I listened intently for references to their craft personal knowledges. Beginning with technical rational propositional knowledge and skills, a journey

towards more contextual and interpersonal understandings, personal knowledge and socially constructed knowledges was described. This can be seen as developing craft knowledge and practice wisdom (Higgs and Tasker, 2017; Higgs, 2019) in their practice knowledge (Estabrooks, 2005; Higgs, 2012; 2014).

Interpreting how the novice practitioner progresses towards expert level involved the incorporation of knowledge from the craft domain, and a framework that could potentially be modelled to understand this process may be proposed from the interview data. For example, starting from a set of basic technical (biomedical/propositional) skills, progressing in that same domain, and eventually developing abilities to deal with people (interpersonal, contextual skills),

> "*I think the best physios... will evolve and they will ... They will start by having that structure and by developing their techniques and then they might do something to make their techniques better and then what they'll do is they'll develop all these different ways of dealing with people as human beings and working their social side of things. So, from a development point of view, I think it's a very natural thing that you'll go from being very mechanical and using your initial skills to then developing other skills some of them are evidence based and some of them are practice based. But I think everyone's individual*", (Luke, Participant 12).

Interviewees felt that the mechanically minded novice is focussed on pathology, starting as a mechanic, and develops via a zooming out from pathology to incorporate the whole person,

> "*I think initially you treat the symptoms, or you treat what the person is talking to you about. Whereas as you mature as a clinician you start to treat the person because you realize that some of what they are complaining about is smoke and the fire is actually something that they haven't even pinpointed… I do think that the assessment and the diagnosis is important, but not to see that as separate to the person themselves. I think as young students you're trained in the symptoms and the diagnosis and you can almost detach that from the person and talk to it and deal with that, forgetting that there is someone with an awful lot of other things going on in the background. And just being able to talk to them…the key piece of a jigsaw that actually makes you realize how everything is connected for that person*", (Belinda, Participant 2).

This was also reflected by other participants, also describing a 'zooming out' from specifics as a progression towards more expert level of thinking. Reductionist thinking about

one joint or area was considered very limited and novice-like. This is another insight into how body-as-machine is predominant thinking early on and becomes insufficient as the practitioner evolves and gains more understanding. Biomedical outlooks evolve to incorporate psychosocial ones. Utilizing craft knowledge where practice becomes more relational and participative using communication and understandings with patients makes a more expert successful practitioner. While the novice needs structure, when the practitioner gets experienced and expert enough, they become more subjective and 'feel'-based,

> "*It can be subjective I think when you're experienced enough for it to be subjective. When you're not, I think we need this background of evidence based*", (Luke, Participant 12).

This suggests the expert is afforded or perhaps just takes more freedom for themselves and their clinical impressions, away from the rigidity of the technical evidence base when choosing their approach and planning their interventions. Interviewees see the expert as trusting their personal knowledge in practice. These practitioners use their craft knowledge in the form of practice wisdom and personal knowledge to tap into choices of approach for each particular situation. They agree that getting better in practice means widening the lens to incorporate more of the patient and person.

When considering new courses and other ways of developing more practice knowledge participants were split about the requirement for research and evidence before signing up. Some participants were categorical that evidence needed to be there, or absolutely did not need to be there. Others said that a course under consideration should be based in evidence and went on to contradict themselves by saying that they would do something if they thought it would benefit their practice, despite having little evidence.

This pragmatism "*Interestingly the evidence base does come into it for me. I think that's built almost into us. But saying that, if it's something that I applied in my daily practice and I'd like to learn more about it, but there wasn't a lot of evidence-based around it and it works for me, then the evidence base wouldn't come into it*", (Luke, Participant 12) reflects a position that these private practitioners adopt. They want to find success with and for their patients and they want to get better as practitioners in order to achieve that success. They may hold differing views on the sources of useful knowledge and skills but will consider anything that helps achieve that success.

7.3.2.4 Evolution of Practitioner Approach Summary

There is constant change in the field of musculoskeletal medicine, there are always new ideas in how to best interact with, motivate and find success with injured people, and physiotherapists want to continuously update their approaches. The desire to do these courses is rooted in the search for answers for the physiotherapy community. The linear arborescent medical logic of cause and effect understanding of the human body, and the dominant viewing of the body-as-a-machine (Nicholls and Gibson, 2010) are not sufficient in practice, and so physiotherapists are always looking for something else to help with understandings of what to do in the complex practice situations. We are always looking for better understandings, through practice knowledge that is both propositional and craft.

7.3.3 How Research is Useful for Practice

In exploring useful skills and knowledge for physiotherapy practice, research emerged as a strong theme. The role of research in shaping useful knowledge, the extent to which interviewees engaged with research outputs and how they navigated the translation of research findings into their practice are all part of this theme. Within this theme there are four subthemes

- Engagement with and finding value in research findings
- Measurement

I was interested in the different experiences with research that each participant had. This experience varied as all of the interview participants were clinicians and thus dedicated most of their work life to practice. Outside of their engagement with CPD described in the previous theme, many had not been involved since their formal undergraduate or postgraduate education and for most, 9 of the 12 participants, their physiotherapy education years was the extent of their research experience. Three of the participants (Anna, Ivan and Jill) had some role with a higher education institution and felt more connected with research processes, being active researchers alongside their clinical practice.

7.3.3.1 Engagement with and Finding Value in Research Findings

All 12 participant interviewees expressed a real engagement with reading new research findings. When faced with a clinical question, all said they would at some point choose research, either original research or a review paper to try to help them. Podcasts, social media engagement and YouTube video clips were also methods used to learn about new approaches and to keep up to date with changes in the profession. There seems to be a culture of continued evolution in physiotherapy, and as the profession is changing, so too are the therapists trying to keep abreast of what is happening. The participants reflect an ideal in the physiotherapy community: they trusted research to inform them about new developments.

Using social media to gain information was a popular one, though with the insight to appreciate that it is a filter of information. The Twitter accounts of some participants were used purely for academic following, where they followed who they perceived to be ‘top people of the physio world’ as one participant explained, and if those people all advocated for

a certain piece of research, then they would read it. For all practitioners in this study, social media was perceived as an excellent way of filtering through the thousands of articles published each month to get straight to the interesting stuff, "*I don't sit through Pub-Med every week and download stuff, but if I see something on Twitter, I'll have a look at the abstract and say, 'Hmm, I'll read that.' It's a nice filter*", (Jill, Participant 10).

The engagement with social media led participants to awareness of the arguments that play out, the divides, the tone of those arguments and the differing positions. Holding a position of skepticism about biases, personal spin and agendas playing out under the guise of research debates and quoting of evidence was something they did;

> "*It's very much, I think a sensationalist way, some of them really frustrate me the way they present it, they are putting it up for, to create a debate or to create a problem, instead of just placing the information for people to interpret themselves*", (Hannah, Participant 8).

For most of those social media arguments, the weapon of choice is evidence. Evidence is thrown and dodged, accepted and rebuffed in the form of significant differences, p values and statistics, "*There's such a bias out there towards evidence based. And if you're reading and listening to podcasts and listening to some of these very vocal people, it's all evidence driven, evidence driven*", (Belinda, Participant 2). Conor in particular was critical of evidence being used as a weapon to make undisputable claims, "*They slam anything that's not double-blind, randomized",* (Conor, Participant 3). Research that is adjudicated to be in the lower tiers of the evidence pyramid are sources of arguments and scorn on social media, being judged by the standards of the dominant methodologies for generating scientific evidence.

What is considered as evidence, as strong evidence, and as enough evidence to be useful in practice is of importance. The construct of useful evidence for the physiotherapist practitioner was described by Anna, which matched well with all other interpretations, as '*if you do a certain treatment, that you will get a particular effect which will be repeatable and will reliably have the same outcome in the vast majority of cases*', (Anna, Participant 1). It is a version of causal evidence, requiring objectivity and uses cause and effect logic. Interviewees considered the evidence for particular treatments, assessments and techniques to be proven as reliable, valid and effective if it was presented via published research,

"*We're taught that the pinnacle is peer reviewed published research. That that's the ultimate in evidence-based practice if an article says if you do this, it has this effect and it's significantly effective in something. That's what we're taught as physio's is the ultimate evidence*", (Anna, Participant 1).

There was a perception in the data that the evidence-based therapist is always reading research and would view information in terms of being academic and systematic, a type of informed rational expert. Interviewees felt that to be able to justify treatment decisions was a professional duty and acknowledged that most physiotherapists are aware of seminal research work that can be quickly referenced as the evidence for that justification. That the vast majority of physiotherapists describe themselves as being evidence-based was clear, it is a chosen identity, so much so that it would be seen as strange not to be,

"*Particularly if you're in private practice whereby, the demands are higher and the expectations are higher, I don't think anyone can really say that they don't base their practice on evidence. If they do, I'd really like to know what they're doing. Because I think it kind of has to be"*, (Damian, Participant 4).

There was a firm acceptance of the need to engage with research outputs, striving to keep up with developments and staying in line with what is perceived as best practice.

This acceptance though, came with a caveat and a desire to keep a critical eye and a licence to accept and adopt research outputs or not. This captures some of the desire for practitioner autonomy that came through from the interview data, as striving to be evidence-based in practice can be limiting, in so far as sticking completely and only to what can be backed up by formal research-derived evidence would potentially rule out aspects of practice. One particular participant rejected evidence-based in favour of evidence-informed, arguing that it allowed for clinician autonomy and the use of different types of practice knowledge,

"*Rather than say evidence-based ... evidence-informed, I think is better, because you're informed by what's out there but it doesn't shape you completely. Yeah, because I think the way you practice ... Again, everything we do is multi-faceted. It's not just by what we read. It is by personal experience, by our working experience, where we trained, how we're trained, who we trained with, our CPDs. So, it's an informed practice. So, there's many little factors feeding in to how I practice. It's not just what I read. It's not just based on that*", (Jill, Participant 10).

This way of seeing evidence shows that there is more to it than the description of causal evidence above and serves as an acknowledgement that evidence comes in other formats including evidence from practice. It is always a situation-based, negotiated product (Wierenga and Greenhalgh 2015), from different sources, such as patient values and goals and experiential evidence (Christiaan-Beenan et al 2018) as well as evidence derived from traditional scientific research methodologies. The practitioner as a pragmatist using research outputs when it translates well to practice is visible in this data.

After analysis, there was consensus that physiotherapists should engage with the evidence base and keep connected with it. The reasoning for doing this was grounded in a feeling that the physiotherapy profession should be underpinned by a base of evidence and that it needs this underpinning for reasons of legitimacy, reassurance and having confidence in the structures of physiotherapy as a practicing profession; "*I am proud that physiotherapy is an evidence-based practice because I think it differentiates us from a lot of other professions that don't have any evidence base behind them"*, (Luke, Participant 12). The alternatives were interpreted as negative, and not representative of physiotherapy,

> "*If we don't have that evidence-based practice, we can go way off into stupid tangents. If we keep close to the evidence base and respect it, and keep referring to it to understand it, that's our science connection. That to me is what makes us medical clinicians as opposed to stones and colours and auras and magnets. For me that's probably what draws us closer to actually no, we know this works, and therefore we use it*", (Belinda, Participant 2).

Here is an enactment of the moral obligation to be evidence-based (Gimmer-Somer, 2007; Dannapfel et al, 2013), as well as a tone in some comments that suggests that not working out of evidence as a profession means inferiority.

Apart from inferiority, interviewees suggested that a physiotherapist without a base of evidence from which to make their decisions is rudderless and will find it difficult to be effective in practice,

> "*It gives us ... Something that's tangible to say we're very proud of the fact we teach people to use these approaches. We know there is a certain amount of evidence behind them. Otherwise, what's the alternative? It's a free for all. We just go and try things and it's everyone for their own*", (Luke, Participant 12).

The data shows that physiotherapists in private practice want to be under the umbrella of evidence to avoid ignorance and poor decision making, "*We can't retreat into the ivory tower of the RCT and the matched study and explain everything through research. But we can't sit under the ignorance of no evidence base"*, (Keith, Participant 11).
These findings conclude that research and evidence is very important for these interviewees. It acts as a truth, as a protective shield and as something positive to project to the public about our profession. They see evidence as coming from research; having gone through a scientific trustworthy process and thus cannot be denied. The desire of these practitioners to be meaningful, significant and orthodox in the sea of different therapies is apparent and aligning with being evidence-based is a way to achieve this. EBP is the flow of this desire (Deleuze and Guattari 1987; Grace 2009) for legitimacy and alignment with the parent profession of medical science. Generating evidence, having it and using or wielding it is also an expression of demarcating physiotherapy territory.

In order to analyze in more depth, the evidence that practitioners endorsed the use of, and found use for in practice, we explored the research they engaged with. Although most participants were not active researchers, they all held an awareness of what 'good research', or 'strong research' looked like. This included evidence hierarchies (Murad et al, 2016, Crosbie, 2013), and where to begin in searching for top quality research: the high impact factor journals, Cochrane Reviews and NICE (National Institute for Health and Care Excellence) guidelines. In chapter three, I wrote about the profession aligning with medicine and science and adopting those dominant epistemologies. The hierarchy of evidence starts at its high point of level one meta-analyses down through the tiers to level six case studies and expert opinion, as lowest forms of evidence (see chapter five). Participants were aware of this hierarchy and accepted the idea that the higher the better. Interviewees aligned with the same position that is projected by science publications, ranking the value of research based on its position on the evidence pyramid. This displays what these physiotherapists think research likely to produce strong evidence looks like; and how more robust disciplinary truths are produced from the scientific method of research.

There was however, a slightly different interpretation of the evidence pyramid and its ability to exert power in deciding what research gets accepted and noticed.
Standards set by journal editorial boards and the processes involved in meeting expectations based on the lens of scientific rigour were seen to be high; "*I have some experience of the*

requirements of the well thought of journals and how rigorous they are in terms of their evidence-based studies", (Anna, Participant 1). Standards set in producing research for the higher tiers was also viewed as potentially unrealistic as seen in an experience by one participant who tried to find a co-author to publish with;

> "*I sent him the piece, and I always knew that this thing was gonna be ... by its nature it's a cohort study, so what, we're level three, four already. But then I suppose the ... because it's a field-based study, and I think this is the whole point. I think physio is a field-based practice, you can't structure stuff at level one and two, really, unless you're gleaning. Unless you're cutting down to the cleanest samples. But people aren't clean samples. Basically, he declined to be an author on it because it wasn't rigorous enough, whereas I thought…That's him saying it's not good enough, it doesn't fit the bill of what evidence really is*", (Keith, Participant 11).

The data shows that interviewees saw physiotherapy research as being unable to achieve the top tiers on the pyramid, with our place being somewhere lower, "*So for me, physio study and clinical study is always gonna be (level) three and below. It doesn't mean it's not useful, and it doesn't add to an evidence base, and we shouldn't be a snob about it*", (Keith, Participant 11). The scientific research methodologies required for higher levels on the pyramid, or simply for acceptance of research papers do not translate well to patient cohorts with injury histories, multi-factorial issues and pain, *"no two patients are the same",* (Ivan, Participant 9) and thus are only suitable to certain types of practice contexts. A strong valid scientific methodology was identified by interviewees as having the treatment intervention controlled, the procedures randomized and the participants blinded, ideally with the researcher also blinded, for another methodological ideal. This approach was seen to reduce the chances of a placebo effect and to minimize bias, something that all participants were in favor of minimizing. While they all saw the scientific methodology model as an ideal, they agreed that those standards are not achievable for a patient cohort in physiotherapy research, "*I do think there's too many rigors placed on being controlled with our research. When you have human subjects, that's not always feasible*" (Anna, Participant 1). "*Traditional research looked for clean samples, and life isn't clean*", (Keith, Participant 11).

Technical critique discussed included the problem of not being able to blind the patient in physiotherapy research, being that they are awake and constantly interpreting and engaging, or alternatively zoning out and disengaging while the treatment intervention was

being carried out. Both scenarios were seen as problematic for those structuring robust research. Conor gave an excellent example of how non-blinding equals bias and how that piece of research was now worth a little less,

> "*The problem is that blinding in physiotherapy, someone has to apply ... For manual therapy, by its nature, you have to apply it. They have to be awake when you're doing it. It's not like in surgery you knock them out to do it. So at least the person is gone asleep before the actual surgeon starts the surgery. But from our point of view, they have to be awake, because a lot of what we're doing is a response to what they're feeling. So, we can't blind. Once you can't blind it, it depends if the persons looking over and they see a 50-year-old male coming in, maybe looks like he might be a doctor. And maybe you say a 20-year-old female comes into the room who's just literally out of college. Bounces in, whatever. Or whatever bias you can put on it. The famous one is the older Chinese man versus the young white female in acupuncture, and it being like, one hundred percent more effective when the older Chinese man does it. That's the problem. They're not blinded trials. They're not blinded*", (Conor, Participant 3).

The data presents interviewees as being cognizant of the phenomenon of the interpreting research participant patient, being awake and aware of the therapist's treatment, aware of their instructions and will interpret what the researchers are trying to achieve. Human participants have most likely volunteered for the study and will interpret the treatment intention before it has even occurred. They will have developed their own interpretation of how useful or not it is; " *They tend to be your volunteers; they want to be compliant….you tend to get a filtered patient and type of person*", (Hannah, Participant 8). This awareness is linked to interviewee's connection with their patients, seeing them not as subjects in an objective research setting, but as people alive to their environment and continuously interpreting. While fundamental problems achieving true blinding was perceived as problematic, deviating from scientific ideals in validity and reliability, they seemed to imply that lower level on the evidence pyramid is as much as physiotherapy research can hope for. On analysis, the problems pointed out by interviewees fell into the category of 'medico-scientific research rules are not achievable in our research, let's try harder', rather than the 'this system isn't suitable, let's try a different one'. The latter was implied but not explicitly visible or audible in the interview conversations. One interpretation of this is that the desire to align with the common-sense of the dominant medico-scientific

evidence-production discourses is strong. Though it is debatable whether there is much 'common-sense' in trying to maintain this position.

This data shows how participants have certainly engaged with and thought about research practicalities, and the translation to their practice lives. This shows their connection with their epistemic beliefs, though on an unconscious level, (Christian-Beenen et al, 2018). They have gone beyond biomedical health concepts and knowledge coming from an authority or scientific source and by foregrounding difference, and were thinking about the greyer, context-dependent factors involved in the generation of knowledge. There was a feeling that because tier one status cannot be achieved very often, physiotherapy research is sub-optimal and not as useful. In the context of its preferred state of being strongly aligned to medical science, where does this leave physiotherapy? Foucault's ideas about knowledge being locked in an intimate relationship with power can be useful here as analysis. Historical contexts mean that physiotherapy has aligned itself with science and medicine (chapter three). The large scientific journals and their practices hold the power to define what is true, and if physiotherapy research wants to gain currency and eminence in the medico-scientific world then it generates its knowledge by following the same methods. It duly does and ends up generating a particular type of knowledge, as evidence for practice.

The relationship that interviewees have with EBP can be ambiguous, conferring legitimacy but functionally hollow. Using a Deleuzian lens, the flow of desire is great and the common-sense is strong which means that accepting EBP is easier than the alternative. The contradictions between endorsing EBP, using it to gain territory and simultaneously resisting and criticizing it are very real for these interviewees. They do not grapple with the ambivalence, preferring to choose a type of impassivity. They may be described as acting in qualitative multiplicity by holding positions on many sides.

7.3.3.2 Measurement

Linking to the technical problems of conducting physiotherapy research with highly scientific methods, measurement came through as a subtheme. When it comes to measuring the effectiveness of aspects of therapy and techniques conducted in practice, practitioners conceded that they would love to have simple ways to objectively measure their effect on function or a component of it. Seeking out strong objective measures was seen as the ideal in the context of the rational expert they strive to be and that they would like to project about themselves and their profession. However, interviewees were aware that this simplistic

logical linear method for knowing something did not match reality or complexity of practice, something reflected in the following quotes,

> *"I think that we want to be able to measure everything. Ideally, we could just measure and get objective data and scores and say, we will get the tape measure out and look to see what range they can move. And then say, well that's worked and that hasn't worked. But human beings are so much more complicated than a measuring tape",* (Ivan, Participant 9),

> "*But it's so multi-faceted that we do our best to measure things in the physio profession and our research and everything. We all do our best to measure what we're doing, but it's so multi-faceted that it's very notoriously difficult to measure"*, (Anna, Participant 1).

These sentiments show that these physiotherapist practitioners feel that measuring to gain propositional objective knowledge, mapping a positivistic epistemology, would be an appropriate approach, in the ideal scenario, though it falls down once the situation moves beyond the simplistic clinical case. Nevertheless, the data shows a compulsion to measure whatever possible, and reveals the logic and common-sense of measurement. Measurement also maps linear thinking, cause and effect logic and the arborescent. Data analysis shows it to be a simple, logical and common-sensical way of knowing the body.

However, many aspects of the body are either difficult to measure or immeasurable, something every participant spoke passionately about. Interview conversations moved through these immeasurable aspects of movement, function, motivation and emotion illustrating how interviewees engage and consider what and how they can capture effects of their treatment. Despite the difficulties, the researcher, in endeavoring to answer clinical questions, needs to measure components of function in some way. This typically manifests as objective measurement repeated on all research participants, zooming in to one joint, one muscle or group of structures in order to apply the same intervention for all research participants/subjects. There is commonly a controlled research environment in situ to control for movement above or below the joint in question, and for this control to be applied successfully, the measurement is conducted in a passive way, for example in a non-weight bearing position. Interviewees identified a divide between academically driven research,

following dominant traditional scientific methodologies, and clinical scenarios, which generally do not fit into such structures,

> "*I think some of our research follows traditions of research, I think is the way to say it. That some of our research is very academically driven and driven by traditions of research and traditions of structure of research rather than necessarily answering the questions that the on the field clinician wants answered*", (Anna, Participant 1).

Interviewees perceived many research methodologies as a straight jacket; a requirement to quantify the treatment intervention in terms of force applied, number of repetitions and sets, hand placement and control of other joints in order to follow the rules of reliability and validity. Once these positivistic standards of rigour, validity and reliability in MSK original research are achieved, the usefulness to the clinician is lost, again Anna made this point strongly, "*But it almost becomes a non-clinical scenario*", (Anna, Participant 1).

The data demonstrates that these physiotherapists hold conflicting positions regarding measurement. On the one hand measurement is desirable, and on the other it is limiting and disqualifying because to measure means losing some of the clinical realness. The practitioner is well aware of all of the components of practice situations that cannot be measured or captured objectively, all of the qualitative multiplicities (Deleuze, 2002). They can see these problems but seem to view objective measures or PROMS as the only tools available in research. Where is subjectivity and the qualitative research processes in the minds of these interviewee physiotherapists? My analysis suggests that they do not consider, read or see very much qualitative research. If objective measures are seen as easier to collect, then these physiotherapists may see interviews or focus groups as generating data that is more complicated to analyse. This may be linked to views they held regarding the evidence pyramid and a belief that physiotherapists need 'stronger' evidence such as can be provided with large scale scientific methodologies. If we are only allowed to know what we can measure, then we will never know much. It is none the less difficult to battle with the logic of measurement and desire to show the evidence.

Some resistance to the dominant methodologies in sports medicine/MSK research and disconnection with its outputs was expressed in the interview data. While sports medicine and MSK research by its nature become reductionist and tends to zoom in on one joint and one injury, the clinical practitioner of physiotherapy would rarely just consider the painful

joint and disregard others up or down the kinetic chain. Research tends to focus on the effects of one treatment, and participants stressed that in clinical practice this rarely happens, where treatment consists of many aspects including education, advice, exercise prescription as well as manual therapy. This was emphasized many times,

> "*You can't, because each of those people will be different and you'll apply each of those things a little bit differently. Well in order to get the right approach you will. If you don't do that then you won't get the right results. So that's the really interesting thing",* (Luke, Participant 12).

A concept that emerged was that there has to be a trade-off between aspects that are easily measurable, versus true clinical functional scenarios, a middle ground that would require compromise from the rigors in methodology imposed by research journals. The interview data suggests that there is an inversely proportional relationship between the desire for the rigid clean unidimensional controlled sample with the environment required for a research project to meet its criteria of worthiness, and real life multidimensional unmeasurable people who are patients. The more rigid and clean the sample is, the less real the patient is. The limitations of positivistic methodologies and methods are visible to these interviewees.

While these are limitations in the eyes of the critic practitioner MSK research forges on and works hard to provide answers. These answers are rarely definitive yes/no or black or white, despite the checks and restraints that are imposed on methodologies making it very difficult to ever get any hard evidence in physiotherapy research,

> "*And again, it won't be a definitive answer, I would say. It would be very much a discussion answer. It's just another essay at the end saying, "This is what we know. This is where the gaps are still, and this is what we think." But there's no black, white, yeah ... Is this A better than B?",* (Jill, Participant 10).

> *"But I'm open to it, because I know that hard evidence in physiotherapy is very difficult to come across*", (Ivan, Participant 9).

Conversely, the research that does come to a statistically significant conclusion has been the most zoomed-in and reductionist piece that then may not be trusted "*We need evidence, we absolutely do need evidence, some of it is just kind of uni-dimensional and not that functional*

and therefore not useful to me. But I don't want to use it as a stick to beat me with", (Belinda, Participant 2). A sense of frustration with lack of clarity and a sense of distrust of too much clarity captures the position of these practitioners. In assessing whether there is a disconnection here, my analysis suggests that on one hand there is a frustration and some hard critique of how sports medicine research has tracked scientific methodologies and how that is not suitable for the realities of physiotherapy. On another hand, there is a sense that striving for evidence and using it where possible is the right thing to do. On yet another hand, the pragmatic physiotherapist will dip in and out of evidence-backed techniques in their practice to achieve desired outcomes with their patients, with no disconnection at all.

What came across in the data was the concept of knowing what the research says (negatively) about a technique and choosing to use it with certain types of patients based on clinical judgement; an exercise in navigating through the evidence and knowing how to apply it. The data demonstrates here the physiotherapist in practice will use their own clinical judgement on whether certain overarching evidence is applicable for their patient with their bespoke problems. This is a perfect example of the definition of EBP; integrating evidence with patient preferences and clinician expertise of interpretation. It also leans into the craft knowledge domain, specifically personal knowledge gained through experience. And so, practitioners acknowledged the evidence that is presented through journal articles and consensus guidelines but held onto the privilege of viewing it through the lens of knowing their own patients and their own experiences of what works for their patients. They put a virtual asterisk beside some evidence, accept it for what it is, and note how it does not necessarily translate into their own practice,

This leads to an examination of practitioners' practice-based evidence (PBE) (Green & Ottoson, 2004, Green, 2008, Leeman & Sandaleowski, 2012, Thorne, 2016), that derived from and accumulated from experience, patient communication, patient preferences and clinical instinct. When challenging complex cases arise, research-derived evidence is less applicable, and practitioners lean on their craft knowledge and PBE. Many participants were very comfortable with the idea that the research can say one thing, or nothing at all, but if they see something different in practice, they base their clinical decisions on tacit craft knowledge such as practice experience and trust their clinical judgement,

"*From experience, from seeing that patients respond very well. Yeah, there are definitely things that you wouldn't maybe read in a book or would have been taught but I've seen them work and they're effective with the few, they tend to be, and go to that if you see the thing, that particular syndrome, that particular presentation*", (Hannah, Participant 8).

The tacit knowledge generated into evidence found organically in PBE, would see construction of knowledge from dialogue and experience, where coming to know something to be true has been achieved through the interaction with patients and others. As opposed to EBP, PBE uses the bottom-up instead of top-down direction of knowledge flow. This type of practice evidence is tacit and explicit practice knowledge (Higgs & Titchen, 1995, Greenhalgh et al, 2014), a craft knowledge that may be different in each patient context and is difficult to research in the scientific way.

The concept of trying to follow routine treatment strategies for every patient, because of the variance in each person, especially when you factor in their injury, came through as a problematic issue. The perception of each physiotherapy patient being bespoke came through, with bodies that can adapt, which results in significant challenges in grouping them together based on their physical or injury characteristics, for research purposes or for the purpose of deciding on a treatment strategy.

"*I think the body is just, everyone is slightly different actually. I think it's really hard to pigeon-hole people*". "*That's why I need to come back to I don't think two injuries present the same way*" (Fergal, Participant 6).

"*As soon as you start dealing with a human being, it just gets complicated. The human body is just so many influencers. You know what I mean*?", (Anna, Participant 1).
"*As far as I'm concerned, the best physios, they do little bits of everything. You take what works for you and then you apply it in the way the works for you. I don't think there's a one size fits all. We know that 10 patients can walk down the street with the same injury and they'll all present differently, because the body isn't 'one size fits all'",* (Luke, Participant 12).

Participants displayed a type of knowing concerning how to achieve improvements without being able to translate them into hard repeatable measurement-focussed evidence. They could

generate their own truths with their patients despite being unable to prove it through measurement,

> "*Was I effecting flexibility? Maybe. Marginal gains, probably. As I say the strength gains would have been quite minimum, was I desensitizing them to that particular position? Technically, is that it? Again, I've used it quite a lot with people since. I would say it's probably, one of the ones I probably go to quite quickly"*, (Hannah, Participant 8).

Soft improvements and minimal changes, impossible to prove objectively to a third party, once enough to affect their patients positively was sufficiently satisfying for these therapists. Disciplinary research evidence is mostly generated via measurement whereas tacit craft knowledge gained through accumulated working experience does not require it or does not use it. Data analysis shows practitioners with limitations in translating some of the research outputs back into their practice, thus finding large aspects of their world not reflected in sports medicine or physiotherapy research and its literature.

The many abstract things that are occurring in the therapy spaces were simply acknowledged by participants with a shrug and an air of acceptance of them fitting into the grey unknowable,

> "*There's a lot of evidence that once you've been in contact with a physio and you like the physio, you're actually going to feel better. So how do you measure that*?". "*If he (GP) says you come in here and you're gonna get better, they're better coming in, because no matter what you do their belief is the doctor said they're gonna get better, how do you measure that as well*", (Eamonn, Participant 5).

> "*There's a touch component for patients. That feeling of, 'Someone is putting their hands on me, and they're giving me something...' I think that's a difficult thing to quantify. And I think it's a difficult thing to actually research and to get measurable outcomes for. What's the impact on the person's mood and their thoughts when they feel like ... I think it's just a very complicated area. And patients are such complicated beings. And these presentations are so multifactorial, that you have to approach them in a variety of ways*", (Ivan, Participant 9).

Real-life clinical practice situations do not fit with dominant propositional knowledges, they are qualitative grey spaces, and so there may a tendency to file them as irregularities, forget about them or simply give up trying to capture what is going on. Craft knowledge, especially personal knowledge, care, experience and in some cases, intuition will help the physiotherapy practitioner to navigate through therapy choices to positive outcomes.

They see people who adapt and live well with mechanical imperfections, and those with terrible pain and lack of function with seemingly minor mechanical or tissue issues. They can appreciate the body as beyond machine, more like an ecosystem of flux and a responsive sensitive organism. They search for ways to help their patients, clearly shifting between different knowledge sources from both the propositional and craft domains, choosing the most relevant bits from each based on the patient's unique history and their own craft abilities. They outline the challenges well and imply that their processes in the clinical encounter are dynamic and rhizomatic but do not articulate them in that way. They are also acutely aware of difference in each of their patients.

7.3.3.3 Summary of Research as Useful for Practice Theme

The physiotherapist interviewees engaged with new research findings, and trusted evidence in this format to inform and guide them. This shows that one of the most dominant way of knowing that infiltrates practice is research findings published in established scientific journals and texts. The archaeology of knowledge (Foucault 2013) in physiotherapy where research holds a lot of power and influences knowledge generation is seen here.

The physiotherapists I spoke to saw evidence as a very positive thing in the profession and strive to connect with and be informed by the formal disseminated research-derived evidence that comes out. However, their complex challenging cases in practice are not clean enough for the research findings and evidence will be lacking or not applicable to those patients, meaning that a large bank of practice-based evidence, rich in context and nuance is what they draw from rather than available evidence. There are big swathes of physiotherapy practice that will not be captured using the tried and tested methodologies.

Deleuze said that "*Binary logic is the spiritual reality of the root-tree*" (1987 pg 5). His root tree being the opposite of the rhizome. He described binary thinking as permeating Western society, so deeply embedded that it is accepted without question. I think this is reflected in

these practitioners who, while critiquing methodologies, accept this form of thinking and evidence generation as being logical and common-sensical. Binary linear thinking limits and simplifies in ways that disallow openness to what could be. It can be likened to epistemicide (De Sousa Santos, 2007). The physiotherapist engaging with research outputs is likely to be in line with the discourse that evidence for practice is best. The practitioner who criticizes methodologies and sees the limitations of a measurement approach is the same physiotherapist. These positions are directly in conflict but held together at the same time, a movement in multiple directions at once, as a multiplicity (Deleuze, 2002).

'*No two grains of dust are absolutely identical, no two hands have the same distinctive points, no two typewriters have the same strike, no two revolvers score their bullets in the same manner'* (Deleuze, 1994, p.26). There are no two injuries that are the same and certainly no two patients. Difference is everywhere and Deleuze theorized difference and repetition expressing that how things change and evolve is in relation to their environment and it is the spaces between things that possibilities are created. The practitioner is searching for ways to help their patients may be drawn to binary linear thinking, knowing that it is insufficient. They need the rhizome of craft knowledge in practice, they can articulate the complexities and nuances of their craft but are not sure how to name it or how to justify it in an academic way. There is no disconnect, physiotherapy practitioners just know more is going on than journal outputs can tell them.

7.3.4 Physiotherapy Practice with Unique Tacit Understanding

In the conversations about physiotherapy practice, the concept that it is a unique profession emerged as a finding. Physiotherapy research has different requirements as discussed in the research theme, but this uniqueness goes deeper. Physiotherapy has many commonalities with aspects of medicine as well as many other health and care professions but the interview participants in this study see physiotherapy as having characteristics that differentiate it from everything else. These differences and the uniqueness of the profession have come together as a theme, though a much less dominant one in the overall findings.

Key to the uniqueness is the time spent with the patient. The physiotherapist has time with their patient to try to get to the bottom of their issue(s) and try different potential solutions with them. As each patient has a different past medical history, or biography of injury, and as each patient will have different interpretations of their own bodies, reasoning through choice of treatment becomes a skill. Although administered in exactly the same way, a particular treatment on two patients may have completely different outcomes. Practice and treatment, then, is negotiated between physiotherapist and patient, depending on patient history, injury and context. A very high level of knowledge, craft and competency is required. This was something about which interviewees had a lot to say,

> "*I think that if we collect hundreds and thousands of different techniques throughout our lifetime, but it's just learning who are the right people to actually apply this for. For me, our techniques we apply doesn't come only with the pathology, but it's more the person you're applying them to*", (Luke, Participant 12).

Thinking about the interpersonal skills of the physiotherapist and the ability to care for the patient by knowing what it wanted or needed from the treatment session is something that was universally echoed, "*We have to learn how to deal with people as people. There are so many different skills that a physio needs, it's incredible the skills we have and because we have that much time with the patient as well. We have to develop a relationship. It then becomes about how do you manage this person? As a person, not only as a body.*", (Luke, Participant 12). The sense that the real aspects of 'at the coalface' physiotherapy practice can blend with the artform of dealing with people was evident, "*And then you think, another patient, well I'm gonna tweak it for this patient. And they need more of this. And that's the, sort of, the art of the profession as opposed to the science*", (Ivan, Participant 9).

Knowing what to do and having useful knowledge comes from a construction between people in different contexts, a perspective concerned with care, craft and holistic approaches (Higgs, 2014).

The concept of the physiotherapist as interpreter and practitioner of tacit understandings was also apparent after data analysis, where being able to formulate your treatment and rehabilitation sessions specifically for the patient in front of you was seen as vital for success. That each patient needs something different in terms of how the message is delivered and how the treatment is tailored was something that success in private practice was largely dependent on,

> "*I think that's the viewpoint. The viewpoint is that no two patients are the same. And that's what makes it such an interesting profession. It's the personalities of the people you're dealing with, which is what makes it so challenging. That's what makes you more or less successful as a physiotherapist. How good you are at reading personality types and recognizing how to manage those personalities through their rehabilitation*", (Ivan, Participant 9).

Deleuzian ideas of multiplicity again come through very strongly here as the physiotherapist engage with qualitative multiplicities in each clinical encounter and present themselves in many forms to their patients through their work.

Physiotherapy in private practice, for the vast majority of the time, does not involve high stakes decision-making where patients are very unwell and may die if the correct decision is not made. What come through from the interview data is that the realm of medicine is obviously more high-stakes, and thus simultaneously more difficult and much easier. It can draw from biomedical viewpoints for many decisions. Medicine has specialities where the doctor can zoom in on one aspect of the body, or one physiological system. This breaking up of the body into components may change perspectives for specialist doctors and is something that the physiotherapist cannot do. As Ivan says,

> "*Because we're not orthopaedic surgeons just cutting out a joint and putting a replacement joint in, we're dealing with grey area presentations. We're not dealing with the black and white most of the time in private practice. It's not like some of the medical professions, such as orthopaedics and whether you're taking bloods, rheumatology where you can actually look at markers and ranges. It's slightly different.*

You're dealing with people in physiotherapy, as opposed to components of their bodies", (Ivan, Participant 9).

The data reveals that these physiotherapists in private practice know that narrow biomedical epistemologies are deficient with most of their patients. They use the time they have during the treatment session to access tacit understandings of what is going on with their patient and how they can help them. The reality of practice for physiotherapists means that they are in another terrain that is possibly less straightforward than other medics. The biomechanical biomedical body-as-machine (BAM) metaphor does not work, they must rely on other epistemologies.

The interviewees are clear that there is a lot more to the clinical treatment encounter than one might expect. The set of knowledge and skills, many of them tacit, wrapped up in what Joy Higgs calls personal and craft knowledge, drawing from experience and different contexts is visible to these participants. After analysis I have the impression that they do not know what to call it, nor do they know how it could be translated into a research inquiry to generate evidence for such ways of knowing. The practitioner in this research knows they operate in a unique field of practice. Their epistemic beliefs have certainly moved from naïve towards sophistication (Beintzle et al 2104, Christiaan-Beenan et al, 2018), despite being unable to explicitly name them.

The next chapter brings sections 2 & 3 together in order to further analyse and discuss meanings.

Section 4 – Bringing it all Together: What I have learned

Section 4, *Bringing it all Together: What I have learned* consists of two chapters.

In chapter 8, *Towards a marriage of different knowledge sources*, I synthesize the combined findings from sections 2 and 3 to further analyze, discuss meaning and think about how different knowledge sources exist together. The approach I have taken is to present the positioning of my practice drawing from different approaches and influenced by different discourse in an effort to resolve my professional problem of disconnection. This works to provide suggestions for where the future lies for my practice in the clinic, as a teacher and as a researcher.

In chapter 9, *Conclusions and Closure,* I highlight the contribution of this research to physiotherapy education, research and practice. Recommendations from this piece of research are outlined and I reach final conclusions and closure of this inquiry.

Chapter 8 - Towards a marriage of different knowledge sources

8.1.1 To what extent does physiotherapy research generate knowledge for practice?

At the start-point of this inquiry I came from a position where I saw the journals of the two chartered societies as being very important sources of information and evidence for both my teaching practice and clinical practice, as well as a respected potential vehicle for dissemination of some of the research that I was involved with. This viewpoint I held aligns with one of the cornerstone conditions of how a 'trade' professionalizes, by developing a supported body of scientific knowledge that is validated academically (Flexner, 1915; Houle et al, 1987; Evans, 2008). Subscribing to the idea that the way the physiotherapy profession approaches its research displays how the research community thinks, knows and strives to know more about solving and managing physical problem, I examined two journals. This analysis of the professional journals in chapter three gives some insight into the way physiotherapy musculoskeletal original research (MSK OR) is organised, carried out and presented, specific to those particular journals. The perception that may be formed by a reader of *Physiotherapy* and *Physiotherapy Practice and Research* is that physiotherapy research drifts hardly at all from quantitative designs and methodologies that are embedded in a biomedical approach. The scientific standards of validity, reliability, generalizability and a culture of standardization (Reivonen et al, 2020) are upheld, reflecting an approach that physiotherapy takes to knowing the body that is objective, hierarchical and linear. Much of the research observable in these journals is capable only of capturing aspects of physiotherapy practice that may be measured, observed or quantified objectively. These findings contribute to a possible conclusion that physiotherapy knowledge as reflected in these two official chartered society journals is propositional (Higgs and Titchen, 1995; Eraut, 2000; Pavese, 2021) in the sense that a 'justified true belief' is pursued, produced and accepted via this research (Niedderer, 2007). If the exercise of journal analysis is reflective of the type of evidence that is available, it represents a knowledge generating approach and epistemology that mirrors positivism. On this trajectory, physiotherapy knowledge production is unidimensional and limited. However, this is too simplistic a conclusion. The evidence base in physiotherapy is an ever-expanding source of knowledge and knowing. If anything, this journals analysis would have reinforced my professional problem of disconnection, because my frustrations stem from knowing how limited this way of knowledge production is. There is scholarship on non-propositional knowledge in

physiotherapy, and inquiry that uses qualitative and alternative methodologies. These are published in different journals, as texts, grey literature and in formats what may not satisfy inclusion criteria that I employed for my analysis, of being original research in the MSK domain. The dominance of quantitative design and methodology in the two journals that I did analyse does not represent all the research being carried out in the physiotherapy world, nor is it generalizable, being so focussed and narrow. Sources that would have yielded more evidence of non-propositional knowledge that could have balanced these findings were not selected, which is a limitation of this inquiry. It is an inherent contradiction that the binaries I have been pushing back against in my practice were reinforced by my selection of a narrow field and scope of research by only focussing on MSK original research in two journals. The findings of very dominant quantitative research producing propositional knowledge could have set this inquiry up to manifest this binary, something that could have been overly simplistic. I selected the two journals in good faith based on the argument that these official journals of the chartered societies inform the physiotherapist in Ireland, at least to some extent, and may shape their perception of knowledge sources in physiotherapy. They did to mine. In the context of professionalization, these journals are validated by the regulatory authority (albeit the old version before CORU was established), which is a distinct purpose of legitimization via professionalization, to add to the scientific body of knowledge validated by the academic world (Flexner, 1915; Houle et al, 1987), another condition of professionalization and a large element of the legitimization of physiotherapy as a profession. This validation is evidence that the 'scientific knowledge of choice' is within an EBP framework to the detriment of other evidence-based approaches. If I was conducting the interviews again, I would have explored the perception of these journals as knowledge sources more explicitly with participants.

The physiotherapy practitioners that participated in this study are all engaged with research outputs and evidence-production, keeping abreast of new developments that may be applicable to their practice. Their concepts of the rules of 'good research' were based in quantitative epidemiological-style studies with a heavy leaning on controlling the research environment; large cohort numbers, fulfillment of ideals of controlling, randomizing, blinding and the application of the exact same intervention for each participant. Again, coming from their view of how to conduct research and generate worthwhile evidence, they acknowledged a reductionist practice of only accounting for one joint or one injury or one type of treatment, critiqued it but could appreciate the difficulty that any other method poses.

Their views aligned with research as conducted and presented in the formats visible in the two selected journals. Their practice decisions would rarely just consider the painful joint and disregard others up or down the kinetic chain, and treatment sessions consist of many aspects including education, advice, exercise prescription as well as manual therapy. Real treatment scenarios, however, are challenging to reflect in research literature. Finding a cohort of patients who all have as close to (a) the same injury, (b) the same medical and physical injury history, (c) the same patient interpretations, motivations, and body awareness as possible is not feasible, as seen in the interview data. Interviewees see the applicability of some research outputs to their daily practice as poor, which contributes to a potential disconnect between research-derived evidence for practice and practice itself. Analysis of interview findings illustrates a tension between the ideal of life as presented through clean screened research and reality of life presented by the patient attending the clinic, and between following one's perception of the rules for good research and being able to preserve the clinical applicability of the research findings.

Interviewees strongly felt that the dynamism of practice is extremely difficult to capture for research purposes. They expressed the view of having given up trying to measure everything in clinical practice situations, recognizing that they can know something to be true despite never being able to produce objective evidence about it. The 'how to' of research following quantitative design rules and the reality of practice clash and there was a sense that there is an inversely proportional relationship between ideal scientific rigour in research situations and clinical reality; the more of one you get the less of the other you will have. We spend a lot of time in one-on-one situations with our patients, listening, talking, coaching, motivating, guiding, and thinking about them. I have wondered why we do not reflect this in our research? Part of the answer is the tacit nature of this knowing in practice that will never emerge in research as it is simply uncommunicable and documentable, non-linguistic and context-specific, personal to each therapist (Gourlay 2002).

Having acknowledged the nature of tacit knowing, evidence to enhance craft knowledge for physiotherapy practice could be borne from qualitative methodologies where meaning is constructed or interpreted. It is the job of research to find methods that can capture the lived experience, but this type of research is not what the participants in this study were familiar with. These types of knowledges are fundamental for practice but were not discussed by participants, suggesting they did not see them, read them, or were involved in

using these research strategies. Tacit knowledge is associated with expertise (Berliner, 1994) and connoisseurship acquired through experience such that the detection of fine discriminatory changes made by the expert are beyond scientific measurement (Beeston & Higgs, 2001). Craft knowledge belongs to the connoisseurs and the tacit parts remain uncommunicable – making their justification through research dissemination as evidence a poor fit (Ball, 2012; Niederrer, 2007; Niederrer and Townsend, 2014). This may explain participants' lack of awareness to research that produces non-propositional knowledge and goes towards answering the question of why we do not reflect the craft aspects of practice in research.

8.1.2 To what extent is biomedicine and BAM balanced with more holistic models?

The BAM (Nicholls and Gibson, 2010) epistemology linked with the biomedical health concept (Wade & Hellinger, 2014) featured for all the practitioners who participated in this study, but to what extent? There is a small amount of evidence that their medical gaze (Praestgaard et al, 2015) works to transform the person into a patient to view their body through a lens that sees it as a series of mechanical joints that work together, irrespective of who the person that inhabits those joints is. BAM was agreed by the participants in this study to be wholly necessary, serving a purpose and allowing success with the simple problems, the acute traumas, and the less complex patient presentations. This finding aligns with the idea that practice in the medical scientific context is reproduced for some of the time by most physiotherapists and "*obscures other ways of seeing 'what is going on' and the realities of unpredictable bodies*" (Setchell et al, 2018:16).

BAM feeds into research, and research most likely reinforces BAM. Evidence from research that is to be translated into practice, suits BAM more than any other approach to the body and to practice. BAM is also associated with the historical positioning that happened as physiotherapy professionalized and consciously chose an objective approach to the body, seeing this as preferable to dealing with a sensual body, or a body that does not conform to structure and organization. Analysis of the interview findings shows an acknowledgement of the need for different approaches, and that the biomedical BAM viewpoint and approach will only take the practitioner so far and is critiqued as being insufficient for most of the interviewees' patients.

Beyond BAM and biomedicine, participants show how the body may be conceptualized in a different way, capable of showing resilience, always moving and in a state of flux, like the body that refuses to hold still (McDonald and Nicholls, 2015). They saw the biopsychosocial (BPS) approach (Engel, 1977) to aspects of injury and pain as being vital. They use this approach to explain and aid their understandings with complex chronic cases, but it tends to get accessed and explored in an informal way; from colleagues and through experience, perhaps in the context of professional socialization (Howkins & Ewens, 1999; Ajjawi & Higgs, 2008; Bartlett et al, 2009). They did not recognize much of it in the form of disseminated evidence from research. Because patient presentation with their individual contexts embedded in psycho-social contexts is so variable, interviewees thought that it is not explored in any depth in physiotherapy research, and not in enough depth in formal undergraduate disciplinary learning. Other more holistic models of healthcare such as the socioeconomic model (Bronfenbenner, 1977;1986) or more non-Western models like the nomad model within occupational therapy or the aboriginal healthcare model NACCHO (Khoury et al, 2015) did not feature in the interview findings, and so for these physiotherapists, like my start position, BPS is the main alternative to biomedicine and BAM.

8.1.3 To what extent are epistemic beliefs examined?

As part of the disconnection that I have been experiencing, I ask why quantitative objective research practices are dominant? Beyond the professionalization processes of physiotherapy, and beyond the difficulty in researching for evidence of craft knowledge (Herbig et al, 2001; Greenhalgh, 2002; Law, 2004) is there a perception for participants that qualitative research is inferior, less useful, or less trustworthy (Audrey, 2011)? A lack of epistemic sophistication (Bientzle et al, 2014, Christiaan-Beenan et al, 2018) for researchers is another possible reason, for those who have never considered or developed philosophical assumptions about truths and knowledge production. Interviewees described their practice knowledge without knowing where it fits on the spectrum of epistemology. Without ever formally encountering the spectrum, fully appreciating anything other than scientific method may not be possible for these physiotherapists.

Another interpretation that may be useful in understanding these dominant research practices, is that choice of methodology does not reflect much about the worldview of the researcher. Perhaps it is as simple as there are only a limited number of ways to collect data. For example, the use of objective measures in data collection may not match the researcher's

epistemology but they do not know of any other ways to do it. Physiotherapy researchers may see aspects of practice being beyond research, or they may simply wait for better technology to map movement, joint and muscle function/dysfunction in a more sophisticated way, frustrated at how difficult it is to measure the moving, thinking human, with so many moving parts and multiplicities. If there are other ways to capture what goes on in the body, in the treatment session and for the patient, they may not be visible to budding researchers. There is also the inescapable fact that tacit knowledges are by their nature ephemeral and impossible to capture, no matter the skills of the researcher. It may even be the case that trying to fit them into a research framework and into standardized terms of description may be harmful, in that they would suffer from attempts to structure and describe something so amorphous.

Medical scientific research practices are normalized in physiotherapy as has been discussed earlier. Foucault (1972) wrote about governmentality and discipline; how it coerces people into appealing to that normalcy. It may be that the physiotherapist researcher and reader of the research is coerced in this way to get on board with the normalcy of how research is done. Or it is simply the case that the physiotherapy community has examined other ways but feels that this type of approach and way of producing knowledge for dissemination is the safest, least likely to mislead and most robust way to ask and answer questions and problems. There is physiotherapy research that is not objective, quantitative or reductionist, and I, like most of the physiotherapists I interviewed, need to engage more with it. It is possibly the case that the immeasurable skills of the connoisseur and the tacit non-propositional knowledge in physiotherapy simply sit in a place where they are fully appreciated, just not researched.

8.1.4 What is the status of craft knowledge?

Participants described their evolution as practitioners as a movement away from specific structure-focus and reductionism to the use of a wider lens and consideration of more causes, seeing the whole person and wider context of their situation, and not just their body. This transition from mechanical thinking to a more holistic view to incorporate tacit craft knowledge described by interviewees resonates with the novice to expert continuum of skill acquisition in the literature. Benner (1984) adapted a model from Dreyfus (1982) and described the development of nursing competence via five stages: novice, advanced beginner, competent, proficient, and expert. Development through the stages is dependent on clinical

experience and the length of time working in the profession (Altman, 2007; Brykczynski, 2017; Ozdemir, 2019). Guidance, education, and mentoring is important for progression along the continuum, as is trial and error (Benner et al, 2009). The expert can grasp the whole by utilizing intuitive abilities as well as combining technical and existential skills to arrive at innovative solutions (Benner et al, 2009; McHugh & Lake, 2010; Brykczynski, 2017). They have a broad vision, sensing the needs and capabilities of their patients, and transition from explicit rule-governed behaviour to intuitive contextually determinate behaviour (Altman, 2007). Benner proposes that the intuition of the expert can be developed, some is done subconsciously but some can be developed purposively via a meditative process of education and extensive deliberate practice with appropriate exemplars (Benner et al, 2009).

For physiotherapists, intuition resides in craft knowledge alongside patient-physiotherapist communication, and imagination (Higgs, 2014). Higgs says that "*knowledge is also manifest in the visible and invisible, explicit and tacit, robust and ephemeral dimensions of practice*" (Higgs, 2019:4). Practitioners accumulate craft knowledge and pursue practice wisdom through reflection and appreciation (Higgs, 2019) as well as via CPD, and organically with the passage of experience-rich time.

An epistemology of understanding your patient and viewing them as more than just a patient with a body, but a person and ecosystem of flux lies in these findings of the physiotherapist progressing from mechanical skills to other craft-domain skills. This was identified as evolution in their approach towards more expertise in their practice and this may be seen as evidence of the connected physiotherapist, finding solutions and success in practice because they appreciate that their patient is a person who has adapted and can adapt to their environment and stimuli. For the physiotherapist that becomes connected with their patient, knowledge is more dynamic and mutable, justified by evaluating a diversity of sources of evidence like patient values, expertise, experience, intuition and context-dependant variables. Caregiving as an ontological commitment, resists depersonalising ideologies (Tronto, 2017), such as the physiotherapist mechanic and the patient as just their body, comes through in the connected physiotherapist. That each patient is bespoke was a concept that was very clear in the data; even if a physiotherapist sees ten hips in a day, each one is individual with different adaptations, motivations, biographies and expectations. Participants were clear that accessing care, empathy and all their tacit craft knowledge of personal experience, intuition, relationship cultivation and adult education was a necessary approach. They did this

daily, suggesting that there is epistemic sophistication beyond BAM, cause and effect and measurement. Their craft knowledge is alive and well, but they did not call it craft knowledge and did not see this part of their practice in research outputs.

Tacit knowledge has been explored in medicine (Malterud, 1995; Malterud, 2001), and is stressed as an important element of clinical decision making as a form of 'medical craftmanship' (Malterud, 1995). Tacit knowledge is conceptualised as a part of expertise in anaesthesiology (Pope et al, 2003), and in nursing, with the ability to predict clinical outcomes (development of pressure sores) when systematic procedures for predication alone have failed (Carroll, 1998). Welsh & Lyons (2001) developed a model for use empirically that values intuition and tacit knowledge in mental health nurse practitioners, without expressly naming aspects of it. Past experiences, community contextual knowledge and recognition of the tacit knowledge of others (Kothari et al, 2011) are identified as some of the explicit parts of applying tacit knowledge and the ability to pick up cues from patients in order to use ones' own bodily dispositions to make meaningful connections with patients (Kontos & Naglie, 2009) suggest that embodiment of knowing is an element of the tacit domain within nursing.

In occupational therapy, tacit knowledge is also conceptualised as part of expertise, and has been examined in the context of clinical reasoning. Carrier et al (2010) examined the underlying cognitive processes in clinical reasoning and describe it as '*a process of expertise via a wide range of schemata accessible through cues that are frequently used unconsciously. Expert clinical reasoning is non-linear, more intuitive, complex, and harder to articulate than the clinical reasoning of novices'* (2010: 5). The integration of tacit and formal knowledge optimizes OT interventions (Schell, 2009; Hussey, 2007), and for occupational therapy, there is also difficulty in making aspects of tacit knowing explicit.

8.1.5 What constitutes evidence?

The interview data shows that all participants advocated for EBP as a good idea, viewing EBP as a useful concept to incorporate into their daily practices. EBP is *'the integration of best research evidence with clinical expertise and patient values*' (Sackett et al, 1996:72). It is interpreted by the participants of this study as being the integration of the first aspect, the research-derived causal evidence, with less focus on the latter two aspects. Other knowledge

sources drawn from in practice were described but were not necessarily seen as evidence. Alongside causal evidence, evidence from social scientific qualitative methodologies that has been interpreted or constructed by researchers does of course exist. It is either not very visible, as discussed earlier, or not trusted as much.

There is also evidence from the situation-based, negotiated product (Wierenga and Greenhalgh 2015) that is practice; from different sources, such as patient values and goals and experiential evidence (Christiaan-Beenan et al 2018), a version of practice-based evidence (PBE). Participants liked to construct meaning based on each other's experiences and each other's opinions via a professional socialization process (Howkins & Ewens, 1999; Bartlett et al, 2009; Ousey, 2009), using relationality with and through dialogue (Freire, 1993). Findings suggest peers are an excellent source of knowing for the practitioner, with respect shown for different ideas and different approaches of peers. A safe space to discuss and troubleshoot, learn together and reflect (Patton et al, 2013) was described by many physiotherapists as part of their professional lives. One cannot always identify how one has learned things, the learning comes from practicing, usually with energy, emotion and passion. Participants had experience in practice, had successfully treated thousands of patients and built up databases of successes, failures and knowledge. They had rich practical evidence, to draw from and agreed that performing treatment and rehabilitation over and over in different patient contexts leads to knowing and knowledge, progressing towards expertise (Benner, 1984) and generating more PBE (Green, 2008, Green & Ottosen, 2004). The repetition allows for difference to be appreciated and this is where knowledge is generated (Deleuze, 1994). The evidence found organically in PBE, would see construction of knowledge from dialogue and experience, where coming to know something to be true has been achieved through the interaction with patients and others. PBE is different from EBP and reflects different types of knowledge (Higgs, 2014). Findings from this research show the clinical physiotherapist to have a big knowledge store of PBE, where experience counts, similar to other professions like Speech and Language Therapists (McCurtan & Carter, 2015), who value practice knowledge highly, guided more by their experience and colleague opinions than scientific sources.

Trust in one's PBE varied between interviewees but was generally low in the sense of how PBE technically translated into knowledge, however, not in terms of how interviewees valued PBE more broadly. When presented with their own evidence from experience, patient

communication, patient preferences and clinical instinct, they wondered if it could be classed as evidence at all. Within craft knowledge and interlinked with intuition is the idea of practice wisdom (Higgs, 2012; Higgs and Tasker, 2017; Higgs, 2019) and clinical wisdom (Benner et al, 2011). A therapist who is *"'thinky-feely' and using 'old-wives' tales' and being unscientific is how mindfulness and practice wisdom are described*" (Higgs and Tasker, 2019:187). I suggest that the participants in this study feel exactly the same about acknowledging their intuition. Higgs promotes the concept of practice wisdom in much of her recent writing arguing that it requires a therapist to build and then critically use multiple practice and craft knowledges. Practice wisdom *"rests on an inherently richer, deeper and more humanly complex realisation of lived reality, creative understanding and human interests*" (Higgs, 2019:4). The term practice wisdom did not feature in my data, but instead being happy to achieve 'soft improvements' is described as a common feature of practice. I argue that practice wisdom is discernable here, having been pursued through a journey of reflection and appreciation of what it is to practice physiotherapy. This resonates with the idea of '*subvert(ing) the ubiquitous reductive discourses of biomedicine'* (Setchell et al, 2018:165). Intuition as an element of knowing in practice did feature as an epistemology in the data, but to a minor extent. Interview data suggests that intuitive practice is not trusted as it cannot lay the claims that EBP can, and thus its legitimacy is questionable, being seen by interviewees as the opposite to evidence-based practice. Intuitive practice may be stymied by evidence and associated discourses that suggest working without evidence has negative connotations for the profession, as experienced by some interviewees. Engagement with craft intuitive knowing and the softer aspects of practice was happening for many of the participants but acknowledging these types of knowledges as legitimate made some of them uneasy. The physiotherapist may be coerced and disciplined (Foucault, 1972) to get in line or '*stay in their lane'* (as Damien said) by the normalcy of EBP, and the discourse that it is required for practice decisions.

In discussing this analysis, there may be a sense that interviewees were comfortable using intuition/tacit understandings while in practice, but that when it comes to the public face of their work, they do not promote them, identifying themselves as aligning with EBP. Craft knowledge as intuition that manifests as practice wisdom is an element of practice, alongside evidence derived from scientific sources. It is appreciated by the interviewees I spoke with, to some extent. This suggests no disconnection for these practitioners, rather a

way of using different knowledge sources and making them work for their practice – a pragmatic solution to something they may not perceive to be a problem.

8.1.6 Therapist Adaptability or Multiplicity

There are many insights in the findings of the physiotherapist moving beyond a mechanic working on a body-as-machine, as well as insights into holding multiple and contradictory positions during practice. Whether some of these can be identified as therapist multiplicity is debatable, but I argue that there are some glimpses of multiplicity on display.

Findings show that the physiotherapist will change, morph and allow themselves to be plastic and adaptable in their approach depending on what the patient needs. They have different practice approaches that they can call upon for different patients and different situations as they tune in to each patient and access their practice wisdom in deciphering what each patient needs. In the data participants see themselves as plastic and adaptable, describing constructing knowledge through dialogue and communication with patients in particular situations and contexts which then cues the physiotherapist to mediate their way of behaving and knowing what to do. Some of these different approaches are based on language use as motivation or language best avoided in certain contexts, illustrating how they can be reactive as well as anticipatory in their work. It also illustrates the intuitive context-dependent behaviour of Benner's (1984) experts, changing approaches based on cues from each situation.

Dealing with difference between things suggests the examination of a binary, and something for me to consider about my disconnection. Participants in this study rejected the binaries of either-or manual versus exercise, passive treatment versus active management, and evidence for versus evidence against. The binaries of propositional knowledge on one hand versus non-propositional, craft, tacit knowledge on the other that I have utilized is limiting and may not capture the true picture of how one comes to learn and know something. Deleuze's rhizome is useful in reconceptualizing the many entry and exit points, offshoots and random pathways a physiotherapy session may manifest. There are other theories in education and psychology literature that have no need of the binary. Lave and Wegner's (1991) situated learning theory sees knowledge co-constructed as a social process, occurring within authentic contexts, cultures, and activities as a mostly unintentional process (O'Brien & Battista, 2020). This situated learning theory is echoed in participants accounts of their evolution as therapists.

Kolb's experiential learning model is another useful way of breaking the propositional/non-propositional binary and views learning as "*the process whereby knowledge is created through the transformation of experience*" (Kolb, 1984: 38). His theory sets out 4 different learning styles, with most of us using a preferred learning style within a matrix of doing or watching and feeling or thinking. A learner with diverging (feeling and watching) as a preference sees sensitivity as a characteristic, as well as being an information gatherer and excelling at brainstorming. Assimilators (watching and thinking) like a concise logical approach when learning. Convergers (doing and thinking) like technical tasks and problem solving while accommodators (doing and feeling) prefer intuition to logic and take a practical hands-on approach to learning (Kolb, 1984; McLeod, 2017).

Gardener's (1984) theory of multiple intelligences may also be useful to challenge the binary of propositional versus non-propositional knowledge. This theory takes into account a wide variety of human cognitive capacities and views one's ability to respond to new events and situations successfully as their intelligences (Gardner & Hatch, 1989), of which there are nine. A physiotherapist may require high interpersonal abilities to discern and respond to their patient presentations, high bodily-kinaesthetic abilities to demonstrate exercises and drills and spatial intelligences to guide their handling and force production during manual therapy. Musical and linguistic abilities may not be required for the role, and logical mathematical intelligence may be honed into clinical reasoning abilities. For a similar group albeit novices, Kutz et al (2013) profiled athletic therapy students using Gardner's theory and found kinaesthetic intelligence to be highest followed by interpersonal abilities, with verbal intelligence scoring lowest. This theory sees different forms of knowledge in each domain of intelligence, assembled in a format with dispenses with binaries.

Interviewees could see beyond the limitations of cause and effect and in doing so were rejecting difference between. Simultaneously they accepted the many-foldedness (Mol, cited in Setchell, et al 2018) of their patients, the multiplicity of their bodies and the rhizomatic aspects of practice. An example of holding different positions sees participants in this study appreciating and defending soft skills and soft improvements of practice while criticizing other professions as being inferior for relying only on them. Participants hold EBP in high esteem and criticize some of the research practices that generated the evidence. Holding different and conflicting positions within oneself is a classic Deleuzian affirmation. Being comfortable in this contradiction and overlap is acting in multiplicity. One of the findings in

this inquiry is how physiotherapists present themselves in many forms of the same person through their work, depending on the context and requirements for each situation. Simple adaptability it may be, but deeper engagement with the self as a process; relational, dialogical and dynamic in a flux of difference is multiplicity. For them, multiplicity may be a way to navigate a disconnection, something for me to consider in my own endeavour.

8.2 Future possibilities for my practice

8.2.1 Dealing with difference differently

One of the key findings in this study concerns measurement. It is a logical behaviour in the eyes of the physiotherapy participants of this study. Practitioners try, and researchers really try to measure the body, in order to appreciate changes, gains and deficits. The interview data is clear that participants feel that it is not possible to capture much of what is moving or going on. No two injuries are the same, no two patient biographies, no two practitioner interpretations are the same, and so difference is everywhere. My analysis leads me to ask how is difference in the context of the patient/participants under study dealt with in physiotherapy research? Interview findings suggest that if there is no blinding, controlling of other joints and other variables, if a practice situation provides a sample population that is not clean enough or the volunteers are too interpretative, then the research slides to the bottom of the evidence pyramid, or goes unpublished, or does not get done. Another way to appreciate difference may be required to appreciate the difference in what we see, do, in ourselves and the differences we make through practice. Interview findings illustrate that practitioners want to make positive differences to their patients' functional outcomes. They would like to be able to gather evidence of these differences and translate them into a research methodology for scrutiny but do not know how to fit it into what they see as the current structure. Foregrounding difference (Deleuze, 1995) would not only be useful in changing the focus for research but also for seeing practice in terms of what is unfamiliar, strange and new about what we do.

Physiotherapy territory is full of uncertainties. The physiotherapist lives in a world of near constant change regarding disciplinary knowledges. We do not know how many of the mechanisms behind our propositional and technical interventions work, (Van Trijffel et al, 2019). There are treatment and assessment approaches that fall out of and those that come

into favour, usually driven by research and evidence. Perhaps this is cyclical, and out of favour treatment approaches will come around again in the future with newer evidence. The change may work as a spiral, with concepts being revisited with a more informed spin building on prior knowledge, as the searching for truths continues. It may be that we are still early in the Episteme (Foucault, 1972) of EBP. It is a relatively new concept, and the processes of developing more evidence continue as "*one of the signs of a mature profession is its confidence and willingness to scrutinize its own methodology*" (Harrison, 1996:129).

There is an acceptance in the interview data that there is always room for improvement, which reflects the complexity of the professional endeavour to help people with injury and pain. The seeking of answers may reflect a feeling that what we are already working with is not sufficient, as there is so much treatment grey space, yet our instinct is to troubleshoot and resolve paradoxes. It is difficult to be good at this job, there are many insecurities and identity uncertainties at play in this profession. Complexity science tells us to try multiple approaches and to let the direction arise by gradually shifting time and attention towards those things that seem to be working best (Plesk & Greenhalgh, 2001). A concept in complexity science is uncertainty absorption (Bar Yam, 2006; Khan et al, 2018) acknowledging the extent of interdependencies and all the potential solutions to a problem, with none of them being the "right" solution. I suggest the best clinicians can navigate with their knowledge to points where they can absorb the uncertainty of the situation and live with it. I have come to the point, via this thesis, of wondering if my disconnection has to do with my inability to absorb that uncertainty?

8.2.2 Going forward: resolving my disconnection

It was not an aim of this study to identify or name aspects of craft knowledge or to surface them, only to decipher if they are indeed undervalued by physiotherapists. The findings suggest that they are undervalued because even the domain is not familiar to interviewees. For them, types of craft knowledge are not describable or identifiable as fitting into a particular domain, even before any of the heavy work of discussing them starts.

Craft knowledges are unlikely to become visible using the typical scientific methods of inquiry. If they remain invisible in disciplinary research, they may continue to be distrusted in practice, at least in the public face of it. It may take an examination of epistemic beliefs and some introduction of epistemic analysis in physiotherapy pedagogy and a

movement to capturing experience via different methodologies. Borrowing from social science, education and psychology research, physiotherapy could access novel approaches to evidence-gathering. Some of this is happening in specific journals, and the moves are underway by certain critical physiotherapy organizations and leaders. For it to become more mainstream needs more time, and perhaps a change in some of the regulatory frameworks around EBP. Articulating their craft knowledge was difficult for interviewees, something to be expected because of the nature of it, but this may be easier if it was more visible as a focus of research, with methodologies in use that can capture lived experience and personal craft aspects of physiotherapy. A great tension for me has been trying to fit the knowing from the craft domain via practice wisdom what to do and what is likely to be useful, into evidence that can be translated coherently into EBP. Interviewees did not experience the disconnection that I did and did not necessarily feel like they were being kept in the 'right lane' by the professionalisation of physiotherapy that produces scientific practitioners. It is not a finding of this study that physiotherapists should fully embrace aspects of healthcare knowing that EBP undermines, rather that aspects of craft that can be articulated are inspected and explored outside rigid scientific frameworks and raised up in status to become part of the evidence for EBP. That would help me to focus my future research and broaden my teaching practices as part of the process of resolving my disconnection.

In the future, giving craft knowledge a voice, devising methodologies to validate it and making it visible in physiotherapy literature would also be a positive leap forward in helping me to resolve the disconnection I have been experiencing. The rhizome may also be of use in addressing part of my disconnection because practice is a complex process and rather than sticking to pre-planned rational approaches, thinking and practicing rhizomatically opens potentials for the physiotherapist; creatively following any and many paths. Connectivity, heterogeneity and seeing each patient and their body as bespoke is a characteristic of a rhizomatic approach to physiotherapy practice. Having many connections with your patient, appreciating many variations in their body and understanding the many possible entry points on the journey through treatment are examples of how the physiotherapist practicing rhizomatically would function. If common sense means inertia (Deleuze & Guattari,1987), stalling lines of flight and stifling creative alternative conceptualizations of approaching tasks (Deleuze, 2001; Colebrook, 2020), then I must become active in changing the common-sense in my practice and work environment. In my future as a researcher, actively fostering approaches to validate craft aspects of practice and

promote their visibility will be my focus. In my future as an educator, allowing the rhizome to exist in practical sessions will be my challenge.

To summarize the novel contribution this thesis makes to the body of knowledge, I stress again that it is situated as a professional doctorate in education investigating a problem I have been experiencing within my practice. As a novel contribution to literature in the area it provides an illumination of physiotherapy private practice in an Irish context. It examines knowledge sources in use by clinicians and finds that craft aspects of practice are fully appreciated, though not easily articulated, and are felt to be beyond research in the format these physiotherapists are most familiar with.

Chapter 9- Conclusions and Closure

9.1 Conclusions: answering my research questions

To summarize,

- EBP helps to shape the physiotherapist into a state-recognized and regulated professional, who works from a scientific model of understanding health and illness. It acts as an aspect of professionalization, serving legitimacy and provide currency in terms of where the physiotherapist sits in the hierarchy of musculoskeletal practitioners in private practice in Ireland.
- The physiotherapy discipline journals, in presenting original research in the musculoskeletal field, follow a positivistic epistemology where interpretive designs and methodologies are scarce. However, this view is very limited in not considering other sources of research and analysis within physiotherapy and wider healthcare fields and does not represent the whole picture of physiotherapy research.
- The view of these physiotherapists regarding what research for evidence production looks like aligns to what I saw in the journal articles, flawed as that is.
- The dynamism of practice is very difficult to capture in research, and we do not tend to reflect aspects of practice in research because much of that dynamism exists as tacit uncommunicable knowing. For the communicable parts, it does not appear very often in research because that dynamism does not align with the usual scientific research strategies.
- BAM and biomedicine have their place, and most understandings beyond that model are articulated as the BPS approach.
- Epistemic beliefs are not examined by these physiotherapists in any formal way.
- Craft knowledge is alive and well, valued and respected, with no evidence of epistemicide.
- PBE was stored, intuitive aspects of practice wisdom were expressed and appreciated but mistrusted and perceived as not classifiable as evidence.
- Physiotherapists are plastic to their patients, continuously picking up cues, displaying expertise and morphing to the needs of their patients.
- Binary classifications of cause and effect thinking of either-or manual versus exercise, passive versus active treatment and management, and evidence for versus evidence

against are rejected by these physiotherapists. The binaries of propositional knowledge versus tacit and craft ways of knowing are not taken on by participants, being more interested in communicative, hermeneutic interpretative, responsive, practice.

The disconnect does not appear to exist in the way that I postulated that it may. The participants seem to have navigated their practice without experiencing a disconnect. They could identify problems with how a lot of research is conducted but valued their craft knowledge without having to see it in research. If there was a hint of multiplicity by identifying themselves as evidence-based practitioners, aligning with research outputs in theory, but in practice not following it through, it did not seem to manifest as a disconnection.

What does this mean for me? Well, the disconnect seems to have been mine, rather than anybody else's. I arrived at this disconnected place by being sensitized to measurement focused controlled research and the strong promotion of evidence within pedagogy that dominates in my work environment. Engagement with interview participants and their beliefs has allowed me to reflect on the pragmatism and uncertainty absorption that is required to practice as a physiotherapist.

9.2 Conclusions for my academic practice

The origins of the profession, the desire to be aligned with medicine and science and the process of professionalization has meant that, like other healthcare professions, biomedicine and propositional knowledge has dominated. Creating room for the craft knowledges and emphasizing the many aspects of practice beyond biomedicine/BAM that are tacit in nature is important to expand epistemologies in pedagogy. The word 'craft' or term 'craft knowledge' did not appear anywhere in the transcribed interviews and was noted as absent in my field notes. It is not in the practitioners' vocabulary when describing what they do, suggesting that they do not read about craft knowledge, nor see it described or filtered down via CPD or grey literature. There is a lot to fit into a curriculum as it stands, with all of the different domains of physiotherapy that exist. New graduates already feel overwhelmed with what they are supposed to know (Stoikov et al, 2020), but I think some basic exploration of the knowledges involved in 'becoming- physiotherapist' would be beneficial for learners. Epistemology exploration and a focus on the practice knowledges; personal, craft, tacit, intuitive can have a place beside pathology and exercise prescription. Examination of the philosophies underlying

our research and practice are not explicit in current pedagogical practices where I work, and it would be transformative for a profession dedicated to patient care if they were, even to a minimal degree. What this means for me as a lecturer is that I feel a commitment to generate and foster research that can explore craft knowing. I shall also develop modules and programme curriculae that I am involved in with explicit intentions to foster aspect of craft knowledge.

9.3 Final Conclusions

Participants demonstrate engagement with research outputs and responsibility in interpreting them for inclusion in their work, but they want to experience themselves as responsive, caring interpretative therapists. What they do in practice involves getting to know the person who is their patient, being responsive to them, their feelings and interpretations of their own bodies, injuries and pain. They are able to inhabit the numerous worlds of their many patients each day and display energy in their commitments to finding ways to help them. In practice these physiotherapists leave behind technical interests very quickly in favor of human interests and take opportunities to work from their tacit craft knowledge.

I say to them that they have helped to name some of the ways of knowing that exist on the ground in the clinical encounter. They know what they are doing, they are expert at what they do. I hope that the exposure to naming and placing value on their tacit and implicit skills and knowledge will give confidence to working with them in practice. I hope that it resources their practice wisdom and leads to an acknowledgment of an extended epistemology (Heron and Reason, 1997) in physiotherapy. They have helped me enormously to understand my disconnection and make peace with it.

My identity as a physiotherapist has become stronger in this process. Where once I felt weary and overwhelmed by aspects of the profession, now I have energy join the fight for our craft. The experience with the DHAE at Maynooth has given me a new appreciation for sources of knowledge and the interconnectedness of everything. I feel a new awareness for my future path in academic and clinical life. The gardener in me has shifted to guardian, away from controlling of my patch to letting the life in my soil and property take off. As a mother I have settled into the rhythm of a new life observing a 2-year-old in daily amazement.

My future research needs to bring some value to a researcher who is visible in the research and patients who are participants in the process and make room for studies that can incorporate such approaches. I shall look more to the social sciences to explore methodologies that can capture the intricacies and complexities of clinician-patient interactions and pathways to patient recovery. EBP is a concept of incompleteness for me, and I pledge advocacy for space for other tacit ways of knowing via diverse methodologies that can work to nurture craft knowledge.

My educational foundation in biomedicine and BAM may have stifled my teaching practice. My future teaching practice will foster the professional socialization processes that learners will experience, borrow from complexity science to appreciate the uncertainties at hand, and invest in the craft aspects of 'becoming-therapists'.

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APPENDIX A: Participant Consent

PARTICIPANT CONSENT

Title of Project: An Exploration of the Epistemology of Evidence Based Practice in Physiotherapy in Ireland.

Should you agree to participate in this study please read the statements below and if you agree to them, please tick each one and sign the consent form.

- I have read and understood the participant information sheet. ■
- I understand what the project is about, and what the findings and results will be used for. ■

- I understand that what the researchers find out in this study may be shared with others but that my name will not be given to anyone in any written material developed. ■
- I am fully aware of what I will have to do, and of any risks and benefits of the study. ■
- I know that I am choosing to take part in the study and that I can stop taking part in the study at any stage without giving any reason to the researchers. ■
- I know that I may withdraw from the study at any point time up to the point of submission of the thesis. ■

As a participant, you will be taking part in a semi-structured interview, and if agreeable, a focus group. This will include audio recording of the semi-structured interviews and the focus group discussion. If you are happy to participate in these, please tick the appropriate box below. If you do not wish to volunteer for the semi-structured interview and/or the focus group discussion, please tick the appropriate box below.

- I am aware that the semi-structured interviews will be audio recorded and I agree to this. However, should I feel uncomfortable at any time I can ask that the recording equipment be switched off. I know that I can ask for a summary of the interview session. I understand what will happen to the recordings once the study is finished. ☐

Section 3.3 Ethics Policy, Maynooth University: Limits to Confidentiality. It must be recognized that, in some circumstances, confidentiality of research data and records may be overridden by courts in the event of litigation or in the course of investigation by lawful authority. In such circumstances the University will take all reasonable steps within law to ensure that confidentiality is maintained to the greatest possible extent.

I agree to the statements above and I consent to taking part in this research study.

Name: (please print): _____

Signature: _____ Date: _____

Researcher's Signature _____ Date: _____

Prinicipal Researcher:
Mary Dowling,
DHAE Group,
Department of Adult and Community Education,
Maynooth University.
(01) 708 3784
Mary.dowling.2017@mumail.ie

Supervisor:
Dr David McCormack
Floor 2, Education Building, Maynooth University.
(01) 7083947
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APPENDIX B: Volunteer Information

VOLUNTEER PARTICIPANT INFORMATION SHEET

An Exploration of the Epistemology of Evidence Based Practice in Physiotherapy in Ireland.

Dear Volunteer,

My name is Mary Dowling and as part of my Doctorate in Higher and Adult Education at Maynooth University, I am carrying out a study involving an exploration of the epistemology of evidence-based practice for clinical physiotherapists in private practice in Ireland. This information sheet will tell you what the study is about.

What is the study about?
The study aims to find out, from the perspective of practising physiotherapists, the apparent disconnect between the Evidence-based discourse underpinning research and teaching in the discipline of physiotherapy and the epistemology (way of knowing) associated with clinical practice.

What will I have to do?
Your involvement in the study includes the following:

- participation in semi-structured interviews which will be audio-recorded.
- optional participation in a focus group of 6 members, which will be audi-recorded.

What are the benefits?
Participation in the study will enable greater insight into the epistemology of the clinical practicing physiotherapist, that is, their way of knowing and using knowledge in their job. This study will explore whether there is a disconnect between the clinician in practice and the research that provides the evidence for evidence-based practice (EBP). My hope is that findings from this study may provide a greater understanding of tacit clinical knowledge, which may go on to influence the types of evidences that are acceptable and useable in evidence-based practice.

What are the risks?
While every step to ensure confidentiality will be taken, it must be recognized that, in some circumstances, confidentiality of research data and records may be overridden in courts in the event of litigation or in the course of investigation by lawful authority. In such circumstances the University will take all reasonable steps within law to ensure that confidentiality is maintained to the greatest possible extent.

What if I do not want to take part?
Participation in this study is voluntary and you can choose not to take part or to stop your involvement in this study at any time. If you are taking part in the semi-structured interviews, you might decide

that you don't want to answer a question. If this happens, you do not have to answer any question you do not wish to.

What happens to the information?
The information that is collected will be kept private and stored securely and safely on the researcher's computer. Data collected on a mobile device will be protected with a strong password at a minimum, and/or encrypted if the device supports encryption, and will be removed from the mobile device as soon as is practicable. Data will be removed to a desktop PC or server in a secure location at Maynooth University. The computer is protected with a password. Your name will not appear on any information. You will be assigned a fictitious name when the information is being written in a report by the researcher. The information that is gathered in the study will be kept for 10 years after publication in line with Maynooth University policy. After this time, it will be destroyed.

Who else is taking part?
12 chartered physiotherapists who are in full-time private practice in Ireland, dealing mostly with patients with neuromusculoskeletal problems will be taking part in the interview stage. 6 chartered physiotherapists will take part in the focus group stage. All physiotherapists will be members of the Irish Society of Chartered Physiotherapists, and from the South-East area in Ireland.

What if something goes wrong?
In the unlikely event that something goes wrong during a semi-structured interview, the interview session will immediately stop until the researcher and participant are ready to restart the session or the session will be stopped completely. 'Going wrong' refers to an interruption of the interview by another person or event, the participant or researcher feeling unwell, the participant feeling uncomfortable or unhappy with the questions such that they require a break or cessation of the interview.
In the unlikely event that something goes wrong during the focus group, participation will immediately stop until the researcher and participants are ready to restart the tool or the session will be stopped completely.

What happens at the end of the study?
At the end of the study the information will be used to present findings. The information will be completely anonymous. No participants's name appears in any of the written thesis. All data gathered from the research will be stored securely and safely by the researcher (Mary Dowling) on the researcher's computer. Data collected on a mobile device will be protected with a strong password at a minimum, and/or encrypted if the device supports encryption, and will be removed from the mobile device as soon as is practicable. Data will be removed to a desktop PC or server in a secure location at Maynooth University for 10 years after publication, after which it will be destroyed.

What if I have more questions or do not understand something?
If you have any questions about the study you may contact either of the researchers. It is important that you feel that all your questions have been answered.

What happens if I change my mind during the study?
At any stage should you feel that you want to stop taking part in the study, you are free to stop and take no further part. There are no consequences for changing your mind about being in the study.

<u>Contact name and number of Project Investigators.</u>

Principal Investigator
Mary Dowling
Graduate Student and Chartered Physiotherapist
Doctorate in Higher and Adult Education (DHAE)

Department of Adult and Community Education,
Maynooth University.
(01) 708 3784
Email: Mary.dowling.2017@mumail.ie

Other investigator
Dr David McCormack
Department of Adult and Community Education,
Floor 2, Education Building, Maynooth University.
(01) 7083947
david.mccormack@mu.ie

Thank you for taking the time to read this. I would be grateful if you would consider participating in this study.

Yours sincerely,

_____ _____

Mary Dowling Dr. David McCormack

APPENDIX C: Ethical Approval

Maynooth University
National University of Ireland Maynooth

Social Research Ethics Sub-Committee

Protocol for Tier 2-3 Ethical Review of a Research Project Involving Participation of Humans

Please note the following:

1. The ethics committee will review the protocol and determine eligibility for Expedited Review. If the committee decides that this project is not eligible for expedited review you will be notified and the protocol will automatically be assessed by standard review. **The committee will make the final decision regarding eligibility for tier 2 review**.
2. Before submitting this application, all researchers named within it should have read and agreed the contents. In addition, all student submissions should be countersigned by the Supervisor.
3. While attachments may be appended, it is important that you do not simply refer to them, but that you fully address all points in the text of this form. Please keep in mind that your application could be read by someone who is not a specialist in your field, so it is important to make your explanations as clear and thorough as possible.
4. Place your cursor inside the box that follows each question and begin to type – the box will expand as you type. *(Text in red italics is for guidance only and can be overwritten)*

1. Tier 2 Expedited Review ☐

Select from specific criteria (1-5) that entitles the project to be exempt from standard review. Please give a short justification for selecting Tier 2 review based on the specific criterion selected above.

Specific Criteria No 1 –

1. *Research involving adults (with the exception of those identified as vulnerable) where the material is of a non sensitive nature where the research subjects may be identified either directly or through a key/indicators linked to subjects. This includes surveys, interviews and/or observational studies.*

In this study, I will research the discourses around evidence-based practice for physiotherapists in Ireland. The first stage does not involve participants, and is a piece of desktop documentary analysis of physiotherapy journal articles. In the second stage, I will be interviewing individual chartered physiotherapists who work in private practice in the south Leinster and Munster areas. The third stage involves a focus group of some of the interviewees from stage two.

All interview and focus group data will be anonymised. There will be no identifiable markers for any of the participants in the write up, and as the Irish Society of Chartered Physiotherapists is a 4,000-strong professional body, and because the participants will be included from almost half of the country, it will not be possible to identify any participant.

The purpose of the interviews and focus group is to get a sense of how the participants view and interact with evidence in their daily practice. The content of the interviews and focus groups is non-sensitive in nature.

This study is of mixed methods, with an interpretative phenomenological analysis aspect to the qualitative part.

1a. **Tier 3 Standard Review** ☐

2. Title. Brief title of the research project:

An Exploration of the Epistemology of Evidence Based Practice in Physiotherapy in Ireland

2a. Project Funding: Is this project in receipt of funding? Yes ☐ No X ☐

If yes, please indicate the source of funding for this project (SFI, H2020, IRC etc.). You must include the funding agency reference/ contract number (e.g. SFI/RFP2017, IRC- REPRO/2015/76):

3. Information about the researcher(s), collaborator(s), and/or supervisor (if the researcher is a postgraduate student)

Please include a letter from the supervisor (*see template at the end of this form*) outlining how the student is suitably prepared/qualified and will have adequate support to carry out the type of research proposed. *Include the names of all researchers that require ethical approval for this project.*

Name:	Qualifications or Student No:	MU Address/Dept.	MU Email only :	MU Telephone only :	Role in the project:
Mary Dowling	B.Physiotherapy (Hons) MSc Sport and Exercise Physiology MA Teaching and learning in Higher Education Student Number: 16250416	Department of Adult and Community Education	Mary.dowling.2017@mumail.ie	n/a	Researcher
Dr. David McCormack	PhD	Floor 2, Education Building, Maynooth University	David.mccormack@mu.ie	(01) 7083947	Supervisor

4. Previous ethical approval for this project (if applicable)

(Please attach a copy of your approval letter)

Other Ethical Approval	Reference
Maynooth University Ethical Approval Yes ☐ **X** No ☐	
Other Institutions Yes ☐ **X** No ☐ Under review ☐	

5. Research Objectives. Please summarize briefly the objective(s) of the research, including relevant details such as purpose, research question, hypothesis, etc. **(about 150 words)**.

The main objective of my research is to explore, from the perspective of practising physiotherapists, the apparent disconnect between the Evidence-based discourse underpinning research and teaching in the discipline of physiotherapy and the epistemology associated with clinical practice. I note this disconnect initially in my own clinical practice and also in my pedagogical work as a physiotherapist educator. The disciplinary knowledge is predominantly rooted in a positivist, biomedical paradigm that is reflected in a detailed audit of papers in the key disciplinary journals. The research will be of a mixed methods nature, including an initial quantitative documentary analysis followed by a larger qualitative piece using both both individual interviews and focus group findings designed to explore clinician's perspectives on the epistemological resources they draw on in their daily practice.

I hypothesise that the disciplinary gap, which I have experienced in my own practice, will be reflected in the experiences of other clinicians: for example, in the extent to which they rely on sources such as patient-physiotherapist communication, tacit knowledge, intuition and imagination, for clinical decision-making. In collecting and disseminating this research my hope is to influence the strict positivist paradigm of disciplinary knowledge so as to widen the epistemological base on which physiotherapy pedagogy is predominantly based.

Research Questions:

- What is the epistemology of the physiotherapist as evidenced in the official journals?
- What is the epistemology of the clinician-practitioner physiotherapist?
- What evidence is acceptable for research and clinical practice?

6. Methodology.

6a. Where will the research be carried out?

Location(s)	Documentary Analysis to take place at the researcher's home study and office at ITCarlow. Interviews to take place in various private physiotherapy practices in Carlow, Cork, Kilkenny, Kildare, Waterford and Wexford. Focus Group to take place in a meeting room at the Newpark Hotel, Kilkenny, or similar more convenient hotel for the participant sample.
Proposed start date	*01/07/18*
Approx Duration	*18 months*

6b. **Research Methodology and Methods to be used** *(Tick all that apply)*

- Observation/ Ethnography ☐
- Documentary Analysis **X** ☐
- Arts-based/Visual ☐
- Action/Narrative/Participatory Research ☐
- Experimental Research ☐
- Analysis of existing data ☐

- Interviews and/or Focus groups **X** ☐
- Surveys and questionnaires ☐
- Other including online web-based (please specify below) ☐

6c. Briefly describe the overall methodology of the project.

This research study will use a mixed methods approach. Stage 1 is of a quantitative nature, and stages 2 and 3 are qualitative pieces. The qualitative pieces are set from the focus of Interpretive Phenomenological Analysis, where I will attempt to apply the double hermeneutic of 1. Asking the participants to interpret their world, while 2. I interpret their interpretations of their world, Smith and Osborn, (2008).

Stage 1 will involve documentary analysis of the official journals of the Chartered Society of Physiotherapy in Ireland (*Physiotherapy Practice and Research, IOS Press)*, and The UK (*Physiotherapy, Elsevier).* It will involve an audit of all Musculoskeletal Original Research Articles from 2013-2017, to break down the incidences and frequency of types of methodologies used, types and frequencies of Outcome Measures used and types and frequencies of statistical analyses utilized.

Stage 2 will involve the semi-structured interviews of 12 physiotherapists in private practice. I will recruit these participants from the professional and regulatory body, the Irish Society of Chartered Physiotherapists (ISCP). This body regularly acts as a gatekeeper for research involving its members, and actively encourages participation in studies of interest to the profession in Ireland. The ISCP sends routine weekly emails to members, in which my research will be briefly outlined and my contact details provided for anybody who would like to volunteer. Volunteering physiotherapists will then contact me directly for more information and potential participation in the study, and there will be no need to identify themselves to an ISCP gatekeeper officer. After volunteering, I will seek their informed consent and ensure confidentiality of their participation before commencing the interviews. Using vignettes of Evidence-Based Practice (EBP) and insights from the documentary analysis in Stage 1, I will be asking about their world of physiotherapy in an Irish private practice and their ways of knowing in the context of evidence-based practice.

Stage 3 will involve assembling a focus group, from 6 participants of Stage 2. Using insights from Stage 2, this stage will attempt to find out what evidence is most useful in practice, how that can be integrated into research and what is the best path forward for the profession obsessed with EBP.

6d. Depending on the methods/techniques to be used, elaborate upon the research context(s), potential questions / issues to be explored, tasks/tests/measures, frequency/duration of sessions, process of analysis to be used, as appropriate.

Relevant details regarding the procedures for data collection, storage and retention should be reflected in the content of the Information Sheet. You should attach (as relevant) interview guides, survey questions as an appendix to the submission (maximum 1000 words).

Research Contexts: The research context here is that the practice of physiotherapy is a relational social one but that the research around it, is very deductive and is situated in the positivism paradigm. There is a tension between the objectivity of the research that guides the practice and the practice itself, which relies on knowledge derived from intuition and subjectivity. Research in the health sciences has, for the most part, tracked and followed the medical approach to investigation, focussed on scientific objectivity using a reductionist zoned-in approach to assess the validity and usefulness of assessment and treatment approaches. Evidence-Based Medicine (EBM) is a term coined in the early 1990s, (Guyatt, 1991), and can be defined as "*the process of systematically finding, appraising and using contemporaneous research findings as the basis for clinical decisions*" (Evidence-Based Medicine Working Group, 1992). Interest has grown exponentially since the early days and EBM is now taught throughout the world's medical schools. EBM has been driven by a group of medical epidemiology researchers including David Sackett, (Sackett, 1995, Sackett and Rosenberg, 1995, Sackett et al, 1996, Sackett et al, 1997). In an attempt to provide strong critical validation of research, they promoted the randomized controlled trial (RCT) and the systematic review as being the tools of greatest value in investigation. Coupled with objective measurement of large

cohort numbers, RCTs use statistical analysis to assess success or failure in effectiveness of a treatment technique or approach.
Because the randomized trial, and especially the systematic review of several randomized trials is so much more likely to inform us and so much less likely to mislead us, it has become the "gold standard" for judging whether a treatment does more good than harm, (Sackett et al 1996:72)
From EPM, came EBP, evidence based practice, for the allied health professions, the purpose of which was to align with the biomedical model and far away from the holistic alternative health model. Within the world of treating and helping people who have pain and movement impairments, there is a myriad of different possible solutions, those from the scientifically trained physiotherapists to the alternative natural healers. There is a tendency to defend and demarcate territory amongst health care practitioners, probably because the word "physiotherapist" has never been a protected title in Ireland, and anybody could call himself or herself one and begin to practice as one. This situation is currently changing and 2018 should see the legislation passed to protect the title (www.coru.ie). In an effort to be as far way from the world of alternative healing, physiotherapists have aligned themselves with science and medicine, believing that this legitimizes us in our own and in the public eye, and so we adopt a position on the opposite edge of the spectrum from alternative therapy, opting for objectivity and science.
Historically, physiotherapy has taken this on as a paradigm so as to ally itself with, and secure its identity as an allied health profession that draws and emulates established medical epistemology. This position gives the profession security and self-esteem as well as conformity with an ingrained and dominant western medical-scientific epistemology. The physiotherapy profession use scientific evidence to inform practice, legitimizing their decisions about their patients. Physiotherapy research strives for more evidence to disseminate to their practitioners.
In practice, however, physiotherapy clinicians use their practice knowledge within social, cultural and historical contexts that shape their beliefs about their knowledge, (Shaw & DeForge, 2012). This sets up the situation where the conscientious physiotherapist striving to help their patients may examine best evidence, and find useless or inapplicable advice, thus experiencing the disconnect that I am postulating exists between research and practice. In the absence of evidence for a multi-faceted biopsychosocial situation how does the physiotherapist act? I believe that asking the clinicians about what evidence-based practice (EBP) is and is not for them will lead to greater understanding of what the sources of knowledge that physiotherapists draw on in their daily practice and how we need to evolve within the profession.

Potential Questions/issues to be explored: The interviews will explore how physiotherapists in private practice use evidence from published literature to inform how they make decisions about their patients: how to come to diagnosis, what treatment approach to use, what rehabilitation parameters to use etc. The interview will also explore if there are any clashes between what a journal article advocates and what works on the ground. It will also explore the way a physiotherapist knows what they know about their job, what that knowledge is and where it comes from.
The focus group will explore what types of evidence are most useful for private practice, and how best to integrate evidence into a practice base. It will hopefully make suggestions about how best to navigate towards a future incorporating room for the subjectivities and interpretations involved in patient care.

Tasks/tests/measures: The Documentary analysis will use descriptive statistics of frequency and averages for Type of Research Study (Quantitative, qualitative or mixed methods), Outcome measures and Analysis Types. The interviews and focus group will be transcribed verbatim and analysed using open coding.

Frequency/Duration of Sessions: 12 individual interviews will take 45minutes-1hour 15 minutes each. Each transcript will be sent to the participant following the interview to check for accuracy and allow for redaction if requested. There will be 1 focus group, which should take approximately 1 hour. Again, the transcript to which will be sent to each participant following the focus group to check for accuracy and allow for potential redaction.

Process of analysis: Stage 1 (quantitative) will see a simple count of numbers for types of research, outcome measure used and data analysis employed**.** Microsoft Excel will be used for this and to generate graphs. NVivo 12 will be used to analyse the articles that meet inclusion criteria for use of certain phrases around evidence and evidence-based practice.
Recordings from interviews and the focus group will be transcribed verbatim and thematic coding and analysis shall be applied to the collected data to identify categories of description. I will attempt to take Bazeley's advice (2009) and use comparison and pattern analysis to refine and relate categories and themes, use divergent views and negative cases to challenge generalizations and create displays using matrices and models. All of my research findings will be analysed with reference to the relevant literature.

7. Participants.

7a. Who will the participants be?

Physiotherapists who are members of the Irish Society of Chartered Physiotherapists and who work on a full-time basis in private practice in Ireland. Their practices will cater for musculoskeletal injuries predominately.

7b. Approximately how many participants do you expect will be involved? (Please also see 12a if more than 100 participants)

12 approximately.
Interviews = 12
Focus Group = 6 from the same cohort of interviewees.

7c. How will participants become involved in your project? If you have formal recruitment procedures, or criteria for inclusion/exclusion, please outline them here.

Participants will be recruited via the professional and regulatory body for physiotherapy in Ireland, the Irish Society of Chartered Physiotherapists, (ISCP). This society, of which I am a member, regularly sends out requests for interested therapists to participate in research. One of the aims of this society is to support and promote the research of its members.
Inclusion criteria: Must be a full practicing member of the ISCP. Must be working full-time in practice with the majority of patients presenting with musculoskeletal problems.

7d. What will be the nature of their participation? *(Tick all that apply)*

- One- time/short-term contact **X** ☐
- Longer term involvement ☐
- Collaborative ongoing involvement ☐
- Other (please outline below) ☐

7e. What will research participants be asked to do for the purposes of this research study?

Each participant will be asked to read the information sheet (see attached) and ask any questions that they might have regarding the study. They will be asked to read and sign the consent form (see attached), after discussing the background and context of the study with the researcher.
They will be asked to meet, approximately 1 week later, in order to give time to reflect on participation in the interview, at a suitable location for the interview to take place. I propose to use their own private practice, as it will be familiar and comfortable for them, but should they prefer a different location I will agree to any convenient quiet appropriate space for an interview to take place.
They will be then asked a series of open questions regarding how they use evidence, view evidence, and interpret evidence as depicted by their official journal and their own sources during their daily practice.
During the interview they will be asked to view some evidence-based practice vignettes to prompt discussion.

6 interviewees will be asked to volunteer for the focus group stage.
At the time of initial recruitment, the focus group stage details will be outlined to them, and they will be informed that they will have the chance to volunteer if they so wish.
The focus group participants will already have been interviewed, and after the transcripts have been checked for accuracy, will be invited to volunteer to participate in the focus group stage. Should all interviewees volunteer, I will randomly select 6 that are available. Should not enough participants volunteer, I will contact them once more to invite them, and if there are 4 or 5 participants, I will continue with the process. If there are less than 3 willing participants, I will liaise with my supervisor and potentially abandon the focus group stage in favour of doing more interviews.

The focus group will be convened at a geographically convenient hotel for the cohort. Here they will be asked to discuss the ways of knowing for a physiotherapist and navigate a path forward using different types of evidence in physiotherapy practice.

7f. Does the research have the potential for a conflict of interest?

☐ Yes ☐ No **X**

If yes to above, please outline the basis of the potential conflict of interest and describe the steps you will take to address this should it arise?

Access the Conflict of Interest Policy here

7g. Will the research involve power relationships e.g. student/employee/employer/colleague etc.?

☐ Yes ☐ No **X**

If yes to above, please outline the basis of the potential power relationship and describe the steps you will take to address this should it arise?

No relationship exists between the researcher and participants, and participants will not be coerced into taking part. There is no power dynamic at play as both the researcher and participants will be members of the same professional organisation and will view each other as peers.

7h. Will the participants be remunerated, and if so, in what form?

Participants will not be renumerated.

8. Vulnerable Persons.

8a. Will the research be carried out with persons under age 18? ☐ Yes ☐ No **X**

Please note that children under the age of 18 are deemed vulnerable.

See MU Child Protection Policy (in particular section 5)

***NOTE**: Research cannot begin until Garda vetting has been completed. For Maynooth University please see* Child Protection Procedure for relevant contact details.

8b. Will the research be carried out with adults who might be considered vulnerable in any way?

☐ Yes ☐ No **X**

8c. If yes to (a) or (b) above, please describe the nature of the vulnerability and discuss special provisions/safeguards to be made for working with these persons.

***NOTE:** Depending on the nature of the vulnerability, sessions may need to be supervised or the researcher may need to undergo Garda vetting as stated above under point 8. In such cases, the researcher must also be prepared to demonstrate how s/he is suitably qualified or trained to work with such persons.*

9. Risk/Benefit Analysis

9a. Potential Risks: Please identify and describe any potential risks arising from the research techniques, procedures or outputs (such as physical stress/reactions, psychological emotional distress, or reactions) **and** for each one, explain how you will address or minimise them.

I do not foresee any significant risks arising from the research techniques.

The study is not likely to cause any discomfort or distress, either physical or mental. Some participants may come from a positivistic epistemology, and this may be challenged or discussed critically in the focus group stage, but should not be a focus of discussion as the hypothesized 'disconnect' is what will be explored. There is a minimal chance that such a participant may be offended or irritated, and the researcher will prepare for such an eventuality should it occur by providing links to a counsellor, recommended reading and follow up one-to-one discussion session.

Participation is voluntary and based on informed consent. Participants will have an opportunity to read the information sheet before taking part and ask further questions about the study at any stage during the data collection phase (Creswell, 2013).

Participants will be assured of confidentiality and anonymity, with the removal of any identifying information from the transcripts of the recorded interviews and focus groups.

The research will adhere to ethical guidelines in keeping with the British Educational Research Association (BERA, 2011).

9b. Potential Benefits: Provide a list of potential benefits for this Research.

The outcomes of this research have a number of potential benefits:

For the physiotherapy community, it should inform the debate about the dominance of scientific positivistic epistemologies in a field of subjectivity, human touch, tacit knowledge and intuition.

For the physiotherapy clinician, it should legitimize the epistemology of the clinician who works from a position of knowing how to care for their patients, that is not reflected in the evidence that is promoted in the disciplinary journals.

For the participants it should help them to name their world where potential clashes arise between what the journals say works and what their patients say works.

For wider society it may add to some of the resistance to the scientific domination of other ways of knowing.

9c. Risk/Benefit Analysis: Taking into account your answer in section 9 (a) & (b) above, please provide a short justification for proceeding with the research as outlined in this project.

I believe that the benefits far out-weigh the risks of this research.
I believe that the potential outcomes will be a welcome inclusion to the debate around physiotherapy practices and the epistemologies that underpin them. I hope that this research may provide a small catalyst to changing the way our profession views evidence, and the research that goes into providing evidence.

10. Informed Consent.

This section focuses on what and how, you tell participants about your research, and then obtain their informed consent as outlined in **section 3.4 of MU Research Ethics Policy.**
Please note if you are collecting personally identifiable data you must seek explicit consent in a recordable manner (e.g. written or audio recorded and transcribed)
Template consent form available from the website

10a. Will you be seeking informed consent from participants [referring back to sections 6-8 of this submission]. ☐ **X** Yes ☐ No

- Who will be responsible for seeking and recording consent? [Researcher: Mary Dowling]

If yes to above, when and where, is consent obtained e.g. do participants get an information sheet and sign a consent form, keeping a copy for their records or is consent secured by another means?

If No to above, please give the reason why consent is not being sought?

Each participant in this research project will be informed openly about the purpose of this study and the research questions that are being investigated. Each participant will be informed fully that this study will exist for the purpose of gaining a deeper insight into any dissonance between research and practice in the context of evidence-basd practice in physiotherapy. They will be informed about the interview and focus group processes, about what information shall be used and that they shall have the opportunity to review the audio transcripts of their interviews/focus groups for accuracy, to be given to opportunity to redact any part of it and to ensure that they may not be identified in the recording/transcript.

Written informed consent will be obtained by the researcher. The researcher shall present and explain both the Participation Information Sheet (see attached in appendix) and Consent Form (see attached in appendix) to the potential participants in the context of the proposed research. The researcher shall explain that participation is voluntary, based on informed consent and that participants will be assured of confidentiality and anonymity if they participate.

Each participant will have 1 week to decide if they would like to participate in the study, in which time the participants will have an opportunity to read the information sheet again before taking part.

Participants will not be coerced into taking part and will be informed of their right not to participate. Limits to confidentiality as per section 3.3 of the Ethics Policy at Maynooth University will be expressly presented to each participant for consideration.

10b. If applicable, please also justify deceiving or withholding information from participants **(see section 4.9 MU Ethics Policy).**

Not Applicable

11. Follow-up. As appropriate, please explain what strategies you have in place to debrief or follow up with participants – especially in cases where information is withheld or deception is involved or where research has been carried out on sensitive topics, and/or with vulnerable persons.

Not Applicable

12. Data Management, Storage and Retention

Please consult Maynooth University data protection procedures and policy

12a. Personal Identifiers - recording of personally identifiable information about research participants. *(Typically, by their very nature, projects involving repeated contact with research participants require the collection and retention of identifiers)*

(Select all those applicable)

- Not applicable (go to 12c) ☐

Personal Data Category

- Name X

- ID/PPSN/Student Number/Staff Number ☐
- Date of Birth ☐
- Personal email X ☐
- Home address ☐
- Personal contact number ☐
- Image ☐

Sensitive Personal Data Categories

- Medical ☐
- Financial records e.g. Bank account details ☐
- Cultural ☐
- Racial ☐
- Ethnic ☐
- Political ☐
- Genetic ☐
- Biometric ☐
- Sexual life ☐
- Religion ☐
- Offence (including alleged offences) ☐
- Criminal Proceedings, outcomes and sentences ☐
- Trade union affiliation ☐
- Other please specify ☐

If sensitive personal data or personally identifiable data from a vulnerable group for greater than >100 participants is being collected you must complete a Data Protection Impact Assessment in order to comply with Data Protection Law. DPIA should be submitted to ann.mckeon@mu.ie and cc'd to research.ethics@mu.ie (Form is available from research.ethics@mu.ie)

- Has a Data Protection Impact assessment been completed and submitted?

Yes ☐ **X** No

☐

12b. Anonymity

Page 2 of the **Maynooth University's Research Integrity Policy** states 'where ever possible personally identifiable data should be rendered anonymous in order to provide the best protection for participants'.

Will personally identifiable data be protected through the use of pseudonyms and/or codes?

Yes **X** ☐ No ☐

- If yes, please confirm that the key to pseudonyms and/or codes will be held in a separate location to the raw data? **They will be held in a separate location.**

☐

- Will personally identifiable data collected be irreversibly anonymised (All identifiers including keys to link pseudonyms or codes back to individual participants are destroyed)?

Yes **X** ☐ No

☐

- Please indicate the indicative date when the personally identifiable data will be rendered irreversibly anonymised: **Autumn 2021, 1 year after completion of DHAE.**

- Who will be responsible for rendering the data anonymous **Researcher: Mary Dowling**

If you answered No to above and are keeping personally identifiable data please explain your decision & rationale for not adhering to the policy.

12c. Data Access and Security**:**
Data must be stored in a safe, secure and accessible form, must be held for an appropriate length of time, to allow (if necessary) for future reassessment or verification of the data from primary sources, as outlined in the **Maynooth University's Research Integrity Policy.**

Please tick the box to confirm;

- Only the researchers listed on this application will have access to the personal information and data collected from participants ✓

☐

- Electronic Information sheets/consent forms and data collected will be encrypted and stored on a PC or secure server at Maynooth University ✓

☐

- Hard copy Information sheets/consent forms and data collected will be held securely in locked cabinets, locked rooms or rooms with limited access on campus ✓

☒

- Please justify any exceptions to the information stated above

- Do you plan to transfer Data outside of the European Economic Area? Yes ☐ No **X**

☐

- If yes, please confirm you are doing so in accordance with Section 6 of the Maynooth University Data Protection Policy Yes

☐

See Data Commissioners website for a list of approved countries and exceptions

12d. Data Storage:

- Are you planning to collect data on a mobile device (SB keys, smart phones; video recorders; audio recorders and/or laptops)? Yes ☒ No

☐

If yes, to be compliant with Data protection Law, please confirm:

- Data collected on a mobile device will be protected with a strong password at a minimum, and/or encrypted if the device supports encryption ✓

☐

- Data will be removed from the mobile device as soon as is practicable ✓

☐

- Data will be removed to a desktop PC or server in a secure location at Maynooth University

☒

12e. Secondary Use and Processing:

- Are you planning for any secondary use of the data? Yes X ☐

  No ☐

  Potentially for conferences or publications.

If yes, please confirm you will obtain **explicit consent** for;

- Re-use and/or sharing of anonymous data at the beginning of the project I Will ☐
- Re-use and/or sharing of the identifiable data for any purpose other than the current research project I Will ☐
- Depositing in an Archive such as the Irish Qualitative Data Archive or the Irish Social Science Data Archive ? I do not intend to archive the data

  ☐

  - If yes, please give name and contact details for the proposed archive

12f. Data Retention:
Please confirm:

- That Primary data will be irreversibly anonymised (where possible) and retained for a period of (**ten years)** from publication. This information is reflected in the consent form, information sheet, and/or consent script **Yes X**

☐

12g. Data Disposal: Data should be destroyed in a manner appropriate to the sensitivity of that data.
Please confirm:

- Paper based data will be destroyed by confidentially shredding or incineration **Yes X** ☐
- Electronic files will be deleted by overwriting **Yes X** ☐

- If retaining personally identifiable data please indicate the indicative date when that the personal data will be destroyed: [insert date] **Not Applicable X**

  ☐

- Who will be responsible for destroying personally identifiable data? **Mary Dowling**

13. Professional Codes of Ethics. Please append an appropriate code of ethics governing research in your area to this protocol, and/or provide a link to the website where the code may be found.

Irish Society of Chartered Physiotherapy Rules of Professional Conduct Incorporating Code of Ethics. https://www.iscp.ie/sites/default/files/Rules%20of%20Professional%20Conduct%20September%202014%20Public.pdf

British Educational Research Association. Ethical Guidelines for Educational Research. https://www.bera.ac.uk/wp-content/uploads/2014/02/BERA-Ethical-Guidelines-2011.pdf?noredirect=1

14. Declaration

This declaration must be signed by the applicant(s) and Supervisor(s) if appropriate ***(electronic signature is sufficient***).

I(we) the undersigned researcher(s) acknowledge(s) and agree that:

a) It is my (our) sole responsibility and obligation to comply with all Irish and EU legislation relevant to this project.
b) That all personnel working on this project comply with Irish and EU legislation relevant to this project.
c) That the research will be conducted in accordance with the Maynooth University Research Ethics Policy.
d) That the research will be conducted in accordance with the Maynooth University Research Integrity Policy.
e) That the research will be conducted in accordance with the Maynooth University Data Protection Policy and incompliance with data protection law.
f) That the research will not commence until ethical approval has been granted.

Signature of Applicant(s): Mary Dowling

Date: 04/07/2018

Signature of Supervisor(s): (if required)

Date: 04/07/2018

APPENDIX D: Indicative Interview Topics and Vignettes

Indicative Interview/Conversation Questions about EBP in Physiotherapy.

A: Demographics: qualification, where did you study, career path, years of clinical experience, any research experience?

B: How do you know what you know as a physio?

What knowledges do you draw on? Original undergrad, postgrad, CPD, experience, learning from influential colleagues…
Is any of this knowledge innate? Or all learned?
Is any intuitive? Or prescriptive?
Where do you get the information you need to work with your patients?
What would make you try something new as a form of treatment or management with your patients?
How do you get better as a physiotherapist?

Complex patient presentations, complicated, biopsychosocial etc…what do you do when you get stuck?

Day-to Day in the clinic, you make many clinical judgements. What informs them?
What matters most in your job with a patient?

C: CPD, how important is it for you?

How do you choose it which one?
Are you led or lead yourself to one particular type of CPD?

D: Research; what is it for you?

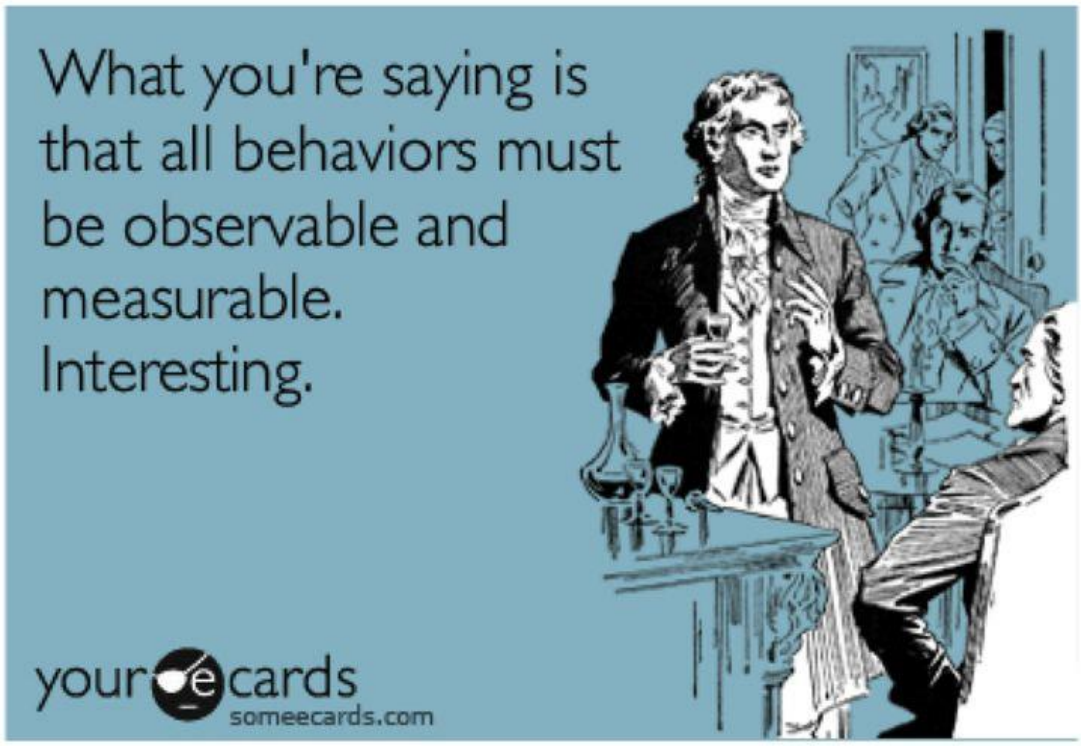
Do you feel connected with it? Does typical physiotherapy research (published in the official chartered society journals) serve you in practice?
Any contradictions between research and practice?
How do you feel about the rules of research?...in order for it to be legitimate?
Have you ever thought about outcome measures, and what is measureable on a human?

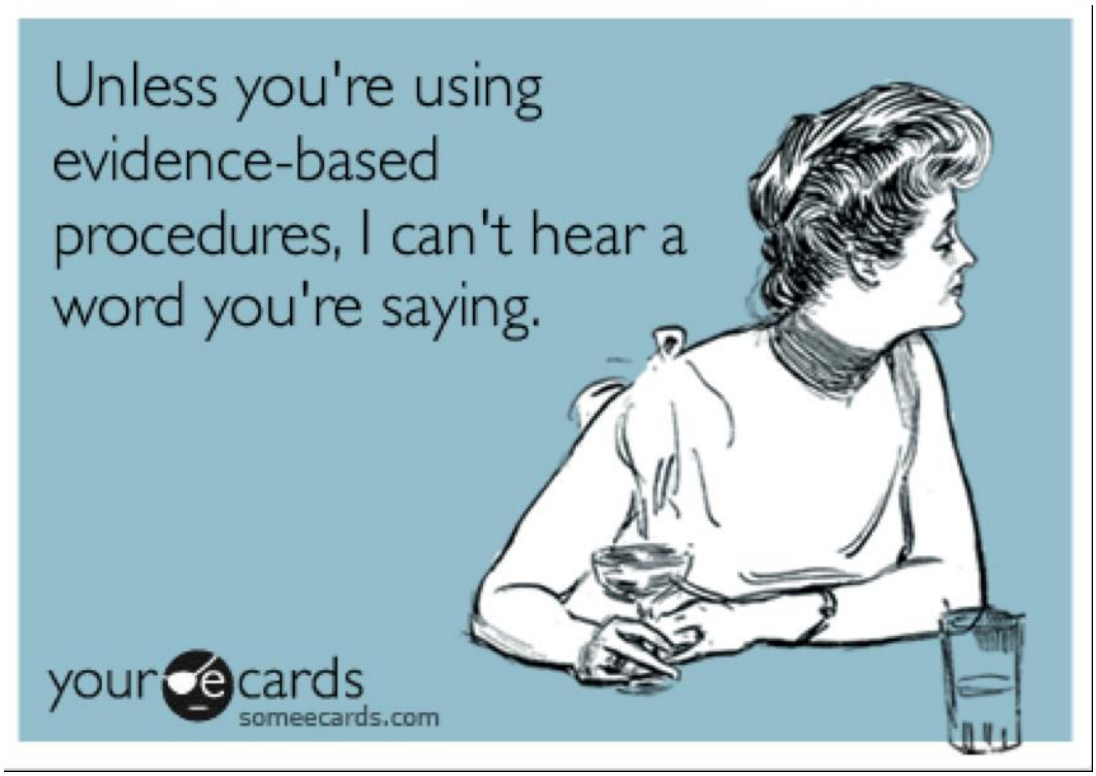
E: Evidence for physiotherapists; what is it for you?

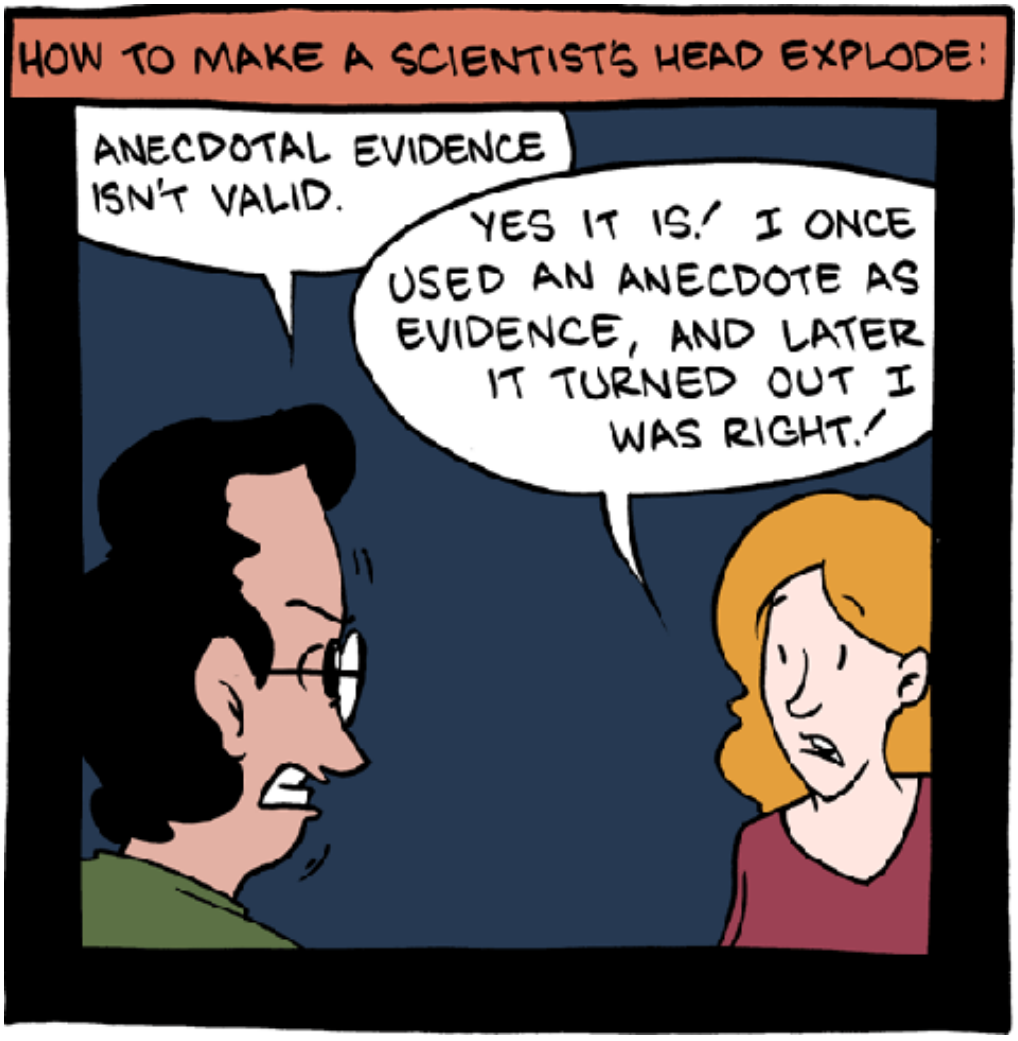
What is evidence for the clinical physiotherapist?
Where does the evidence come from?
Is there such a thing as good evidence or bad evidence?
Is there such a thing as useful evidence and useless evidence?
Is there a hierarchy of evidence for you?
Is there more to care than the physical intervention?
Have you ever considered your epistemology?
Do you feel strongly about EBP?
Tell me how you experience EPB in your practice.
Where does the evidence fit? How far can it take you? Does the clinician see the evidence every day in practice? Practice-Based-Evidence versus Evidence-Based practice?

F: Politics and Identity of physiotherapy in Ireland, is EPB used as an alignment tool to scientific and legitimate practices?

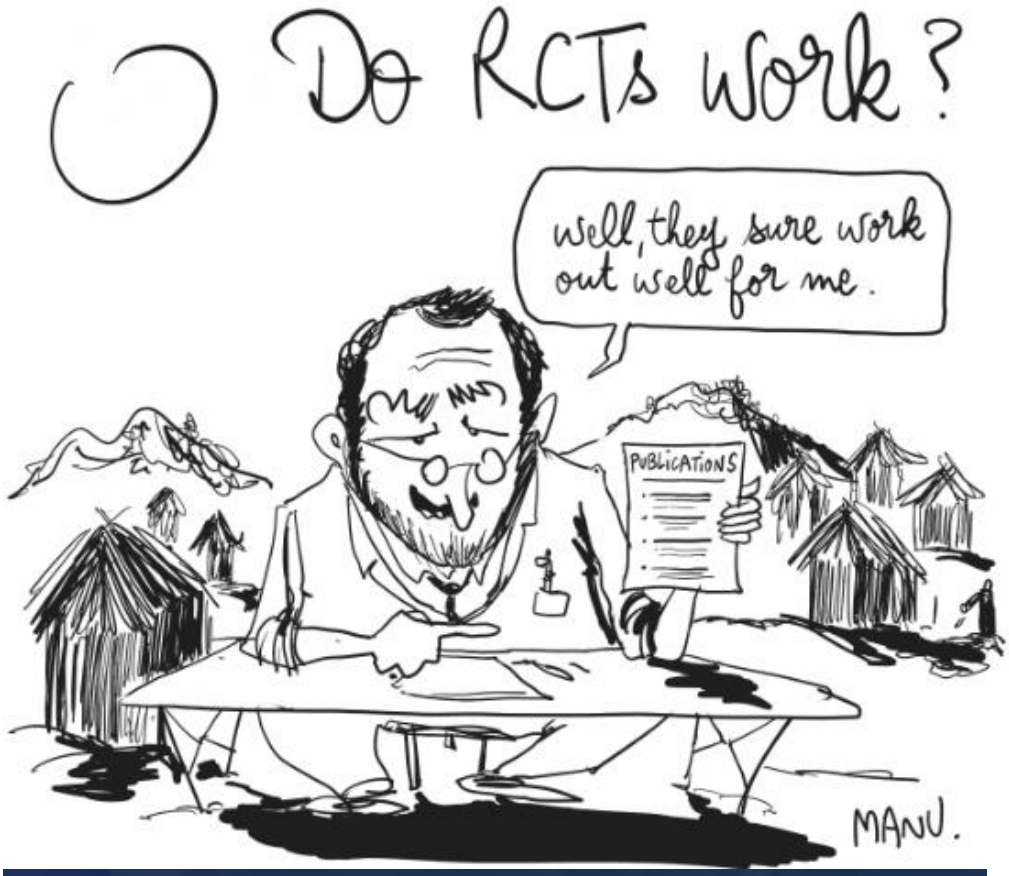
Vignettes to Stimulate Interview Conversation and Discussion





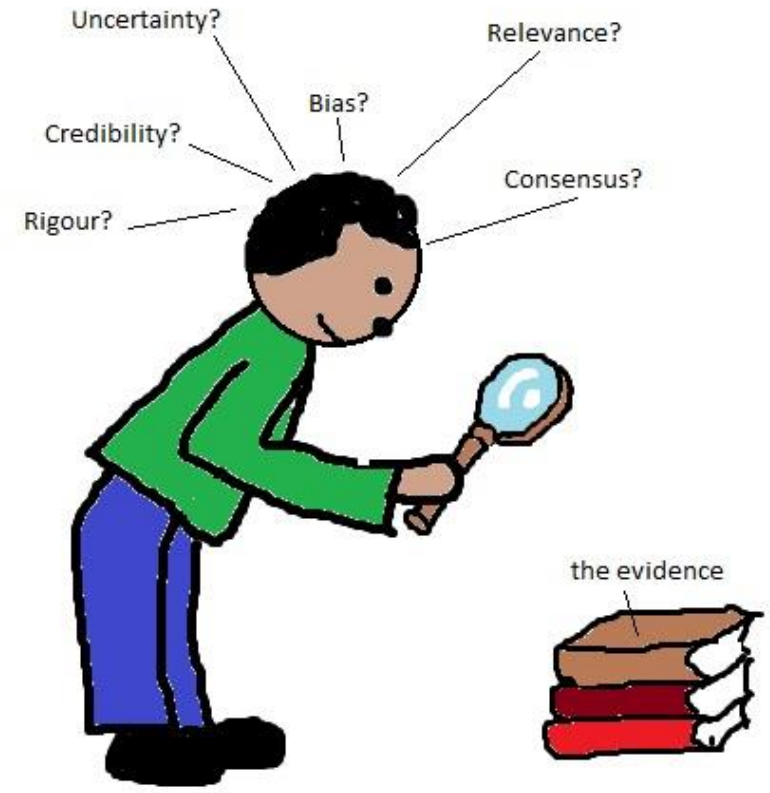

HOW TO MAKE A SCIENTIST'S HEAD EXPLODE:
ANECDOTAL EVIDENCE ISN'T VALID.
YES IT IS! I ONCE USED AN ANECDOTE AS EVIDENCE, AND LATER IT TURNED OUT I WAS RIGHT!


OH, YOU HAVE ANECDOTAL EVIDENCE
THAT COMPLETELY NEGATES FACTS, STUDIES, AND STATISTICS
memegenerator.net


Do RCTs work?
well, they sure work out well for me.
PUBLICATIONS
MANU.


WHAT DO WE WANT?
EVIDENCE-BASED CHANGE
WHEN DO WE WANT IT?
AFTER PEER REVIEW


Well RCTs are the gold standard.
They're like a shiny rock that only has value because people with a vested interest say so?
freshspectrum.com
My stomach hurts
Maybe it was the bad tuna I had for lunch
Too bad I don't have a proper control group, now I'll never know
freshspectrum.com


Uncertainty?
Relevance?
Bias?
Credibility?
Consensus?
Rigour?
the evidence


Quantitative Methods
Only one in 30 take the free ice cream. Interesting...
free icecream
Qualitative Methods
What did you feel when you saw the free ice cream?
Excited. A little scared.
And why was that?


Watson, I know what caused the death
But you have only administered a few interviews and gone on two site visits. Should you not collect evidence that is more robust?
freshspectrum.com

APPENDIX E: *Physiotherapy* Journal Analysis. Year-By-Year

***Physiotherapy* Journal. Documentary Analysis.**

Year by Year Analysis

The following section will lay out the individual years of the documentary analysis, beginning with 2013 and moving through to 2017. There are 3 different charts for each year, the first of which is Research Type, which shows how many original research MSK articles were purely quantitative, purely qualitative or used mixed methods.
The second graph illustrates the Evidence that was presented to the readers by showing the types and numbers of Outcome Measures that were used.
The third chart lays out the Data Analysis Strategies that were used for each particular year.

As can be seen in Figures 5.5.1, 5.5.2 and 5.5.3 there were 18 MSK Original Research Articles in 2013, 15 of which were quantitative, 2 mixed methods, 1 qualitative and there were 2 MSK systematic reviews that year.
Of the Evidence presented, there were 32 Objective Measures, 12 PROMs, 3 Researcher-Scored Scales, 3 Surveys, 1 Interview and 1 Focus Group.
The Data Analysis Strategies saw a total of 92% of analysis being traditional statistical tests on numbers, and 8% of the analysis being of the qualitative variety.

Figures 5.6.1, 5.6.2 and 5.6.3 show the breakdown for 2014, where there were 19 MSK Original Research Articles, of which again 15 were quantitative, 3 qualitative, 1 mixed method and 6 MSK systematic reviews.
The Evidence presented broke down into 22 PROMs, 13 Objective Measures, 2 Researcher-Scored Scales, 1 Survey, 2 Interviews and 1 Focus Group.
The Data Analysis Strategies had an expected bias towards quantitative analysis, with 85% of it being statistics and 15% being qualitative strategies.

Figures 5.7.1, 5.7.2 and 5.7.3 demonstrate the findings for 2015. There were 20 MSK Original Research Articles in this year, with 16 of them being quantitative, 3 qualitative, 1 mixed method and 8 MSK systematic reviews.
The Evidence gathered by the researchers was in the form of 29 Objective Measures, 24 PROMs, 4 Researcher-Scored Scales, 3 Interviews and 1 Focus Group.
The Data Analysis Strategies followed the same route as the previous years with 89% of the data analysed with statistics of some kind and 11% analysed qualitatively.

Figures 5.8.1, 5.8.2 and 5.8.3 represent how the MSK Original Research broke down for 2016. There were 20 articles this year, of which 14 were quantitative, 6 were qualitative, and 5 were systematic reviews.
The Evidence that was presented this year was in the form of 27 PROMs, 25 Objective Measures, 7 Researcher-Scored Scales, 1 Survey, 4 Interviews, 2 Focus Groups and 1 Observation.
The Data was analysed thus: 76% traditional statistics, 6% Other numerical analysis, 18% qualitative analysis.

2017 is represented in figures 5.9.1, 5.9.2 and 5.9.3. There were 33 MSK Original research articles published, of which 24 were quantitative, 5 were qualitative, 4 used mixed methods and there were 5 MSK systematic reviews. This was a higher number than previous years because there was a special issue dedicated entirely to MSK and focussing on low back pain.
The Evidence broke down into the use of 35 PROMs, 14 Objective Measures, 8 Surveys, 5 Researcher Scored Scales and 5 each of Interviews and Focus Groups.

The Data Analysis Strategies followed a similar and expected route considering the skew towards quantitative research and there were 74% traditional statistics, 14% Other numerical analysis and 12% qualitative analysis.

2013

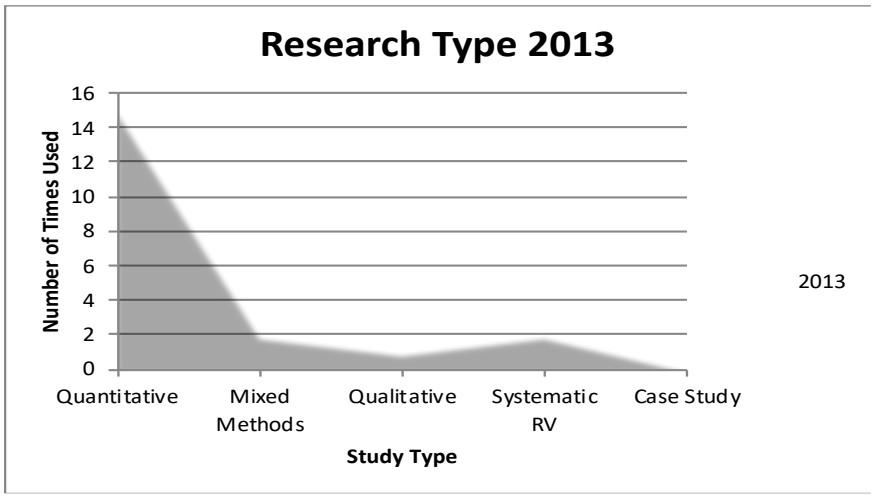


Figure 5.5.1 Research Method Type 2013

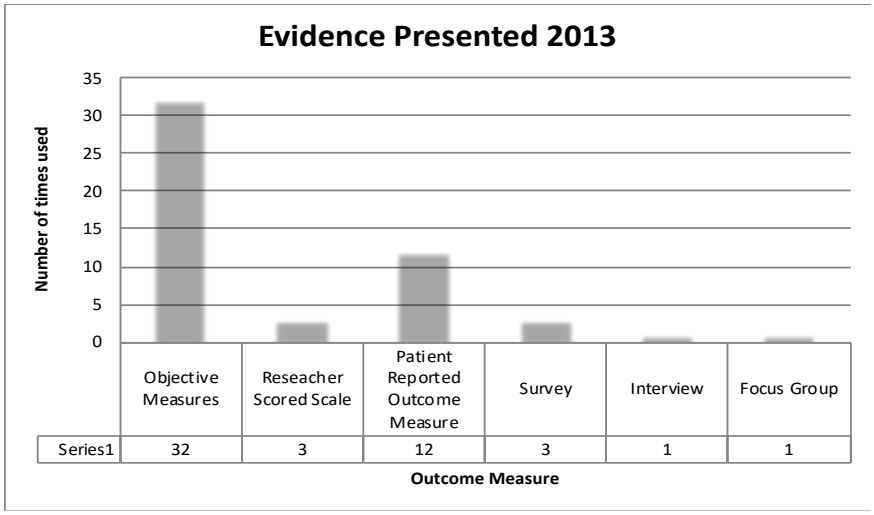


Figure 5.5.2 OMs Presented as Evidence 2013

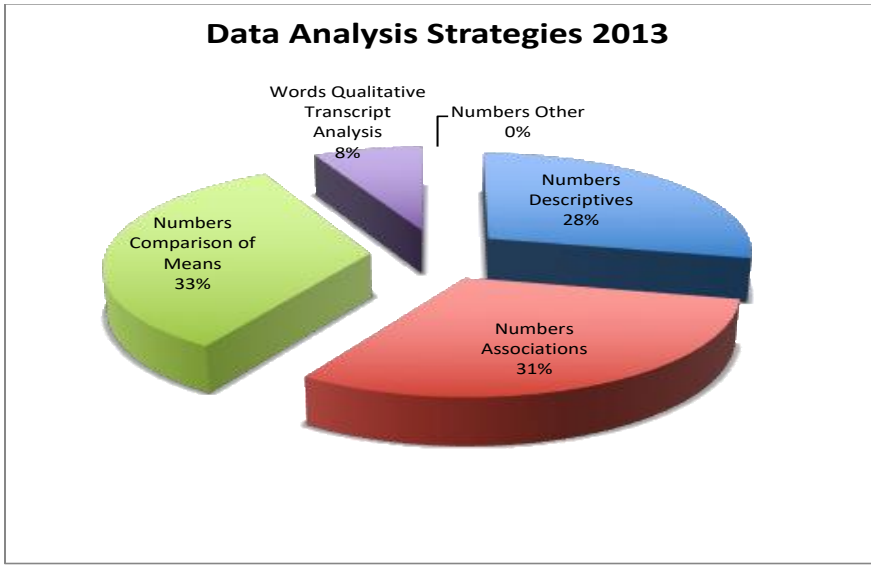


Figure 5.5.3 Data Analysis Strategies 2013

2014

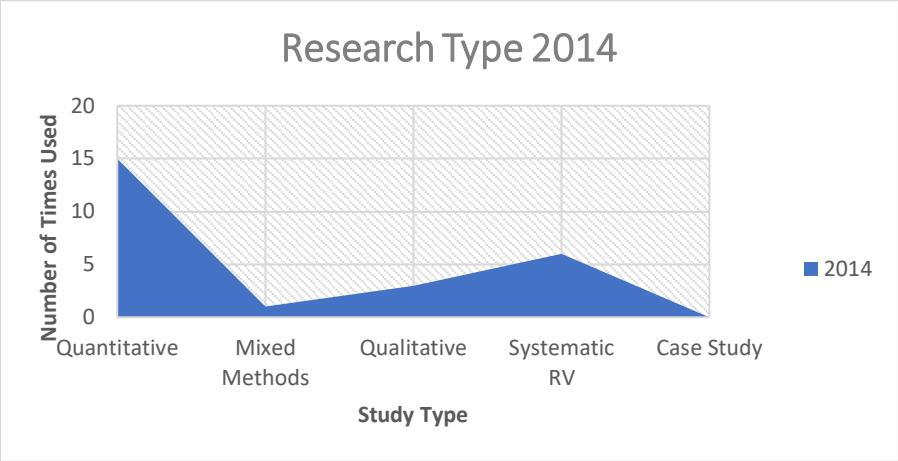


Figure 5.6.1 Research Method Type 2014

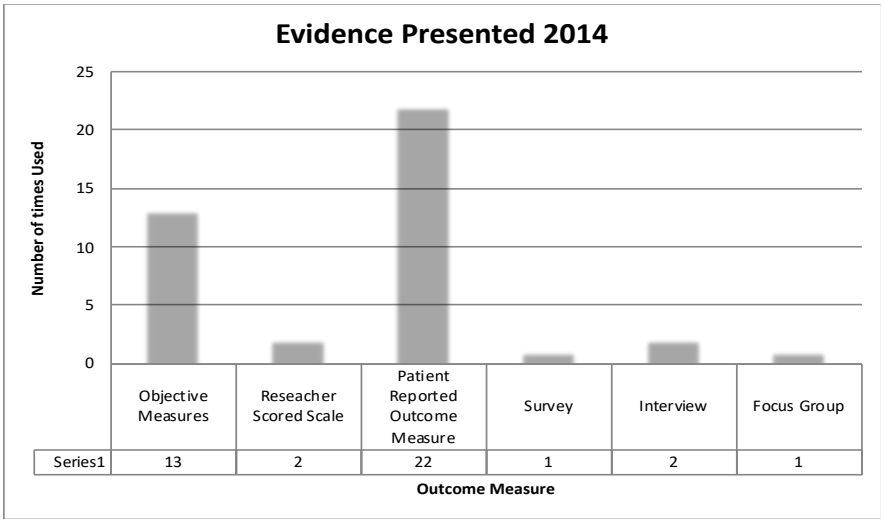


Figure 5.6.2 OMs presented as Evidence 2014

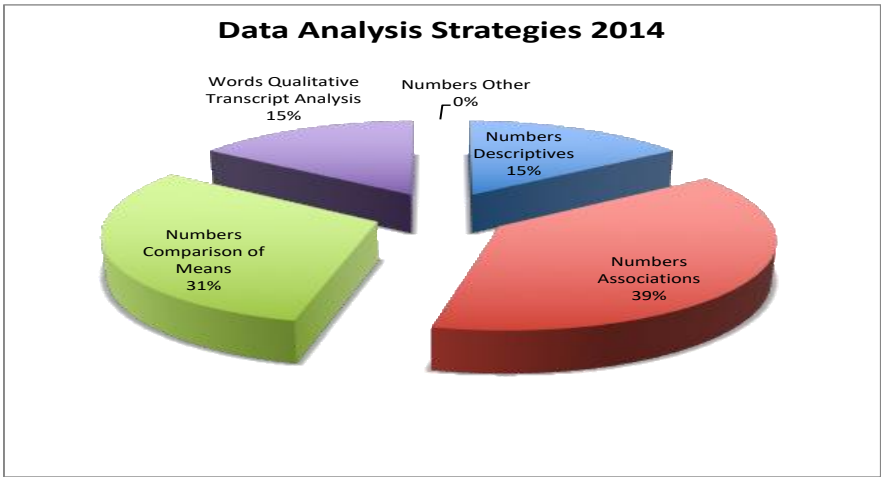


Figure 5.6.3 Data Strategies 2014

2015

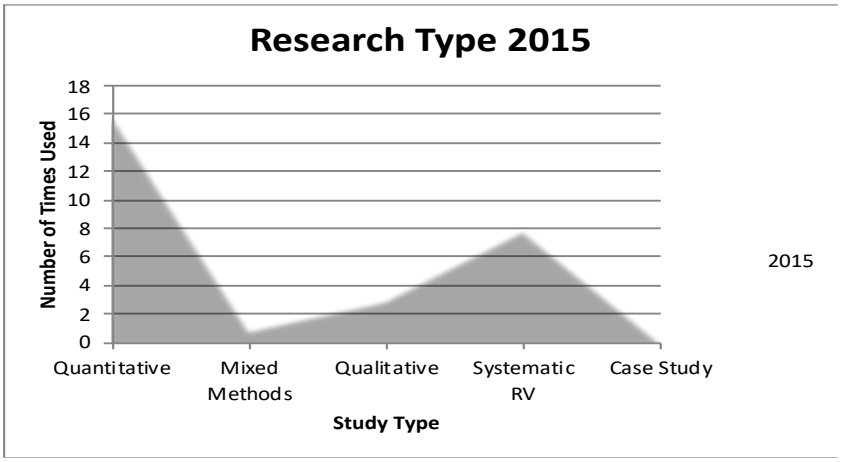


Figure 5.7.1 Research Method Type 2015

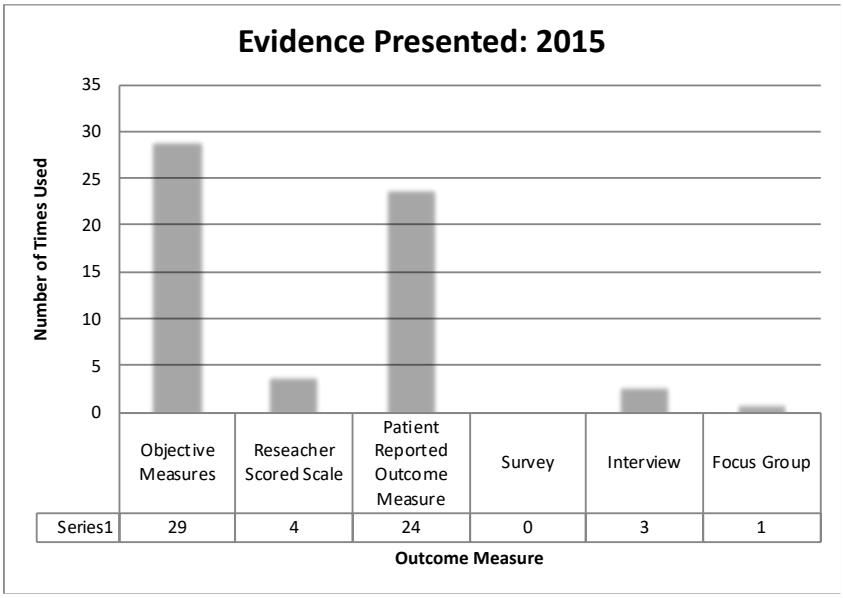


Figure 5.7.2 OMs presented as Evidence 2015

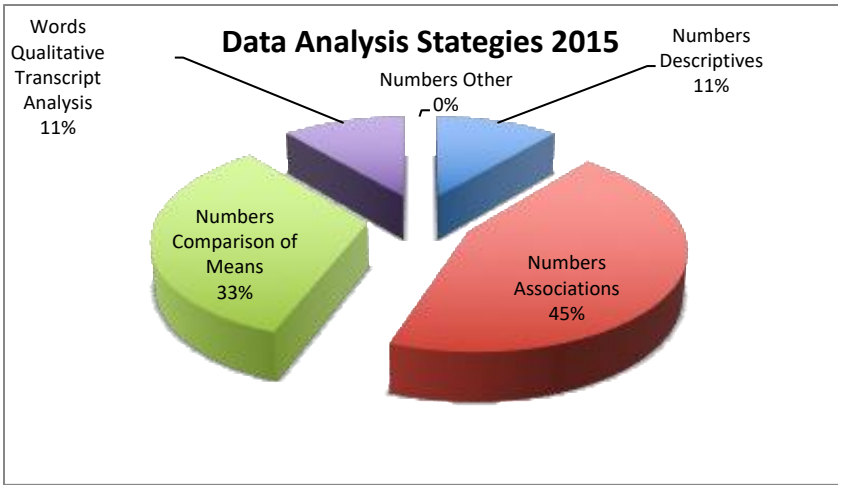


Figure 5.7.3 Data Analysis Strategies 2015

2016

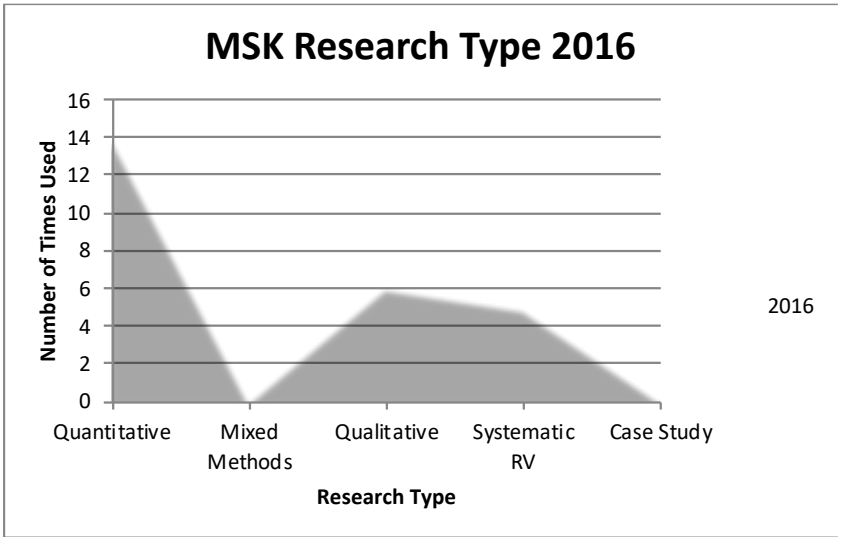


Figure 5.8.1 Research Method Type 2016

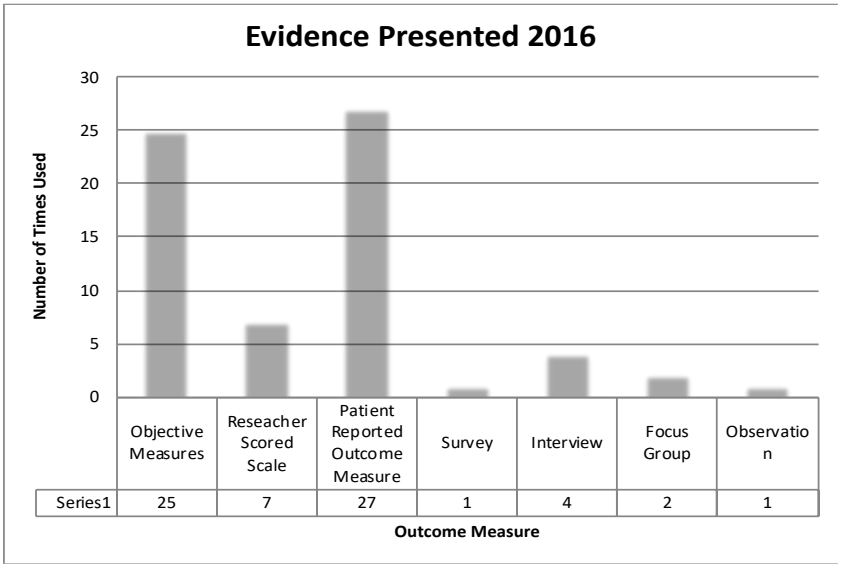


Figure 5.8.2 OMs Presented as Evidence 2016

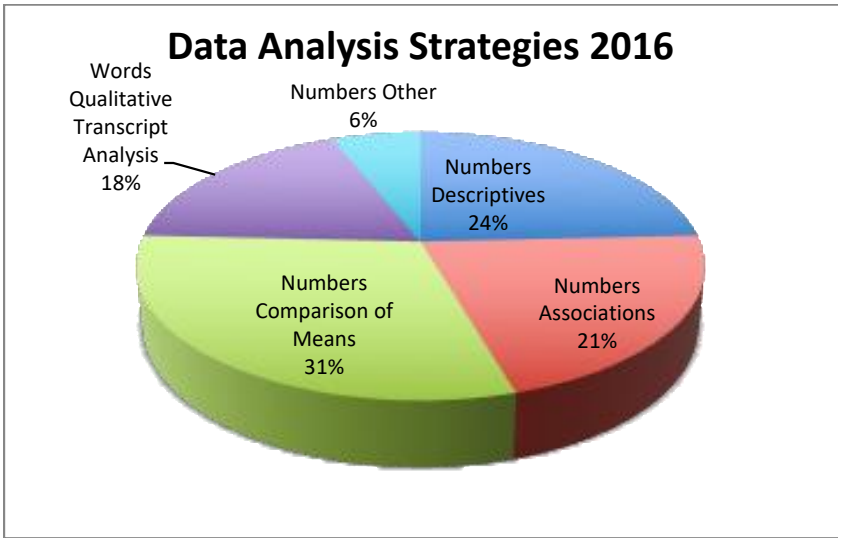


Figure 5.8.3 Data Analysis Strategies 2016

2017

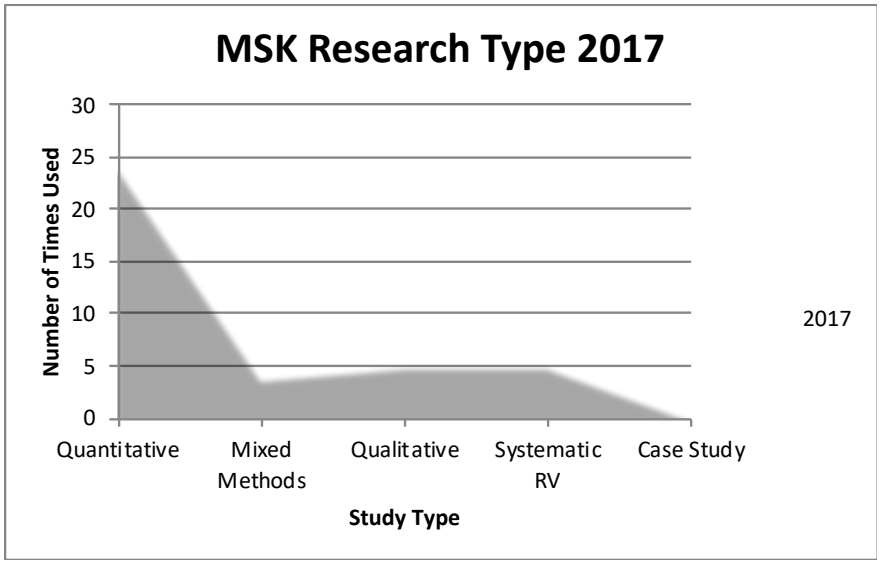


Figure 5.9.1 Research Method Types 2017

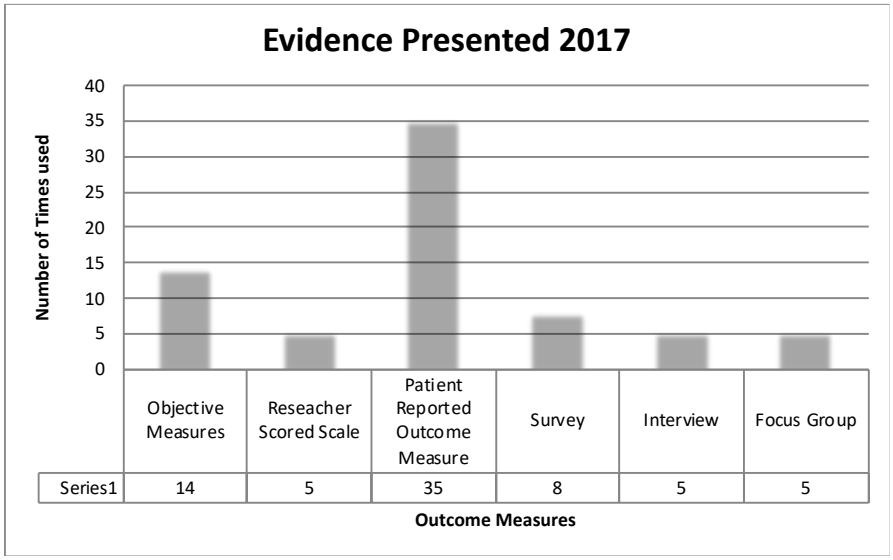


Figure 5.9.2 OMs Presented as Evidence 2017

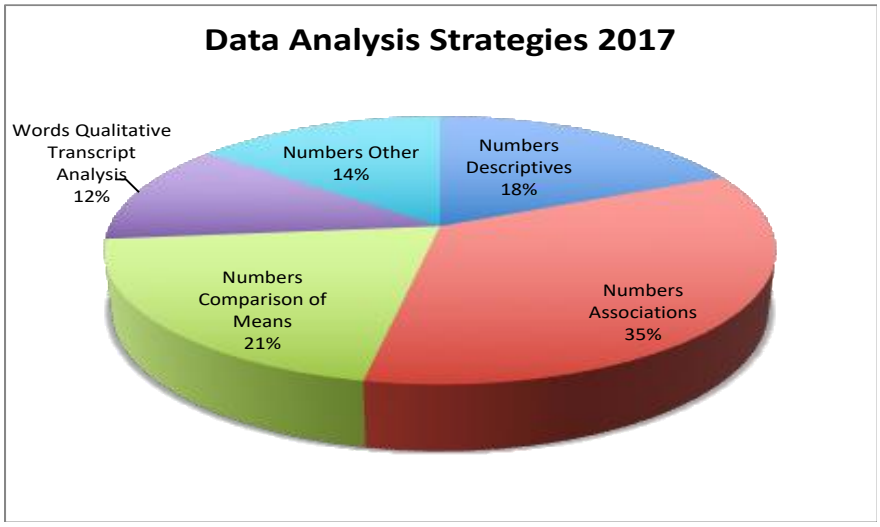


Figure 5.9.3: Data Analysis Strategies 2017

APPENDIX F: *Physiotherapy Practice and Research* Journal Analysis. Year-by-Year

***Physiotherapy Practice and Research* Journal. Documentary Analysis.**

Year by Year Analysis

The year 2017 saw 1 mixed methods study, 1 qualitative study and 6 quantitative studies published from the MSK domain. Drilling down into these studies, and as expected with mostly quantitative studies, most outcome measures were objectively measured on the human subject (13), with three PROMs, one Researcher-scored scale, one Survey and two Semi-Structured Interviews. Data Analysis revealed that most authors used statistical tests to analyse their datasets, as would be expected from mostly quantitative research. Correlation analysis and comparisons of means statistics were the most commonly used types of analysis. See Figures 5.13.1, 5.13.2 and 5.13.3.

In 2016, Physiotherapy Practice and Research published 9 MSK original research articles, of which 7 were fully quantitative studies, one mixed methods and one case study. There were no qualitative articles. In analysing the outcome measured used, I found that again, the majority were objective measures (11), with three PROMs and one each of research-scored scale and survey. As there were no qualitative studies published, there were no interviews or focus group findings presented as evidence. The types of analysis employed by the researchers were mostly of the statistical nature. This is not unexpected as all studies used quantitative means except for the survey, which had some open-ended questions, the answers to which were analysed thematically. See Figures 5.14.1, 5.14.2 and 5.14.3.

There is a similar story in 2015, with 8 of 9 MSK original research articles being fully quantitative, but for the first time, we have a qualitative study that utilized narrative inquiry and semi-structured interviews to investigate the patient experience of Cauda Equina Syndrome. See the Research Type, Outcome Measure utility and Analysis types in Figures 5.15.1, 5.15.2 and 5.15.3.

In 2014 there were 8 MSK original research articles, of which five were fully quantitative, one of them I am describing as mixed methods because it had two open questions on its survey, which the authors said they coded thematically afterwards. One study was a review study and 1 was a case study. There were no qualitative research designs employed in any of the MSK research. As such there were mostly objective measures used, though interestingly more patient reported outcome measures than any other type.
As for Analysis, as expected, mostly statistical tests used to check for causation, correlation or inferred relationship. See Figures 5.16.1, 5.16.2 and 5.16.3.

In 2013 there was a little more of a spread with one mixed methods and one qualitative article published along with the 5 quantitative studies. The qualitative article was an exploratory study of physiotherapist's views of early rehab in critically ill patients. The types of evidence were gathered again from PROMs, purely objective measures and a couple of semi-structured interviews and research-scored scales. The analysis that the evidence was subjected to was again mostly in the form of statistical tests, as seen in Figures 5.17.1, 5.17.2 and 5.17.3.

2017

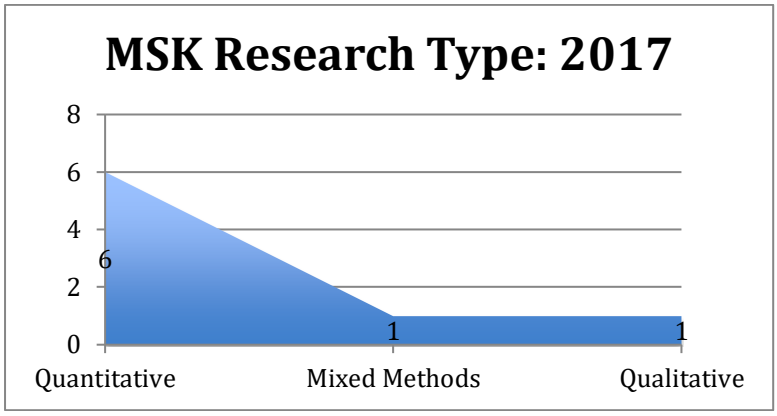


Figure 5.13.1: MSK Research Type 2017

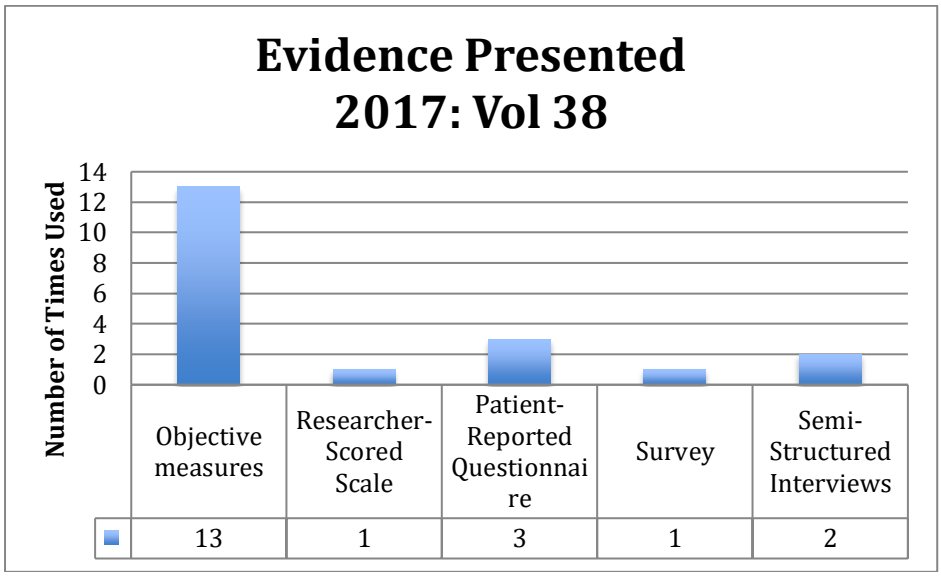


Figure 5.13.2: Evidence Presented 2017.

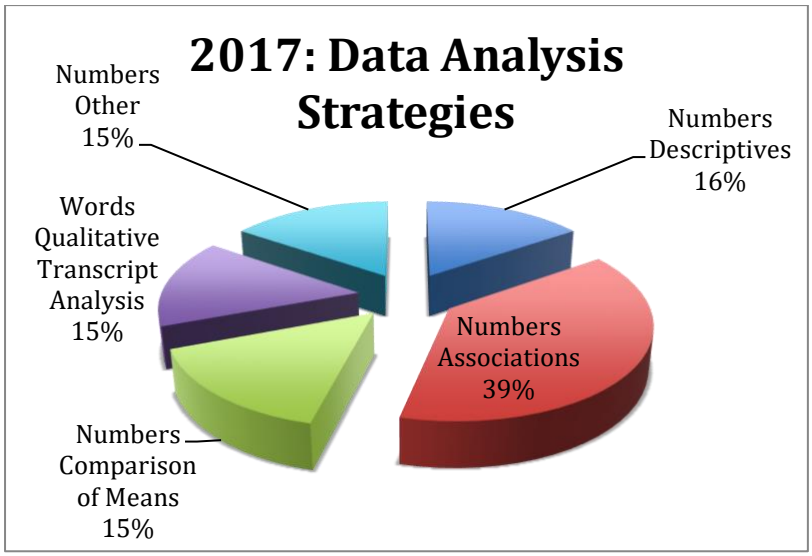


Figure 5.13.3: Analysis Used 2017.

2016

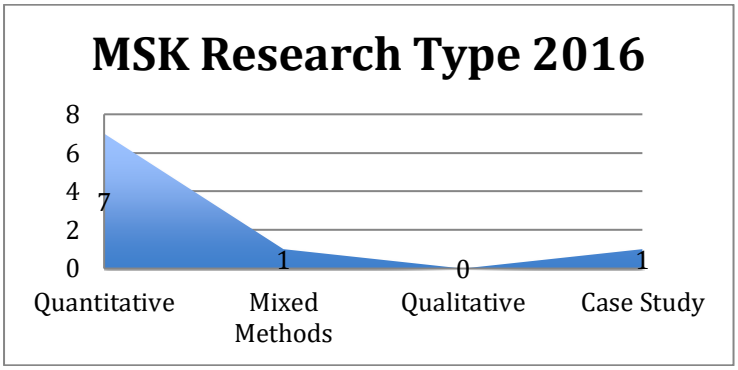


Figure 5.14.1: MSK Research Type 2016

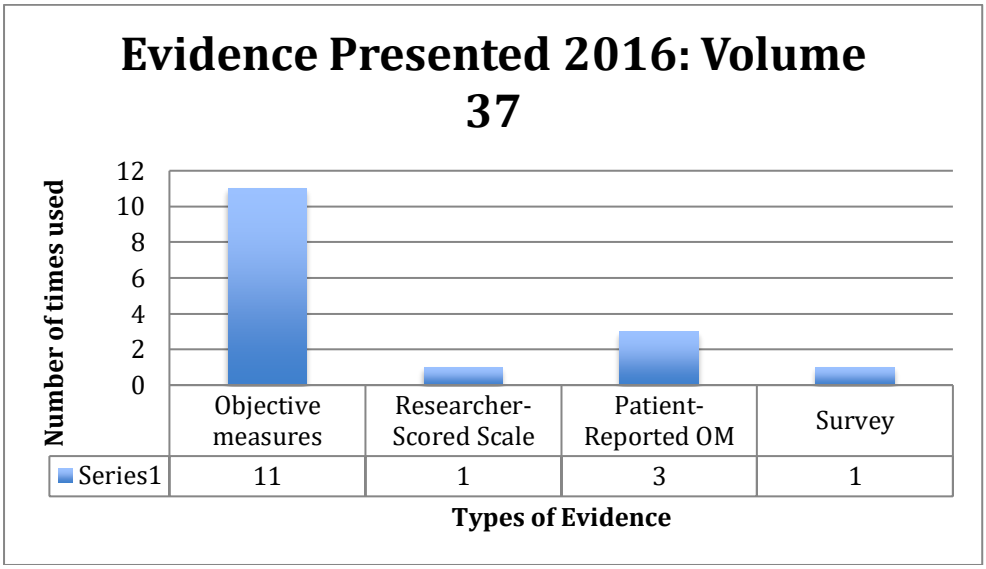


Figure 5.14.2: Evidence Presented 2016

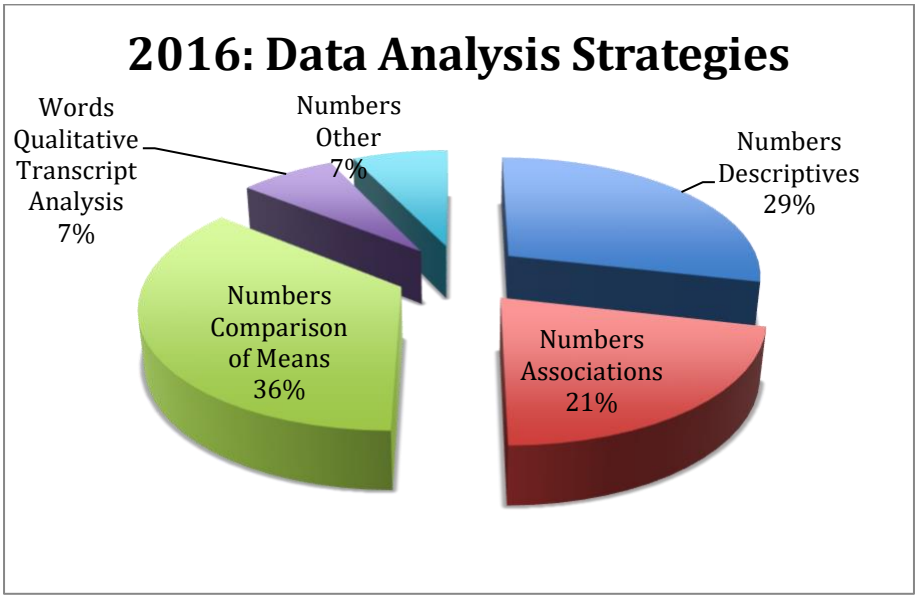


Figure 5.14.3: Analysis Used 2016.

2015

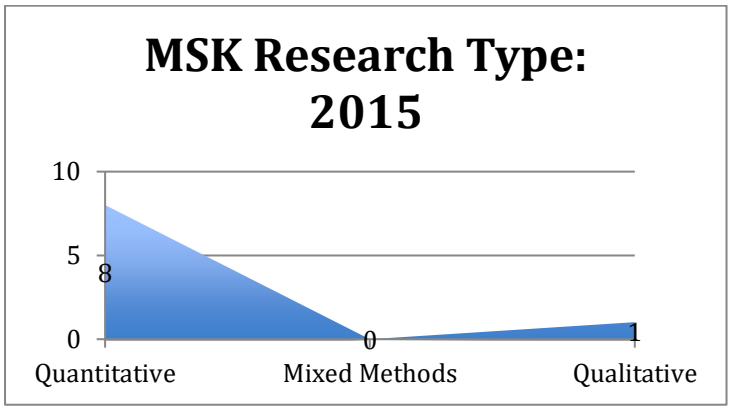


Figure 5.15.1: MSK Research Type 2015

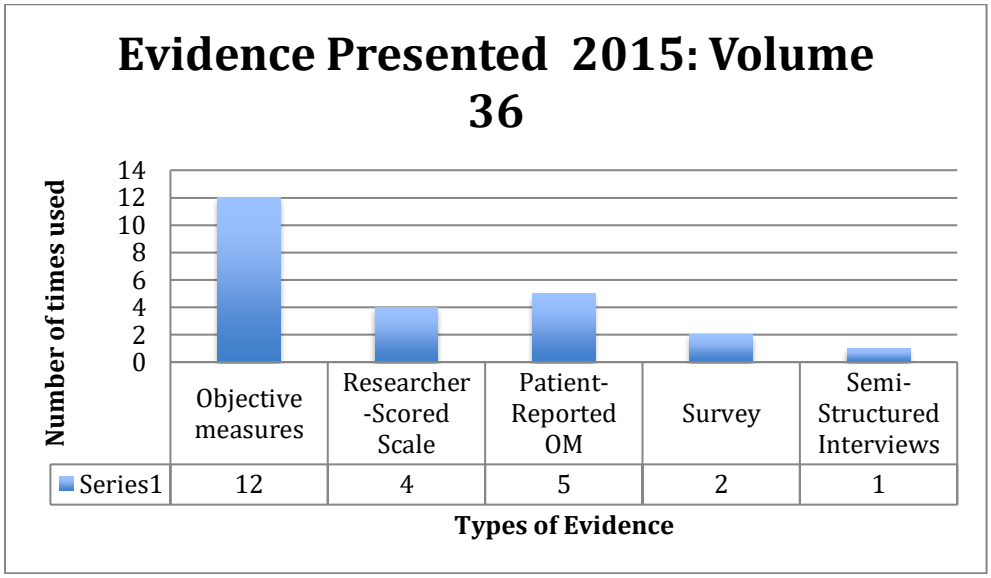


Figure 5.15.2: Evidence Presented 2015

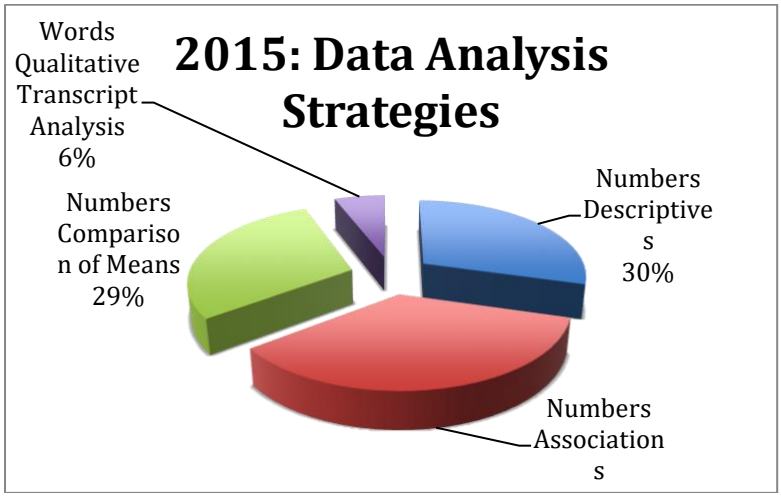


Figure 5.15.3: Analysis Used 2015.

2014

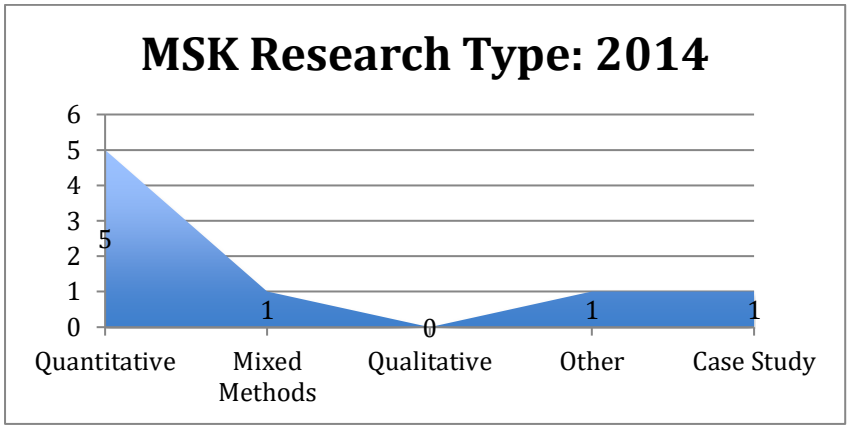


Figure 5.16.1: MSK Research Types 2014.

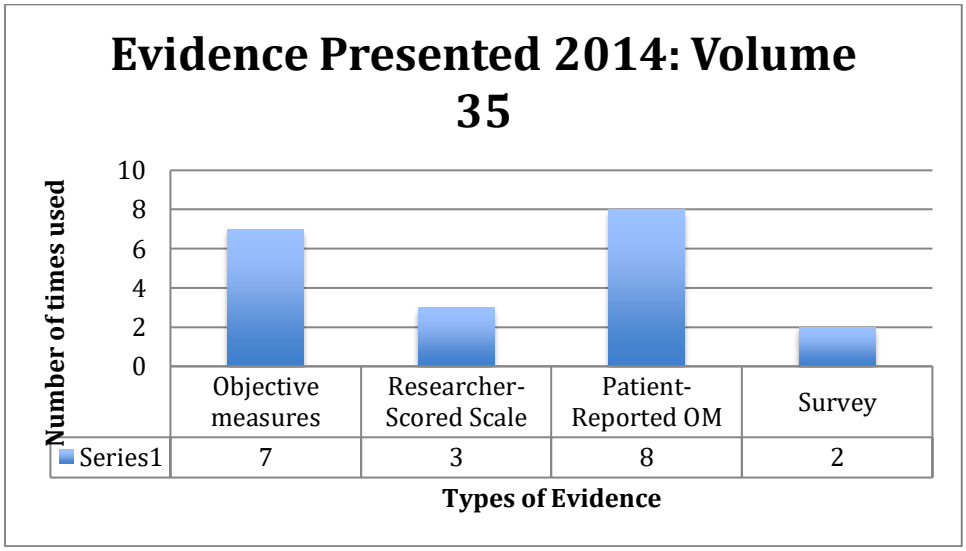


Figure 5.16.2: Evidence Presented 2014

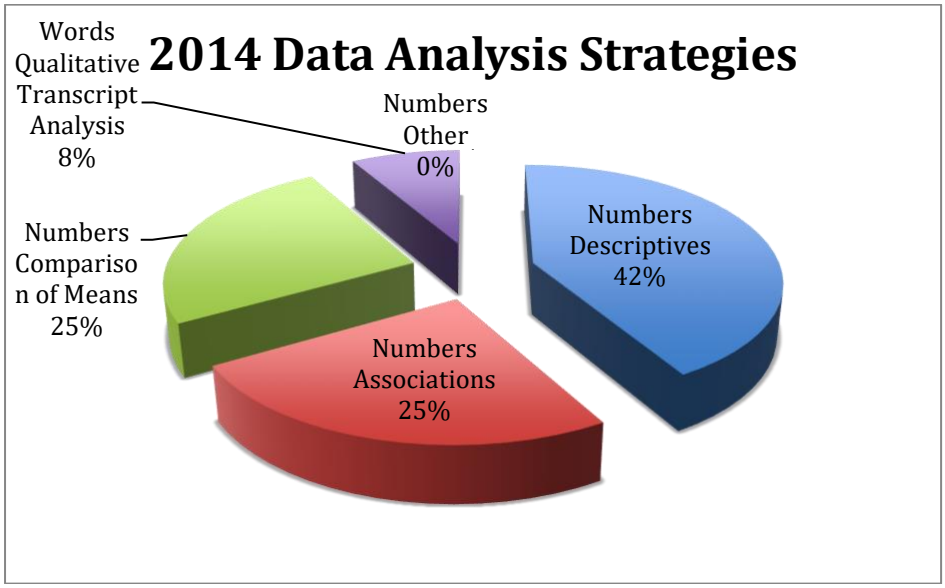


Figure 5.16.3: Data Analysis Used 2014.

2013

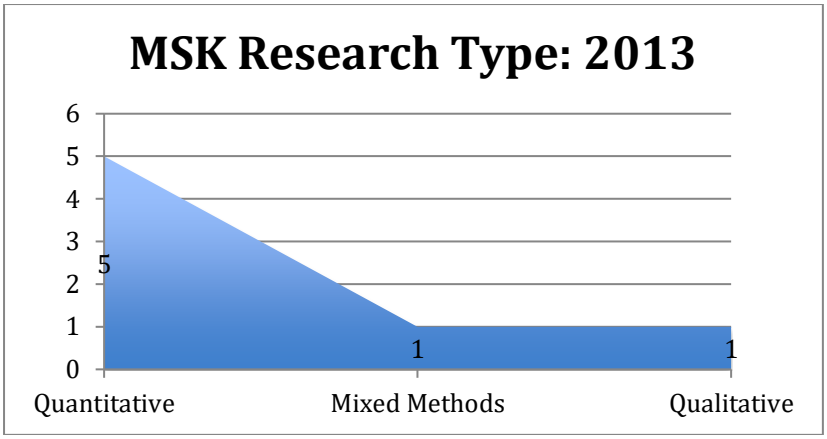


Figure 5.17.1: MSK Research Type 2013.

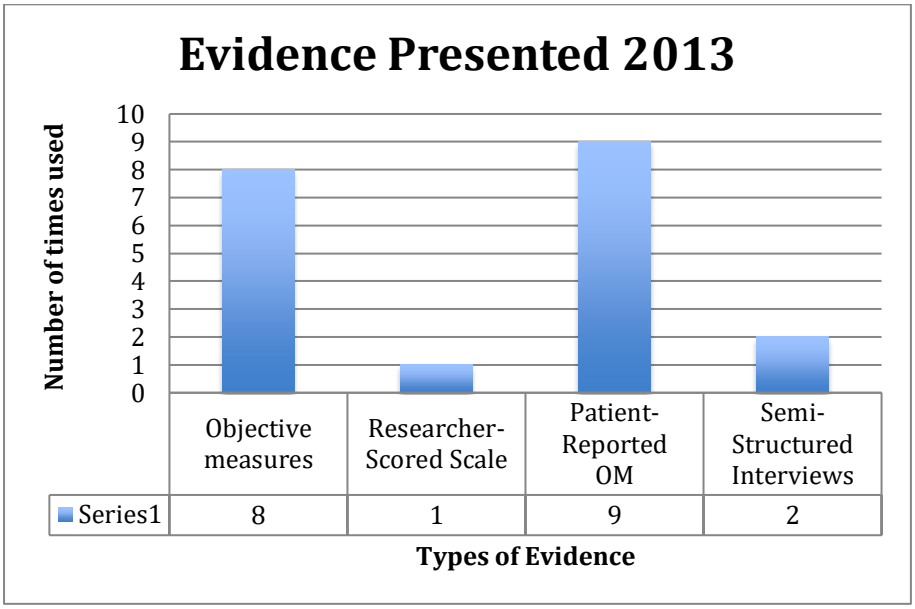


Figure 5.17.2: Evidence presented 2013.

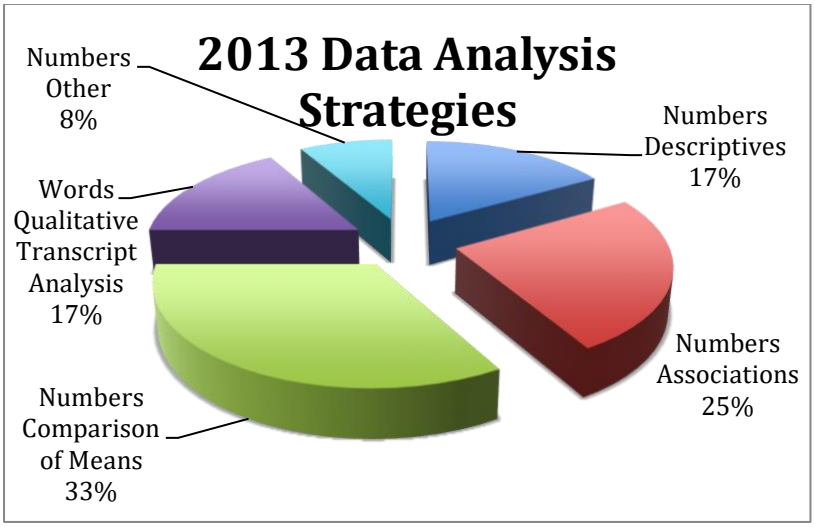


Figure 5.17.3: Analysis Used 2013.