

PROFESSIONAL PRACTICE INFLUENCES:
A SEQUENTIAL QUALITATIVE INVESTIGATION ON
MSK ASSESSMENT OF THE DIABETIC FOOT AND
PODIATRY PRACTICE

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"It's supposed to be hard. If it wasn't hard, everyone would do it. The hard ... is what makes it great."

Abbreviations

LJM – Limited Joint Mobility

MSK – Musculo Skeletal

DFU – Diabetic Foot Ulcer

IWGDF – International Working Group on the Diabetic Foot

IPA – Interpretative Phenomenological Analysis

NICE – National Institute of Health and Clinical Excellence

HCPC – Health and Care Professions Council

COP - College of Podiatry

Abstract

Within the UK public sector, the present healthcare landscape is a result of changing priorities over the last few decades with health care policies requiring healthcare professionals to adapt to new ways of working. These policies reflect the need to sustain a health service which can cope with the shifting demographic of an ageing population and an increase in conditions such as diabetes. These factors have an impact for the profession of podiatry, meaning potential changes influencing the profession, the shape of services delivered and the nature of everyday podiatry practice.

This thesis aimed to get a clearer understanding of the influencing factors on practice for podiatrists. It achieved this by using an interpretative phenomenological analysis approach to gain insight into the experiential practice of podiatrists in both specialist and non specialist practice. Specialist podiatry care is needed for foot related complications in diabetes and international guidance IWGDF (2019) has indicated LJM is a contributory risk factor in the development of diabetic foot ulcerations (DFU). However, the characteristics of foot related LJM are not well understood, therefore, at it's outset, this thesis aimed to develop a clearer understanding from experiential practice. This revealed LJM is currently "off the radar" in podiatry practice, partly due to lack of recommendation to assess in UK clinical guidelines and because priority is being given to other assessments.

As the thesis shifted focus to professional practice, the superordinate themes, safe in our silos, stretching and sensemaking, steering or sailing, revealed the challenges faced by podiatrists in specialist and non-specialist roles. It is difficult to quantify the impact of health policy and changing organisational needs on professional practice, however the podiatrists in this study were employing a range of strategies to cope with the increasing demands. Some of these demands impact on the internal dynamics within the profession. Therefore, it is vital to encourage leading voices within the profession to help podiatrists with transformational change, and to encourage the next generation of podiatrists to embrace digital health technology, and public health roles in order to grow and develop the profession.

Chapter 1

1.0 Introduction to the thesis

This chapter will introduce the thesis, it will describe the researcher's professional area of interest and personal motivation for this body of work, summarising the personal significance of the study and the influences on the researcher in developing the research design. It will provide a narrative and visual map of the thesis structure to guide the reader through the research journey for this study and will conclude by summarising how the thesis will be positioned in the area of professional practice for podiatrists.

1.1 Researcher's area of interest

As a researcher I have a keen interest in the role of podiatrists in professional practice, in particular the specialist areas of diabetes and musculoskeletal care. In my role as a lecturer in podiatry, I spend a considerable amount of time supporting undergraduate students as they develop their knowledge and understanding of podiatry practice. Their learning progress occurs through a range of experiences in clinical, academic, and work place settings. The experience podiatry students gain from mentors within the profession is influential in shaping, motivating and inspiring future career aspirations. Once graduated, podiatrists will be influenced by their organisation, their colleagues and they may work in the private or public sector delivering healthcare services, less so in the commercial sector, or in research and academia. The structure and culture of the business or organisation a podiatrist works within will further influence their experience and provide a range of opportunities for both career progression and professional development. The leadership skills demonstrated by role models and mentors in the profession are important in influencing a podiatrist's career.

The conventional role of a podiatrist is to assess, diagnose, and treat individuals with any number of lower limb conditions aiming to resolve pain and in doing so improve their health, quality of life and wellbeing. There are a number of specialist areas in the podiatry profession, currently these most often focus on diabetes or high-risk care, rheumatology, musculoskeletal care, sports podiatry, podopaediatrics, and podiatric surgery. These specialist areas of practice are reflected in the services provided in the public and private sector by podiatrists.

Due to the enormous scale of diabetes worldwide and problems associated with the foot, diabetes and high-risk care has become a dominant speciality in the profession.

1.2 Diabetes and Podiatry

The prevalence of diabetes is illustrated by figures from Public Health England, (PHE, press release, 2016) who estimate 3.8 million people are affected. 90% of diabetes cases are Type 2, which is largely preventable or manageable by lifestyle changes. Foot problems are common in people with diabetes and in 2014-15 the cost of diabetic foot disease in England was £1 billion (NHS digital, 2017). Evidence suggests providing care structures for the management of diabetic foot disease is important to provide improved outcomes for people with diabetic foot ulcerations. Audit data from England and Wales suggests the basic framework of care structures for services in England and Wales varies between commissioning groups. Over the last two decades there has been a huge impact on the provision and scope of NHS podiatry services in the UK, due to organisational restructuring of health services and shifting government health policy. The population projections from the Office for National Statistics suggests that by 2023, the number of people aged 85 and over is expected to rise to 1.54 million. The size of the population in the older age bracket is important for podiatrists, as older people are more likely to develop dementia, diabetes and MSK conditions (Public Health England 2018). These conditions and the upward trend in obesity will continue the increased demand for health and social care, which includes podiatry services.

The foot complications associated with diabetes, such as diabetic foot ulcers, result in a huge burden of ill health on the individual, which impacts on the demand and cost of diabetes footcare services. The development and transformation of diabetes foot care services has been heavily influenced by the publication of NICE guidelines. NG19 (DH, 2016) recommends care structures should be in place to manage diabetic foot disease. This care structure is outlined as follows;

1. Training for routine diabetic foot examinations
2. An established Foot Protection Service pathway
3. An established Foot Disease pathway for new referrals for an assessment within 24 hours.

1.2.1 Who looks after the foot in diabetes care?

Podiatrists form an important part of the Foot Protection Service pathways in the UK for people with diabetes. Podiatrists play a crucial role in taking responsibility for the management of diabetic foot ulcers, for example, organising advanced imaging, independent prescribing, prescribing offloading strategies or surgical opinion in order to improve patient outcomes. In direct contrast to the other specialists' roles in podiatry, the role of the specialist diabetes podiatrist has become enshrined within national recommendations and guidelines for people with diabetic foot problems. Due to increased prevalence of diabetes in the UK, it is assumed this will be reflected in provision of podiatry services in the public sector with a higher proportion of staff employed working in diabetes care services than in podiatric surgery, MSK or podo paediatrics. Therefore, this group of specialist roles are of particular interest in terms of their experience and understanding of diabetes related foot problems.

1.3 Initial reflections on the area of interest

My area of interest is to gain a better understanding of musculoskeletal foot problems occurring in people with diabetes from the perspective of podiatrist's experience. Having worked in both clinical practice and education for over two decades, my area of interest doesn't naturally align to the organisation of podiatry services in the U.K. public healthcare sector. In the U.K. the design of podiatry services has for many years been conventionally separated into high risk or diabetes services and Musculoskeletal (MSK) or biomechanics services. I feel this is problematic for podiatrists at an individual level as it shrinks their scope of practice and working knowledge into a narrower field of operation. At a professional level, I feel the organisation of podiatry services into specialist areas has the potential to restrict growth and development of knowledge and practice. I acknowledge my personal bias in the context of fostering growth of within my professional field of podiatry. I also appreciate that my views are influenced by my personal investment and motivation as a podiatry lecturer to secure the future success of the next generations of podiatrists. That said, my views about the potential negative effects of allowing the profession to become segregated into specialisms is not at odds with the concerns Stressing & Borthwick's (2014) participants expressed. In fact the impact of changes in podiatry services and concerns about future provisions was strongly

evident. As a response to this, recent U.K. national healthcare policy documents, Five year forward view (2014) and NHS long term plan (2019) actively promote the benefits of collaborative working for service users, both within and between professions. My feelings are that there are missed opportunities for development of leadership roles to unify specialist areas of podiatry practice, which if pursued would help strengthen the influence from within the profession of podiatry.

1.4 Podiatry and MSK

MSK services usually include podiatrists and physiotherapists as key members of a community or hospital service. Podiatrists have expert knowledge and skills in lower limb biomechanics and the design and provision of foot orthoses in the management of musculoskeletal problems affecting the lower limb and foot. This is important because data from Health Profile for England 2018 (Public Health England 2019) suggests each year 20% of the population consult their GP about a MSK problem; and MSK conditions constitute the third largest NHS programme budget. The speciality of musculoskeletal medicine is a fundamental aspect of a podiatrist's scope of practice. Therefore, podiatrists are well placed to receive referrals from GP's to assess, diagnose and manage a range of lower limb MSK problems.

The transformation of MSK services in the past two decades has been led by the collaborations evolving from podiatrists and physiotherapists sharing working practices. This has helped illustrate how podiatry positively impacts on MSK outcomes. MSK as a speciality service has a greater professional presence of physiotherapists than podiatrists. MSK services include referral for conditions with multiple aetiologies, complex morbidities and MSK conditions affecting regions outside the podiatric scope of practice. For podiatrists working in MSK services, there is an array of NICE guidelines which may influence treatment pathways, for example low back pain, systemic connective tissue conditions, congenital conditions, trauma, soft tissue conditions and spinal conditions. For systemic diseases such as Rheumatoid Arthritis and Osteoarthritis which generate musculoskeletal problems in the lower limb, podiatry input has much to offer, however, evidence from the literature suggests rheumatology services do not always feature podiatrists as part of their team. For metabolic

conditions such as diabetes, musculoskeletal problems can feature in the lower limb as a result of neurological, vascular and soft tissue complications.

As health services continue to transform and change in response to the drive from the NHS long term plan (2019), there is an opportunity for podiatrists to evaluate service provision in the speciality areas of diabetes and MSK to enhance and improve quality care.

1.5 Personal research journey and area of interest

When embarking on this PhD journey I underestimated the breadth of skills required to navigate the complexities of decision making involved in undertaking research. I began the journey aiming to characterise the musculoskeletal manifestations of limited joint mobility in diabetes, in order to measure this in the foot. However, evidence from the literature search only partially characterised limited joint mobility. Therefore, I made a decision to look at limited joint mobility from the perspective of the experience of podiatrists. I appreciate now that the skill of making those decisions about my area of interest in diabetes and MSK was an integral part of undertaking research and learning about my strengths and limitations as a researcher. Decision making is part of the dynamic reality of any planned research and I didn't anticipate the need to develop resilience skills in order to deal with the setbacks, disappointment and frustrations of conducting research. A significant limitation at the beginning and mid stage of my research journey was a reduced ability to understand and manage my response to what I perceived to be poor progress. This manifested in a struggle to connect with my supervisors' feedback on my progress. I didn't feel able to converse with them about who I was, or where I was situated in relation to developing my research methodology. Part of this related to a superficial grasp of what a qualitative research project required in terms of authentic investment of myself in the process. Therefore, my development as a qualitative researcher required development of my personal skills to learn to be comfortable with being uncomfortable with the unknown, and accept that the process was going to be messy and unpredictable. I also learned that as a qualitative researcher trying to control my own feelings towards my research would be a barrier to learning. I learned that being more open to my own thoughts and feelings about my research allowed me to progress

to a deeper understanding of the philosophies underpinning qualitative research and eventually a more meaningful understanding my participants experiences.

At a pragmatic level I learned to improve my skills in conducting focus group and interviews and learned how to analyse data using an interpretative phenomenological approach. There are many steps involved in the process of preparing for data collection and I did not appreciate the amount of time required to successfully capture, transcribe, analyse and write up findings.

This research journey has taught me the need to plan ahead, and within that planning, I have learned the crucial skill of creating time in a busy schedule to read, think and write about my research. My greatest learning in this research journey has arisen out of initial failures to understand the stages of the research process and by unlearning the methods I had previously employed.

1.6 Overview of thesis

The study will initially focus the experiences of podiatrists in understanding foot related limited joint mobility in diabetes care. The emphasis on the experiences of podiatrists then continues with a focus on understanding the influences on professional practice. The study employs a qualitative research approach within the research design. Therefore, the qualitative voice will be evident within this study. When it is appropriate, the writing style will incorporate the active voice written in the first person to interpret meaning and enhance understanding of participants experience in the context of professional practice

Table 1 Overview of thesis. This table provides an overview of the thesis activities and reflects the journey between quantitative and qualitative perspectives and from Limited Joint Mobility to professional practice. It represents the thesis journey simplistically seen below as two themes. The stages of the journey are identified sequentially with a brief summary

Table 1 Overview of thesis

	Theme 1 LIMITED JOINT MOBILITY (LJM)		Theme 2 PROFESSIONAL PRACTICE
Stage 1	Introduction <i>This provides background on diabetes related foot complications and the extent of the problem. It considers why LJM is important in the context of foot complications.</i>		
Stage 2	Literature review of LJM <i>A review of the literature establishes an understanding and definition of LJM in the diabetic foot. It identifies the limitations in characterising LJM from the literature.</i>		
Stage 3	Methodology <i>This identifies research designs from the literature and establishes an emerging qualitative research focus in which to better explore clinical practice.</i>		
Stage 4	Focus group <i>Focus group method, IPA approach operational plan, data collection with analysis and reflection on the findings</i>		
Stage 5	Findings → <i>The findings demonstrate themes directly related to LJM and other unexpected themes which are related to professional practice.</i> ↓		→Professional practice The themes which related to professional practice were probed to develop a plan for a literature review. ↓

Stage 6a	<p>Outcomes from Focus group (discussion) → <i>The focus group and literature review findings are compared to conceptual framework on LJM.</i> <i>Participants were not looking for LJM in clinical practice due to external influences impacting on service provision.</i></p>	Stage 6b	<p>Narrative review of literature <i>This reviews the literature pertinent to professional practice themes from the focus group. It culminates in a proposed conceptual framework for professional practice as the basis of a research design to better understand professional practice</i></p>
	↓	Stage 7	<p>Research design <i>Semi Structured Interview as the method to explore professional practice using the conceptual framework developed from the focus group findings and evidence from the literature</i></p>
		Stage 8	<p>Method <i>This section provides the operational plan, data collection procedure with proposed method of analysis.</i></p>
		Stage 9	<p>Findings <i>This section provides a summary of the findings and reflection both on the SSI process and the conceptual framework.</i></p>
		Stage 10	<p>Outcome of interviews (discussion) <i>The themes from the findings analysed in light of the findings from the Semi structured interviews</i></p>
Stage 11	<p>Critical Review of Thesis <i>This section synthesises the conclusions from the findings of the focus group and SSI to provide a unique insight into the perceptions of professional practice in podiatry.</i></p>		

Chapter 2

2.0 Background to Limited Joint Mobility in the diabetic foot

This chapter provides the background to LJM as an early complication of diabetes in the foot. It considers how knowledge on LJM could be mobilised into an assessment model which considers the interplay of risk factors in the genesis of diabetic foot ulceration. This chapter will provide some background context to the role of podiatrists in diabetes footcare services. It will explore the current influences on podiatrists delivering UK based footcare services and attempt to identify the central concepts of professional practice. This will lead into a discussion of the complexities of applying knowledge in practice in the management of diabetic foot ulceration.

2.1 Setting the scene and placing Limited Joint Mobility in the context of diabetes footcare service provision in the UK.

The demand for diabetes foot care services in the UK has steadily increased due to the long-term nature of diabetes and the incidence of foot complications (Diabetes UK, 2015). Diabetes service re-designs have helped to manage ever increasing numbers of people with diabetes by developing a range of skills mix initiatives across several disciplines (Freeman, Gillibrand, Newton, Holdich and Oldroyd 2014). As foot care specialists, podiatrists have a good understanding of diabetes foot related complications. UK national guidelines specify individuals with diabetes should have an annual diabetes foot examination to quantify the risk of developing DFU by assessing the foot. NICE clinical guidelines 19 (DH, 2016) recommends that eight factors may contribute to the development of DFU's; neuropathy, limb ischaemia, ulceration, callus, infection and/or inflammation, deformity, gangrene and Charcot arthropathy. This list is not exhaustive and during a routine foot examination and the practitioner may consider other factors a risk to DFU.

Understanding and defining the scale of less common foot complications and how they contribute to DFU's is important as the magnitude of diabetes related foot problems worldwide is growing. A quarter of all people with diabetes develop sores or breaks (ulcers) in

the skin of their feet meaning the ramifications of managing diabetes-related foot complications are enormous. Globally, diabetes affects 5% of the population and its prevalence is doubling every generation (Boulton, 2005). As the number of people with diabetes rises worldwide there will be an increase in the number of diabetes related foot problems. DFU are a major economic, social and medical burden on the individual and on society. NICE (2015b) reports that the typical costs for an episode of care for a diabetic foot ulcer (DFU) in secondary care is £6,249, compared to £3,221 in primary care. Many of these ulcers do not heal and require minor amputation, costing £8,450 per minor amputation, or £13,499 per major amputation. With around 135 diabetes-related amputations performed each week (Diabetes UK, 2015), efforts need to focus on improving diabetic foot care and detection of risk factors. The common complicating risk factors for DFU's will now be discussed with consideration also given to LJM.

2.2 Risk factors contributing to DFU's

For many years PN, PAD and deformity and footwear were considered to play a crucial role in the underlying development of diabetic foot ulcerations (NICE NG19, 2016). However other risk factors may warrant further consideration during a foot examination. Understanding more about LJM may assist in both detecting risk of DFU and assist practitioners in the management of DFU's. Table 1 provides an overview of the clinical features of foot complications in diabetes. This table creates a broader clinical picture of the pathological changes associated with diabetes foot complications.

Table 2 The range of clinical features associated with complications in the foot with diabetes.

This table shows an overview of the common complications presenting in the foot. The associated clinical features are mapped to the common complications, as detailed in the literature. Limited joint mobility has been included on this table to demonstrate the potential impact this would add to the clinical features in a foot with existing complications.

Complication	Peripheral arterial disease	Foot Deformity	Neuropathy	Limited Joint Mobility
Clinical Features in the foot	Skin atrophy, Muscle atrophy, Loss of fibro fatty pad, connective tissue atrophy	Lesser toe deformities, HAV, Hallux Limitus, Pes planus foot, Supinated foot, *Foot shape may pre date the diagnosis of diabetes	Some or all of the following: Muscle atrophy, Toe deformities, Loss of sensation, Gait changes, Lack of sweating	Reduced range of movement in joints

Figures suggest that as many as 50% of patients attending diabetic foot clinics will have peripheral neuropathy (Boulton, 2005). Of all lower extremity amputations 40-70% are related to diabetes with the majority occurring due to PAD (IWGDF, 2019). Foot deformity is a common finding in daily clinical practice setting for the podiatrist, however it is difficult to quantify if the deformity is related to diabetes or if it precedes the diagnosis of diabetes. Formosa, Gatt and Chockalingham’s (2013) foot screening project in Malta stressed the importance of biomechanical assessment for people with diabetes. Formosa also highlighted the need for assessment of foot deformities and joint mobility to identify ulcer risk and schedule interventions accordingly (NICE NG19, 2016, IWGDF 2019).

2.2.1 Assessment of risk factors for DFU in professional practice

Assessing the foot enables practitioners to stratify patients based on risk and to determine the type of intervention. Monteiro-Soares, Ribeiro J, Ribeiro I and Dinis-Ribeiro’s (2011) systematic review reports there are some consistencies in clinical guidelines for diabetes foot assessment between the UK, Europe and America. The review found five risk factors were present in almost all systems; peripheral neuropathy, peripheral vascular disease, deformity,

previous foot ulceration, and amputation. However, there are variations in the number of variables between the risk stratification systems for the UK, EUROPE and the USA. This sheds some doubt on which variables should be assessed. Formosa, Ghatt and Chockalingham (2016) recently questioned the role and scope of guidelines and of the evidence employed to formulate the recommendations for clinical practice. This challenge to existing clinical guidelines in professional practice suggests other approaches may be needed to better understand the risks for DFU. Understanding the manner in which practitioners assess and manage complications would offer a new insight and understanding in the context of DFU's.

2.3 Diabetic foot ulcers and multifactorial aetiology

The Seattle Diabetic foot study (Boyko, Ahorni, Stensol, Forsberg, Davignon and Smith 1999) explored the independent roles of multiple aetiological factors in the development of DFU's. Boyko et al (1999) concluded the following risk factors independently influence ulcer risk; Charcot foot, joint limitation, toe deformities, reduced foot perfusion, poor vision, greater body mass, sensory and autonomic neuropathy. Given the reoccurrence rates for DFU it is essential to consider independent risk factors such as limited joint mobility in the genesis of DFU. It could be argued focusing on common pathological complications such as PN and PAD is not sufficient in isolation, with more work needed to understand the broader risk factors that contribute to DFU. Identifying multi-factorial aetiology in the prevention of foot ulcers has been recognized as a priority (IWGDF 2015) this reinforces the need to explore complications such as LJM as a feature of the diabetic foot examination. Evidence suggests clinical decision making for treatment of diabetic foot ulcers is a serious challenge for clinicians and harnessing an effective treatment plan to take into account the complexities of risk factor management is difficult to execute. Clinical decision making in diabetes foot health services is not something that can be easily quantified, in fact Greenhalgh (2016) argues clinical decision making cannot be understood by quantitative research alone. Greenhalgh (2016) has argued that qualitative research can provide insight into how practitioners think, something that would be of clinical importance for the understanding of DFU management.

The next section will focus on what is understood about foot related Limited Joint Mobility (LJM) as a risk factor in people with diabetes. The term will be defined from the literature in a broad context and then with specific emphasis to the expression of LJM in the foot.

2. 4 Historical understanding of Limited Joint Mobility.

Limited joint mobility can be traced back in the literature to Cheiroarthropathy. A stiffening effect in the hand joints in adolescents with type 1 Diabetes was first identified by Lundbaek in 1957 (cited in Papanas 2010). The meaning of ‘Cheiroarthropathy’ is derived from the Greek word “Cheiros” meaning “of the hand” and “arthropathy” which is a collective term for disease of joints. The term Limited Joint Mobility (LJM) was first popularized by Rosenbloom (Papanas, 2010). Rosenbloom (1976) provided a detailed account of distinctive skin changes associated with LJM in the hand, of thick and tight skin with a waxy dorsal appearance. LJM in the hands is normally painless, but can lead to fixed flexion contractures which is associated with symptoms of paraesthesia and pain.

In early diabetes literature, LJM is used interchangeably with Cheiroarthropathy to refer to hand pathology only. This should be taken into consideration when reading contemporary publications in the discipline of diabetes as the term LJM is currently assigned to reduced or limited motion in any upper or lower limb joint.

2.4.1 Detecting Limited Joint Mobility as a complication in diabetes

Diagnosis of LJM in the hands is established using a simple clinical examination known as the “prayer sign”. If LJM is suspected, patients are asked to place the palms in opposition to each other as if to pray. The palmar aspects of fingers should be in contact with each other in normal circumstances (Frost and Beischer, 2001). Infante, Rosenbloom, Silverstein, Garzarella and Pollock (2001) suggested if the fingers do not come together in full contact it is termed the prayer sign. The prayer sign is considered a crude clinical examination technique and similar findings have been noted in a normal population Smith (2003). That said, a good level of correlation has been demonstrated when comparing use of goniometer for diagnosis of LJM with the prayer sign (Sauseng, Kastenbauer and Irsigler, 2002). An alternative method for diagnosing hand LJM, is the table top sign, where the palm of the hand is pushed down

against a table top and inability of the palm to flatten against the table is noted, (Grgic and Rosenbloom, 1976; Lindsay, Kennedy, Atkinson, Bell, Carson, McCance and Hunter 2005). The method provides a semi-quantitative measure of the severity of LJM by using a grading scale, as outlined in Table 3.

Table 3 The table top sign criteria (cited in Lindsay et al, 2005)

This table shows the clinical features associated with the 4 stages of the table top sign clinical test.

Stage 0	the entire palmar surface of the fingers makes contact with the table top.
Stage 1	one finger affected, usually 5th proximal interphalangeal joint (pipj) of one or both hands (flexion deformity).
Stage 2	two or more fingers of both hands are affected, usually the 4th & 5th pipj.
Stage 3	there is involvement of all fingers of hands and limitation of movement in larger joint(s), (wrists or elbows).

The validity and reliability of the table top method (Grigc et al, 1976) has been employed in several longitudinal studies for LJM in the hands (Lindsay et al 2005; Amin, Bahu, Widmer, Dalton and Dunger, 2005 and Infante et al, 2001). Other studies have quantified the range of joint motion using a hand-held goniometer to measure active range of motion in order to diagnose LJM, (Abate 2011; Sauseng et al 2002 and Viswanathan, Snehalatha, Sivgami, Seena and Ramchandran, 2002).

2.5 Limited Joint Mobility in the diabetic foot

Delbridge, Perry, Mar, Arnold, Yue, Turtle and Reeve (1988) and Fernando, Masson, Veves and Boulton (1991) indicated the presence of LJM in the foot may predispose to foot ulceration in susceptible neuropathic feet. Fernando et al (1991) suggested LJM contributes to the development of tissue damage by causing abnormal plantar pressure at susceptible sites. This is important to podiatrists in clinical practice, as plantar pressure measurements can identify areas under the foot at risk of damage. This information can be used to predict the areas which may ulcerate and preventative strategies can be implemented to avoid the risk. Therefore, the role of LJM should not be overlooked in the potential for contributing to foot ulceration.

There is no agreement on prevalence of LJM in people with diabetes with values ranging between 8% to 50% (Papanas 2010; Lindsay et al 2005, and Lazaro Martinez, Aragon-Sanchez, Beneit-Montesinos, Gonzales-Jurado, Gracia-Morales and Hernandez, 2011). The broad range may be attributable to differences in the examination technique for LJM, site of examination (hand and or foot), age of population studied, duration of diabetes, and ethnic background of the participants (Infante et al, 2001). It has been suggested by Frykberg, Lavery, Pham, Harvey, Harkless and Veves (1998) and Abbott, Garrow, Carrington, Morris, Van-Ross and Boulton (2005) that complications such as LJM are less prevalent in certain ethnic groups.

2.6 Aetiological theories of Limited Joint Mobility

Research suggests the aetiology of LJM is incompletely understood with the assumption that it is attributable to poor glycaemic control (Lindsay et al, 2005). In vitro studies have demonstrated high glucose increases collagen production (Danne 1993). However, there is no firm evidence to suggest hyperglycaemic state mediates new collagen synthesis. The literature suggests three processes are implicated.

1. Non-enzymatic glycosylation of collagen and accumulation of Advanced Glycated End products (AGE's) due to chronic hyperglycaemia (Duffin, Donaghue, Potter, McInnes, Chan King, Howard, and Silinik 1999; Craig, Duffin, Gallego, Lam, Cusamano, Hing and Donaghue 2008; Abate, 2010 and Arkkila, 2013). The accumulation of advanced glycated end products increases collagen linkages within, creating the stiffness within connective tissue and joints. Whilst advanced glycated end product deposits can be identified in the skin using autoimmune fluorescence as a marker, (Sehgal, 2011) measuring the glycation changes in deeper connective tissue is difficult. Detection of collagen glycation requires sophisticated skin biopsy, (Craig et al 2008). This is invasive and has associated wound healing risks in a vulnerable population. This makes application of biopsy in routine diabetes clinical settings of limited value for the diagnosis and management of LJM.

2. Hyperglycaemia leading to increased activity of the polyol pathway resulting in increased intracellular water and cellular oedema, resulting in joint stiffness, (Danne 1993; Crispin 2003; Smith 2003) Thus, joint movement and normal function of the joint will be altered. The

associated clinical features of these biochemical changes may also be observed with decreased skin elasticity and accelerated age-related changes to the skin.

3.A common vascular pathway between retinopathy, nephropathy and neuropathy and LJM has been suggested. There is sufficient evidence from longitudinal studies (Amin et al 2005; Infante et al 2001 and Lindsay et al 2005) demonstrating a common association between diagnosis of LJM and microangiopathic changes. The pathological changes relate to tissue hypoxia initiating the inflammatory process and a cascade of cellular hyperplasia in the connective tissues (Arkkila 1997; Frost et al 2001; Amin et al 2005; Infante et al 2001). The increased cellular activity produces a vicious cycle of healing and regeneration of connective tissues with disruption of the normal tissue characteristics. There is an increased percentage of collagen which changes tissue function, making it stiffer and less elastic.

2.6.1 Impact of Limited Joint Mobility

LJM may cause stiffness and limitation of movement in the feet and contribute to decreased mobility and increased pressure under the feet. Stiffness in the feet causes difficulty for patients with diabetes, it could make carrying out daily tasks and walking more difficult and increase the chance of developing foot ulcerations. The reduced motion due to stiffness in a joint can increase pain and reduce joint function and affect normal mobility. Compromised mobility is a poor outcome for people with diabetes who are encouraged to remain active due to the benefits it offers for their cardiovascular health.

2.7 Emerging questions

As a result of a focused review on foot related LJM, there appeared a shortfall in information on the typical appearance of foot related LJM. For the novice clinician, it is crucial to gather intelligence from the literature on the common clinical appearances of medical complications, such as LJM in the foot. This allows the clinician to recognise the condition and offer timely interventions to reduce the risk of the condition causing further problems.

The clinical appearance, and characterisation of LJM in the foot are considered vital to better understand LJM in the foot. This requires a further review of the literature to systematically explore for more detail on the characterisation of foot related LJM.

The emerging questions that would facilitate this focused review would be to look at how LJM presents in the foot, to identify any classic structural changes that would enable it to be detected and to establish how LJM affects the foot and to see if that can be measured and treated. The next chapter will aim to answer these questions by interrogating the literature in order to better understand the impact of LJM in the foot.

Chapter 3

3.0 Literature review on LJM in the diabetic foot

This chapter identifies, evaluates and reviews selected literature related to the research question. It begins by providing the search strategy for the literature review on limited joint mobility. The literature on limited joint mobility will be arranged in themes to illustrate the changes associated with the condition. It will discuss how the study designs used in the literature influences and limits the definition and understanding of LJM.

The initial research question for this study emerged from my observations working in a diabetes foot clinic with people attending for treatment of diabetic foot ulcerations.

3.1. Aims and objectives

The literature review aims to identify and answer the research question, what are the identifiable characteristics of LJM in the foot, how can these be measured and treated?

The objectives are;

- 1) To examine the literature on limited joint mobility in the diabetic foot between 1994-2014
- 2) To introduce readers to the research available and inform about the strengths and weaknesses of current literature.
- 3) To provide an understanding of foot related LJM from the literature.

3.2 Search strategy

The literature search method employed a systematic and explicit approach to the identification, and retrieval of independent studies drawn from published sources for the purpose of locating information on LJM. The purpose of this was to detect and synthesise information leading to a better understanding of LJM, to identify any areas for future study, and to develop knowledge for professional practice. Multiple sources were searched for literature in relation to the research question.

3.2.1 Inclusion and exclusion criteria

Publications were included if they referred to diabetes and limited joint mobility of the hand, or limited joint mobility of the foot or feet. International studies and UK studies were included. Studies were excluded if they were not in English. Studies were excluded if the focus was on intervention for LJM in the upper limb. Studies were excluded if they were not peer reviewed. Surveys, cohort studies, reviews, systematic reviews, meta-analyses, quantitative and qualitative studies, commentaries, guest editorials and unpublished theses were all considered. Search terms used were: diabetes, limited joint mobility, foot and feet.

Boolean operators AND, OR were used where appropriate to combine terms and phrases. Supplementary terms used were; foot structure, foot function, tissue changes, diabetic foot ulcer, cheiroarthropathy, again using combinations of *and *or.

Multiple sources were sequentially searched for literature concerning the research question, databases systematically searched were: Cochrane Library for Systematic Reviews, Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE (Index Medicus), Google Scholar, Science Direct, ProQuest, PubMed, NHS evidence, Web of Science and Scopus. Salford Library database was searched for subject specific journals, including Diabetes Care, Journal of American Podiatric Medical Association, Diabetic Medicine, and Journal of Foot and Ankle Research. Additional sources were accessed which included websites specific to the Department of Health (DH), National Health Service (NHS), NHS England, the College of Podiatry website and its professional publication Podiatry Now, and published and unpublished theses. For each search engine, restrictions, limits and filters were applied to focus the literature and align with the scope of the research question. Papers were selected if they were peer reviewed in the date range specified and filtered after retrieval according to the inclusion and exclusion criteria above.

Table 4 Search terms and filters employed for each search engine date range.
This table offers an example of the method by which full text relevant papers were retrieved.

Search engine	Search terms	Filters	Number of papers
ProQuest Central	Diabetes Limited joint mobility, feet	English, Full Text, peer reviewed, title, date 2004-2014, diabetes care,	23

Whilst the initial focus was on literature obtained through use of the search terms identified in the method, the literature was also reviewed using an iterative approach to permit exploration of developing areas relevant to LJM in the foot and beyond the date specified in the search criteria, (not identified in the original search terms). The justification for this approach aligns to the study aims to increase the understanding of LJM, using supplementary search terms to obtain further explanation of LJM. Records from the updated literature review are date sequenced identified in Appendix 14. The knowledge gathered from this approach permitted LJM to be viewed from a range of existing and new perspectives. This will permit assumptions in the literature to be challenged in order to provide new knowledge on foot related LJM.

Table 5 Search terms and search engines with examples of returns from date range 1994-2004

Search engine	Search terms	Filters	Number of papers
ProQuest central	Diabetes, and limited joint mobility and feet and cheiroarthropathy	English, Full Text, peer reviewed, title, date 1994-2004, diabetes care	30

Appendix 14 provides a selection of the published work on LJM in chronological date order. This table demonstrates how development of initial literature on LJM in the hands progressed to recognition and impact of LJM in the foot.

3.3 Problems with the search criteria

Critical appraisal of the literature revealed that some pre-understanding of (LJM) in the foot was required, in order to grasp the rationale for the approach in the clinical and research literature. This has implications for developing an understanding of the characteristics of LJM. Another issue affecting the search was the terminology related to the concept of limited joint mobility. The phrase limited joint mobility can be used in health care literature to refer to people with symptomatic limitation of movement in joints, as a result of underlying pathology which may not be linked to diabetes. Therefore, within the search criteria, the use of and or helped to focus the search on limited joint mobility related to diabetes.

The professional perspective of the term limited joint mobility and associated terms was fundamental to understanding the approaches within the literature.

The literature retrieved was evaluated and critically appraised by comparing and contrasting the content and context in which LJM was examined. The methods used to establish knowledge and understanding of LJM allowed a pattern to emerge regarding the assumptions used to understand the characteristics of LJM in the diabetic foot.

Initial review of the literature suggested the evidence for characterising LJM fell into three broad categories, a) tissue changes, b) structural changes and c) functional changes. These categories will be used to help navigate a focused literature review. It will explain the broad areas of professional practice within the literature and how this creates a series of assumptions about LJM.

3.4 Tissue changes and Limited Joint Mobility

Limited joint mobility is an early clinical complication of diabetes and was initially reported in the hands by Rosenbloom et al in 1974. Delbridge et al (1988) and Fernando et al (1991) indicated the presence of LJM in the foot may predispose to foot ulceration in susceptible neuropathic feet. Fernando et al (1991) suggested LJM contributes to the development of tissue damage by causing abnormal plantar pressure at susceptible sites. Plantar pressure is important to podiatrists, it can be used to identify the areas under the foot at risk of damage

due to overloading of the tissues. However, the research does not provide detail on the strength of the correlation between neuropathy and LJM in generating high pressure. This suggests the relationship between neuropathy and LJM is not fully understood. Therefore, the relationship between LJM and its role the development of DFU warrants ongoing awareness in the speciality of diabetic foot care.

It is assumed the tissues of the foot can change considerably as a result of peripheral neuropathy, with foot deformities, atrophy of intrinsic foot muscles and dry skin. The assessment of PN forms part of the clinical guidelines for diabetes foot assessment NICE 2016. However, the assessment does not require the practitioner to challenge the reason for tissue changes assumed to be associated with peripheral neuropathy (PN). Therefore, the assumption that peripheral neuropathy alone is responsible for tissue changes may be over simplistic. In fact, other coexisting complications such as LJM may contribute to foot deformity and the development of DFU. For example, Delbridge et al (1988), and Fernando et al (1991) assumed a coexistence between LJM and PN, suggesting LJM predisposes to DFU due to elevated foot pressures in susceptible neuropathic feet. However, the research stops short of providing any explanation of the characteristics of LJM which create the predisposition to DFU. It is not known if there is a common pathological pathway between PN and LJM, therefore this impedes understanding of how characteristics of LJM might potentially contribute to tissue changes seen in the foot affected by PN. Further studies by Zimny, Schatz and Pfohl (2003) and Boyko et al (1999) attempted to characterize LJM by measuring ankle joint mobility using a goniometer suggesting reduced range of motion will cause elevated foot pressures in a foot with neuropathy, increasing ulceration risk. Boyko et al's 1999 study found weaker correlation between (limited) joint mobility and ulcer risk (30%) compared with 60% ulcer risk with neurological pathology. The conclusions of Boyko et al's (1999) study may be due to error in goniometry measurement. Of interest to the assessors in Boyko et al's (1999) study were nurses who would be less familiar with foot assessments than a podiatrist. The nurse assessors may have underestimated the subtle reductions in limited range of motion associated with LJM. Subsequent studies by Viswanathan et al (2002) corroborated the coexistence of LJM and PN in their sample, but there was little insight as to whether the two complications PN and LMJ share any associated progressive features or whether the findings from these studies

were co-incidental. The presence of LJM associated with PN lends some weight to the argument for including LJM within the diabetes foot assessment.

In professional practice the identification of LJM within the diabetes foot examination, was endorsed by firstly by Frykberg et al (1998) and later by Armstrong, Lavery, Vela, Quebedeaux and Fleischli (1999), who advocated that clinicians examining the feet should consider limited joint mobility as a risk factor in preventing diabetic foot ulcers. Whilst these endorsements by Frykberg et al (1998) and Armstrong et al (1999) provided some clear direction on the importance of examining LJM in contributing to DFUs, there was a distinct lack of clarity as to how the clinician should examine the foot for LJM. It is not apparent from the current evidence base whether examination of the foot for LJM is an integral part of routine diabetes foot examination in clinical practice. If in professional practice there is stringent adherence to national and international guidelines, then there are no current recommendations to assess for LJM in the diabetes foot examination. The approaches to examining and measuring LJM in the foot thus far remain in a research setting and do not appear in literature in the context of application in professional practice. This makes it difficult to develop a better awareness of the characteristics of LJM and points to a limitation of research in a natural clinical setting.

3.5 Limited Joint Mobility and tissue changes in fat pad

Tissue changes associated with LJM was undertaken in independent studies by Abouaesha, Van Schie, Griffiths, Young and Boulton (2001) and Craig et al (2008) who looked at plantar fat pad thickness. Both studies used ultrasound to measure plantar fat pad thickness in the foot, proposing it was affected by glycosylation changes associated with LJM. The plantar tissues of the foot are normally thicker than elsewhere on the body. Abouaesha et al (2001) and Craig et al (2008) hypothesised a relationship between LJM with hardening and thickening of the plantar skin on the foot. These studies suggested changes in the properties of the tissues were a predictor of high plantar pressure, which in turn are highly predictive of DFU. However, the studies failed to provide the critical values of fat pad changes that characterise LJM. Also, the skin hardening was not quantified to provide a better understanding of range of characteristics for LJM in the foot. Therefore, the underlying tissue changes in LJM need to be explored further to provide a better understanding of LJM. For ultrasound measurement to

be rolled out as a technique to identify fat pad thickening in LJM, clinicians would require knowledge and skills in ultrasound, and availability of equipment, which may limit the applicability in practice. Furthermore, to translate research into the clinical setting practitioners need to have a better understanding of the characteristic tissue changes associated with LJM. The characteristic hardening and thickening of the tissues in the foot described by Craig et al (2008) are well aligned to the typical skin changes as described by Rosenbloom for LJM in the hand. However, tissues change in the foot with LJM warrants further large-scale research to better appreciate the kind of presentations in clinical practice.) LJM as an index for tissue glycation should be undertaken with caution in the elderly population. In the absence of diabetes, a reduced range of motion is associated with the normal ageing process and is not always attributable to diabetes complications (Abate 2011). In fact, the frequency of LJM in control subjects with no diabetes has observed to be as high as 26% (Smith, 2003). This suggests further questions should be asked to establish a reliable method of identifying LJM in the foot

3.5.1 Limited Joint Mobility and ethnicity and tissue changes

The effect of ethnic background on the clinical manifestation of LJM was reported independently by Abbott et al (2001) and Frykberg et al (1998). Frkyberg et al (1998) identified differences in expression of functional joint mobility in different ethnic groups, namely black and Hispanic. Abbot also found differences in expression of LJM in people of South Asian descent. Both studies concluded that the white Caucasian population had a larger prevalence of LJM than other ethnic groups. No conclusions were made as to why this phenomenon was observed or if there were differences in clinical features between ethnic groups. Therefore, whilst this provides some helpful data on the frequency of LJM in different ethnic groups, it does not provide any additional understanding for professional practice on the characterisation of LJM in the foot. Therefore, further work is needed to appreciate why different ethnic groups have lower incidence of LJM. If different ethnic groups have different tissue characteristics this might provide some insights into tissue changes in LJM. Frost et al (2005) investigated whether there were any differences in LJM between the genders. In their sample of 335 Caucasian patients, they found a greater frequency of LJM in the male sample.

This may point to differences in the expression of tissue changes associated with LJM between the genders but may also be due to other variables, such as age, and co-existing diseases or due to physical differences in the structure of the foot between genders. The effect of foot structure and LJM will now be explored in more detail.

3.6 Limited Joint Mobility and structure

It is assumed that some of the structural changes causing gross foot deformity in diabetes are precipitated by trauma and complicated by vascular and neurological disease, such as with Charcot foot syndrome (Jeffcoate, 2005). However, it is possible that progressive stiffening of the articular structures due to limited joint mobility could contribute to joint contracture and thus deformity.

Historically it is assumed that loss of motor innervation to intrinsic muscles of the foot can result in muscle atrophy, a high arched appearance and retracted toes. This has been defined in the literature as “intrinsic minus foot” (Bernstein 2003) and (Bus, Yang, Wang, Smith, Wunderlich and Cavanagh, 2002). Bevans (1996) argues that it is the long-term effects of sensorimotor neuropathy which lead to changes in the architecture of the foot. However, this appearance mirrors similar deformities occurring in people without diabetes or neurological deficit. Therefore, there may be other factors contributing to the intrinsic minus foot. Structural changes in the diabetic foot may also be the result of arthrogenic changes due to the connective tissue alterations associated with limited joint mobility. Given the long-term nature of diabetes, it is possible over time the extra articular tissues become so stiffened and rigid that structural changes begin to emerge in the foot. In professional practice it is beholden on clinicians to assess the extent and nature of deformity in preventing and managing the foot in diabetes. By doing so, the impact of LJM is not overlooked as a factor in the deformity of the foot. However, national and international guidelines (IWGDF 2019, NICE NG19 DH 2016) do not suggest any models of assessment for grading the cause and scope of deformity in the diabetic foot. Minor structural changes resulting in deformity may be due to LJM. Without a clear pathway of care for identifying and managing deformity as a risk factor in the diabetic foot, current clinical practice may be severely underestimating the impact of LJM and its role in foot deformity on the genesis of DFU.

3.6.1 Limited Joint Mobility and Deformity

Structural changes and foot deformity are not exclusive to people with diabetes, and deformity may predate the diagnosis of diabetes, nevertheless, the research suggests deformity is something to be aware of when treating a person with diabetes (NICE NG 19 DH 2016). Formosa et al's (2013) foot screening project in Malta for people with diabetes highlighted that assessment of foot deformities and joint mobility can greatly assist health care practitioners to identify risk and schedule interventions accordingly. Whilst Formosa's work recommends biomechanical assessment of the foot in people with diabetes, this is not reflected in the UK national guidelines, (NICE NG19, DH 2016) which only advocate assessing for foot deformity. However, it is not clear from Formosa's study how LJM should be assessed in clinical practice or what the intervention for LJM should be. This suggests the need for more to be known about LJM in the foot to help understand the impact on practice and overall patient care.

In practice, the mechanisms that result in foot deformity in people with diabetes may not be completely understood or identified using this approach. Therefore, this represents a missed opportunity to discover any underlying factors contributing to foot deformity in this vulnerable group. Hastings, Woodburn, Mueller, Strube, Johnson and Sinacore (2014) believe PN is thought to be a key factor associated with the development of adult acquired neuropathic foot deformity. Hastings et al (2014) suggests this deformity then contributes to high pressure, joint instability and ultimately ulceration. It is possible that any observed deformity in the foot may or may not be related to the diabetes, but it is also possible that pathological change such as PAD PN or LJM may contribute to deformity.

The other aspect of deformity that cannot be uncoupled from foot structure is function. The presence of deformity in the foot may be preceded by functional changes in the foot. Functional changes may be altered as a result of limitations in joint range of motion attributed to LJM. Therefore, this should be considered as an important characteristic of LJM.

3.7 Functional changes with Limited Joint Mobility

Reduced or limited mobility is not good for patients, it makes carrying out daily tasks more difficult which may negatively impact on the persons' well-being (Hengeveld 2013). A person's experience of reduced mobility can be shaped by many factors, culturally, society's expectations of behaviour, psychological processes, and meanings and relationships. All of these are socially linked to the experience of having a long-term condition such as diabetes. Therefore, clinicians should be aware of their own and surrounding influences and behaviours which can impact on mobility for their patients. Joint function can be assessed using a number of methods. Assessing range of motion at the foot joints using goniometry methods has been undertaken in several independent studies in order to quantify LJM in the foot, (Fernando et al 1991; Lazaro Martinez et al, 2011; Viswanathan et al 2002; Dijs 2000; Garcia Alvarez 2013; Formosa et al 2013; Zimny et al 2004; Boyko et al 1999; Duffin et al 1999; Simmons 1997; Sartor, Watroi, Passaroo, Picon, Hasue and Sacco 2014; Abate, 2011; Salsich, 2000; Frykberg et al 1998; Chuter 2001 and D'Ambrogi Giacomozzi, Macerllari, and Uccoli, 2005). These studies do not provide a clear rationale relating to the understanding of LJM, of why certain joints are assessed. Given the difficulty in using goniometry on the foot in a clinical setting, ankle joint, subtalar joint and 1st metatarso phalangeal joints are reported to be the most reliable and practical, Viswanathan (2002). It may be that other joints have equal importance in the normal functioning of the foot. This therefore questions the validity of selecting these joints for understanding characteristic joint changes in the foot. In addition, the use of goniometers has been shown to be problematic as they have a high degree of error in terms of the large differences attained between observers. This large inter observer error creates some doubt as to the how much reliance can be given to static or non-weight bearing assessment of joint range of motion. This is problematic for LJM, as it could lead to over estimation or underestimation of joint mobility. Despite some caution in interpretation of the goniometry findings, the volume of studies that have employed this method, provides an important baseline of joint mobility patterns for comparison which offer some understanding of joint mobility characteristics in LJM.

3.7.1 Measuring ROM for LJM and foot models

Goniometry methods employed to measure LJM are assessed against an expected model of normality for range of motion and function to define the presence or absence of LJM. The goniometry studies assessing for LJM appear to align with a Root paradigm, evident by the use of term, “neutral sub talar joint position” to standardise the approach to measuring joint movement, (Fernadno et al, 1998; Disj, 2000; Viswanathan et al, 2003; Garcia Alvarez et al , 2013 and Lazaro Martinez et al, 2011). There is no firm scientific evidence to support the assumptions by Root, Orien and Weed (1977) that the normal foot should function around STJ neutral for optimal function as highlighted by Jarvis, Nester, Jones, Williams and Bowden (2012). No justification is given within these studies as to why these models are the preferred method for standardising and quantifying the range of motion which compromises the authenticity of the method. There are fundamental problems with the assumptions in current research papers on LJM such as Lazaro Martinez et al (2011) and Garcia Alvarez et al (2013) who base their assessment on a poorly evidenced static theory of the structure and function of the foot. Jarvis et al (2012) suggests podiatrists should not align their clinical practice on outdated methods of static biomechanical assessment. The use of outdated models to characterise LJM hampers the ability to understand how LJM affects the structure and function of the foot.

Other studies in the area of LJM align their assessment of LJM in the foot to a model that aligns with the windlass theory, by assessing dynamic plantar fascia function, Chuter et al 2004; D’Ambrogio et al 2013 and Gelber (2014). Chuter et al (2004) made an attempt to investigate the prevalence of LJM by assessing the range of motion at the 1st MPJ in the foot from a small group of 15 patients with diabetes. They found patients with diabetes and neuroarthropathic changes had a smaller range of motion than the control group. They hypothesised a link between LJM and structural damage to the joints and soft tissue which is frequently seen in the Charcot foot. No recommendation was made in these studies to clinicians to suggest testing the windlass mechanism was a reliable measure to identify LJM in diabetes. The understanding of LJM from research using theoretical models should be viewed cautiously. For professional practice, it is crucial that podiatrists appraise assumptions from podiatric

theories for assessing foot related LJM, as each model has a different threshold of normality which may affect the overall perception of LJM characteristics.

3.7.3 Limited Joint Mobility and dynamic motion

In order to complete the appraisal of the literature in attempting to characterise LJM in the foot, the dynamic foot model was considered. The dynamic assessment for joint range of movement was undertaken by Turner, Helliwell, Burton and Woodburn (2007) who emphasised assessing both the passive and gait range of motion at the ankle subtalar joint and 1st metatarsophalangeal joint. The study concludes that passive range of motion at the 1st metatarsophalangeal joint provides an estimate for identifying patients with higher foot pressure and ulceration. Such studies reinforce the recommendation for early assessment of LJM in the diabetic foot. The research indicates that LJM in the diabetic foot may amplify the damage caused by underlying biomechanical dysfunction.

Jarvis et al (2013) proposed the use of kinematic models to understand foot function and suggested kinematic models demonstrate large individual variation in dynamic function of the foot. This work conveys the importance of individual expressions of movement in both larger and smaller joints. which may be of significance for assessing the progression of LJM in the foot.

3.8 Assumptions in the literature on structure and function

The assumptions in international guidelines IWGDF reflect recommendations in the literature to consider assessing for LJM a risk factor for DFU (see table 6). Limited joint mobility is thought to contribute to the genesis of diabetic foot ulcers (DFUs) (Zimny et al, 2004). Formosa et al (2013) highlighted the importance of assessing for foot deformity and reduced joint mobility in diabetes because deformities can be predictive of ulceration and LJM can contribute to foot complications. However, the evidence in the literature does not appear strong enough to ensure assessment for LJM consistently features globally in clinical guidelines for the prevention and management of foot problems in people with diabetes (Formosa 2013). Joint mobility assessment is not a standard recommendation as one of the eight risk factors for DFU in the UK clinical guidelines (DOH 2016). However, Delbridge et al

(1988) Fernando et al (1991) Boyko et al , (1999) Frykberg (1998) and Pham (2000) suggested several decades ago that LJM is an additional risk factor in contributing to DFU. Therefore, whilst the research literature considers LJM an important factor associated with DFU, there is no consistent message in guidelines regarding what LJM is in the context of the pathological changes occurring in the diabetic foot, the risk factors for ulceration, and reulceration.

Table 6 Recommended check list for annual diabetic foot check from IWGDF (2019).
This table shows items that put the foot at risk of foot ulceration. Information sourced from an original illustration available from <http://iwgdf.org/guidelines/summary-guidance-for-the-daily-practice-2019>

Foot ulcer	Presence of a full thickness ulcer	Yes / No
Risk factors for foot ulceration		
Neuropathy		
Monofilament undetectable		Yes / No
Tuning fork undetectable		Yes / No
Cotton wool undetectable		Yes / No
Foot pulses	- Tibial posterior artery absent	Yes / No
	Dorsal pedal artery absent	Yes / No
Other		
Foot deformity or bony prominences		Yes / No
Loss of joint mobility		Yes / No
Signs of abnormal pressure such as callus		Yes / No
Discoloration on dependency		Yes / No
Poor foot hygiene		Yes / No
Inappropriate footwear		Yes / No
Previous ulcer		Yes / No
Amputation		Yes / No

This apparent conflict between the research literature and inconsistency of recommendations in clinical guidelines is not helpful for healthcare professionals nor the patients in their care.

Therefore, in order to offer a new understanding of foot related LJM, the assumptions in the literature on LJM needed to be challenged. Crawford, Anandan, Chappell, Murray, Price, Sheikh, Simpson, Maxwell, Stansby, Young, Abbott, Boulton, Boyko, Kastenbauer, Lees, Montenegro-soares, Rith-Njarans, Veves, Coates, Jeffcoate, Leech, Fahey and Tierney (2013) in the Podus study listed a range of variables which may be prognostic factors for the prediction of foot ulcers, limited joint mobility was included in their appended list. However, LJM failed to be considered in the final analysis of the Podus study due to lack of consistency in definition. The Podus study demonstrates an ongoing need to identify and quantify the range of factors and complications such as LJM responsible for DFU's in individual patients, (Crawford et al, 2015). However, the implications of LJM for both patients and practitioners will not be realised if there are gaps in the understanding of how LJM is characterised in the foot.

The theoretical models used in podiatry literature have influenced the methods employed by researchers in the assessment of LJM. These models generate disagreement in professional practice regarding lower limb and foot management, which further complicates the ability to generate a reliable picture of LJM in the foot. If there are a wide variety of approaches in the assumptions about the structure and function of the foot, it may lead to a broad range of conclusions about understanding of LJM in the foot. Given the disagreement in the literature on use of outdated foot models, this compromises the current understanding of LJM. The changes in foot structure with diabetes may not be enough to explain changes in dynamic loading patterns responsible for contributing to DFU's. Turner et al (2007) suggested a change in the structure of the foot may still permit sufficient range of movement for normal function. Thus, suggesting the foot may have a margin of tolerance for changes in structure, yet still function without generating pathological damage such as DFU.

Rather than accepting foot ulcers are predominantly related to alterations in foot mechanics or due to neuropathic pathology, it is vital to consider other evidence that tissue changes and alterations in foot structure and function may be attributed to other complications such as diabetes related LJM. The progression of LJM in the foot over time can lead to musculoskeletal changes causing alterations in foot structure and function, which may influence the plantar pressure distribution independent of neuropathy. Bevans, (1999) suggested foot shape,

function and deformity which pre dates the diabetes may dominate the overall appearance of the foot into later decades of the ageing diabetic foot. Bevans explained that pre-existing foot deformities would result in abnormal foot loading patterns and callus formation, in people with and without diabetes. This might explain the role of deformity and function influencing changes in the foot shape, producing diverse descriptions so frequently described in the diabetes literature. Therefore, if this is compounded by tissue contractures as a result of LJM, podiatrists may observe a wide range of different structural and functional changes in the diabetic foot.

3.9 Emerging problems in the literature on LJM

Appraisal of the literature has demonstrated research evidence with a strong affinity to the scientific context of LJM. As the researcher and as a podiatrist, I have a keen interest in the development of professional practice and the benefits this offers both the discipline of podiatry and the enhanced care of patients. The limited information on LJM creates a fundamental difficulty for professional practice in understanding the typical characteristics of limited joint mobility in the foot. There are problems with interpreting passive and active ranges of motion from goniometry measurement. In addition, it is not clear what role motor control and proprioception has on joint range of motion. To examine the foot is it necessary to examine both static and dynamic movement at the joints but there are no normative age-related data for ranges of motion. In addition, no significant large-scale studies have reported impact on functional capacity of the hands or feet with LJM. Foot type, structure and function may be unrelated to changes associated with LJM. It may be that glycosylation of the plantar fascia that leads to contracture and accentuation of the arch height suggests the cavoid foot is mechanical and not neuropathic in origin. It is important to consider that a reduction in joint motion and mobility is associated with the normal ageing process and other factors have also been linked to connective tissue stiffening. In essence, there is considerable uncertainty about how foot deformity and LJM arise and the implications in both the short and long term. Evidence suggests it is worthwhile trying to quantify LJM in the diabetic foot but it is not clear if LJM is independently predictive of ulceration within the foot or a contributory factor.

Finally, there is no universally accepted clinical technique to assess LJM in the foot either in the profession of podiatry or the wider professional medical literature. However, there is a pattern within the evidence base for researchers to focus on 1) structural 2) functional or 3) tissue property perspectives for LJM in the foot.

To understand LJM It is important to define the attributes in the foot and explore how this may be expressed in order to differentially diagnose from other clinical pathologies. Clearly, more work is required to yield a better understanding of the term LJM in relation to diabetes and foot care. Exploring LJM in professional practice to understand the foot with LJM may offer further clarity.

Chapter 4

4.0 Reflective commentary on LJM literature

This chapter will provide a personal reflective commentary on the literature surrounding limited joint mobility. The aim of this commentary is to explore the influence of the literature and its potential impact on podiatrists in how they operate in their professional capacity. The chapter will summarise by discussing how this may influence the design of the research study with a focus on professional practice.

4.1 The influence on guidelines in professional practice.

The literature on LJM provides an insight into the research communities understanding of LJM, but the question of whether this research translates to clinical practice should be considered. Due to the nature of how podiatry services are structured in the UK, management of people with diabetes by podiatrists is likely to be influenced by recommendations made in NICE guidelines NG19 (DH 2016)

The lived experience of podiatrists working in diabetes footcare services are of interest to understand what evidence is used in practice. That is, what weighting is given to NICE guidelines compared to contemporary research publications relevant to diabetes footcare.

The currency of NICE guidelines are date limited and new research and emerging practice may not be reflected in guidelines until the next cycle of review. In fact, there is no pre-determined time period that guidelines are recommended to be updated. NICE state that decisions to update guidelines are balanced with the need to reflect current evidence against the need for stability, suggesting that frequent changes to guideline recommendations would make implementation difficult.

4.2 Challenging the content of annual diabetes foot screening

Podus study findings (Crawford et al 2015) challenged the content of annual foot risk assessment of people with diabetes by suggesting the assessment is based on opinion and agreements among health-care professionals and not based on all available data. The Podus study was an international research collaboration which sought to review all available data using individual patient data to find out which prognostic factors most reliably identified people with diabetes who are at risk of foot ulceration.

There are some difficulties in appraising the findings of the Podus (Crawford et al, 2015) study because the authors change the use of terminology throughout, instead of using prognostic factors as indicated in the title, the phrases variable, predictive factor and risk factor are used at different stages of the report. This may reflect differences in language used in research literature, i.e. variables and prognostic factor compared to the language used in international guidelines on prevention of foot problems in diabetes i.e. predictive and risk factors. Whilst it is possible to navigate how the different terms relate to the aims of the study, it highlights the difficulty in finding consistent definitions in published literature.

The protocol for Podus (Crawford et al, 2015) excluded LJM as a predictive factor due to not meeting the criteria of sufficient data sets and a lack of consistent definition. There may be some fundamental issues that need exploring to understand the use of language in LJM research in order to appreciate how that translates to everyday diabetes practice. If in diabetes practice LJM translates to clinical features seen as structural, functional or tissue changes, then LJM may be reported as deformity, rather than as a specific diabetes complication. Of note, the Podus study found the range of reporting for foot deformity was between 4%- 80% of the patients in the meta-analysis. This suggests there may be widespread under or over reporting of deformity in practice. Given that deformity forms one of the risk factors in NICE guidelines, this raises some concern about the reliability of deformity in predicting foot ulceration and whether it is related to other complications such as LJM.

The Podus study (Crawford et al 2015) also highlights the difficulty in language between clinical guidelines and research literature and perhaps this is a barrier to understanding LJM, is it a variable, risk factor, predictive factor or contributory factor to DFU? The study concluded

that diabetes foot risk assessments are more likely to be completed in clinical practice if they are easy to do, for example the 10g monofilament or pulse palpation.

It also supported the use of NG19 (DH 2016) as a predictor of foot ulceration, which is based on the assessment of risk factors and places people into low, medium and high categories. However, there remain variations in the number of risk factors which are recommended to be assessed in the prevention element of international clinical diabetes guidelines (IWGDF 2019) Therefore, efforts are still required to bridge the gap which exists between research evidence on LJM and clinical practice if podiatrists are to capture the broad range of risk factors which might contribute to foot ulcers in people with diabetes.

4.3 Evidence for Limited Joint Mobility in the foot.

There are some agreements about the presentation of LJM in clinical practice to enable podiatrists to identify the characteristics during routine assessment of the diabetic foot. LJM leads to skin thickening and stiffening, due to tissue glycation, which is associated with joint contractures in the hand (Papanas, 2010). LJM in the foot is likely to involve a complex interplay of tissue changes (Frost et al 2001) with several structural (Guiotto, Sawacha, Guareri, Cristoferi, Avogaro and Cobelli, 2012) and functional features (Gelber, Sinacore, Strube, Mueller, Jeffrey and Johnson, 2014).

Assessment of these complex changes has implications for clinical practice for detecting LJM and its contribution to DFU. Craig et al (2008) approached the assessment of LJM suggesting that increased plantar fascia thickness may be an indicator of LJM leading to reduced joint mobility. Since plantar fascia thickness can only be assessed with specialised ultrasonography, the surrogate measure of joint mobility may be adopted in clinical practice as an indirect measure of LJM. Joint mobility is an important characteristic to assess in people with diabetes, because decreased joint mobility can lead to an increased pressure under the metatarsophalangeal joints which can contribute to an increased risk of DFU.

Garcia Alvarez et al (2013) and Guiotto et al (2012) suggest changes in joint structure and foot shape may also be measures assessed in clinical practice as a feature of LJM. However, Bus et al (2002) indicated foot architecture, joint contractures and deformities may be due to

changes in sensory/motor systems rather than soft tissue or structural changes in foot joints. These uncertainties in the literature reflect a diversity of views on LJM and make it challenging to define. This subsequently makes it difficult to conclude how LJM might be best assessed clinically and understand how it contributes to DFU's in practice. Inconsistencies in the literature concerning the important features of LJM, such as soft tissue, joint motion or other components, might be a barrier to agreeing clear standards in guidelines advocating assessment of LJM. Other barriers may be a requirement for specialist assessment methods such as ultrasound, whereas assessment for LJM may be adopted routinely if based on simple clinical techniques.

4.3.1. LJM - Lack of definition

The lack of consistency in defining LJM in the literature may be a significant barrier in permitting integration of assessment for LJM as a feature of annual diabetes foot screening.

Between 2004 and 2016, several new variables were added to the NICE diabetes foot screening model. Therefore, the factors that influence the updating of NICE guidelines NG19 (DH 2016) should be considered as indicators for change in clinical practice, regarding the number of risk factors assessed in annual diabetes foot screening. As diabetes services undergo change, perhaps there are opportunities for podiatrists to consider how we think about foot screening in diabetes care.

Adoption of research evidence on LJM in diabetes practice is a challenge, as due to the apparent complexity in defining LJM in people with diabetes, it may be considered less common than neuropathy or peripheral vascular disease. Another perspective is that because LJM is difficult to define and characterise, it is poorly understood and missed in clinical practice. Podiatrists could be attributing LJM changes to other complications in the foot, thereby overlooking its contributing to DFU on a larger scale.

The type of research evidence available in the literature may hold the final key to the difficulty in achieving a comprehensive definition of LJM. There is a dominant focus in research of LJM using quantitative designs which are focused on quantifying the physical manifestations of

LJM. The absence of qualitative approaches and limited narrative on experienced based practice of LJM, means there is a lack of opinion on the assessment and impact of LJM. This absence extends to the patient perspective on their experience of LJM and how they feel it might affect them.

4.3.2 Problems with measuring LJM

The variations in the anatomy of joints seen in the foot will have a bearing on the movement seen at a joint. Researchers who are examining movement of the limb during normal walking acknowledge how the geometry of articular surfaces can be significant in determining observed joint movement. Therefore, measurement of movement is a key characteristic of LJM in the research literature.

The most popular method of assessing LJM specific to the foot in the literature was visualising joint range of motion, or using a hand held goniometer. The hand held goniometer as a low technology tool was commonly used to measure LJM, it is portable, economical and easy to use, making it time efficient. However, relying on the findings of research from these studies is problematic due to a number of reasons. The test validity of the hand held goniometer is reported to be low due to difficulty in assessing the centre of joint and problems due to the local anatomy and irregular shape of the joints being assessed. Findings from test-retest validity and reliability studies of hand held goniometers show most clinicians tend to overestimate the movement when compared to 3D kinematics or electronic tracking systems. However, the overestimation pattern is consistent with the hand held goniometer, therefore, the test retest reliability is good.

4.4 Assumptions in professional practice

There are gaps in existing research relating to the assumptions made about range of motion and how this helps us understand and define the characteristics of LJM. Assessing range of motion in a clinical exam as described by the Maitland concept (Hengeveld, 2013) only illustrates where the joint can go in terms of the movement. It does not provide an understanding of where the joint does go during normal function. Nor does it tell us how it

happens. This is because there are many factors that simultaneously influence joint function during normal movement. Strength of muscle may affect movement at a joint, but it is also important to consider that joints rarely move in isolation, instead they move as part of a kinetic chain, therefore joint range of motion may be affected by the position of adjacent joints during normal function. Perhaps observation and assessment of multiple joints during normal function would provide a more comprehensive understanding of the impact of LJM in the lower limb.

4.4.1 Autonomy to assess for LJM in practice.

Review of the literature on LJM reveals a problem with definition and lack of visibility in national UK guidelines. This lack of visibility of LJM in guidelines means reliance is placed on podiatrists to exercise their autonomy to assess outside guidelines in diabetes care. Due to the increasing global burden of diabetes, podiatrists working in diabetes practice will have both an increasing workload and pressures of time constraints, which will impose limitations on their ability to include assessments for their patients who lay outside the standard recommendations.

The seminal articles on LJM are now dated and it is time to consider other research methods to permit a better understanding of LJM. The exploration of new methods to understand LJM should fall between both qualitative and quantitative designs in order to offer a broader perspective on LJM in people with diabetes.

Chapter 5

5.0 Synthesis of literature on Limited Joint Mobility

This chapter offers a theoretical concept for understanding LJM in the foot to align with DFU risk assessment models in practice. It will then explain how key assertions within the literature can be sequenced and integrated to aid understanding of LJM in the foot. This process of structuring evidence from literature is important in making the knowledge of LJM useable and accessible in practice. Developing a theoretical concept evolving from the motivation to understand precisely how LJM knowledge is mobilised into practice. Therefore, the chapter will conclude by suggesting this theoretical concept must be examined in a real-world context to better understand the characteristics of LJM.

5.1 Introduction to synthesis

Initially, a literature review was undertaken to explore if the first research question could be answered through the existing evidence base. Despite a number of published quantitative studies, there was minimal evidence in the existing literature to allow an understanding of LJM as a pathology. Therefore, it was difficult to ascertain criteria for characterising and defining LJM in the foot. This difficulty in defining LJM may go some way to explain why LJM was not indicated as a highly prognostic factor for DFU in Crawford et al's (2013) Podus study. The struggle in defining the characteristics of LJM from the literature suggested a gap in the understanding of foot related LJM. At this point it was not possible to draw any conclusions to explain this. However, it emerged that there was a narrow perspective on LJM in the literature relating to a common research approach for characterising LJM. The identification of a gap in the understanding of LJM created a need to question existing assumptions on LJM which had derived from quantitative research designs. The approach selected for enhancing understanding of LJM in this study is influenced by a process of challenging the assumptions of the positivist philosophy in the existing literature which will be further explored.

To underpin a quantitative experimental study on LJM in the foot, there would need to be clear evidence on measurable characteristics of foot related LJM. Currently there is limited

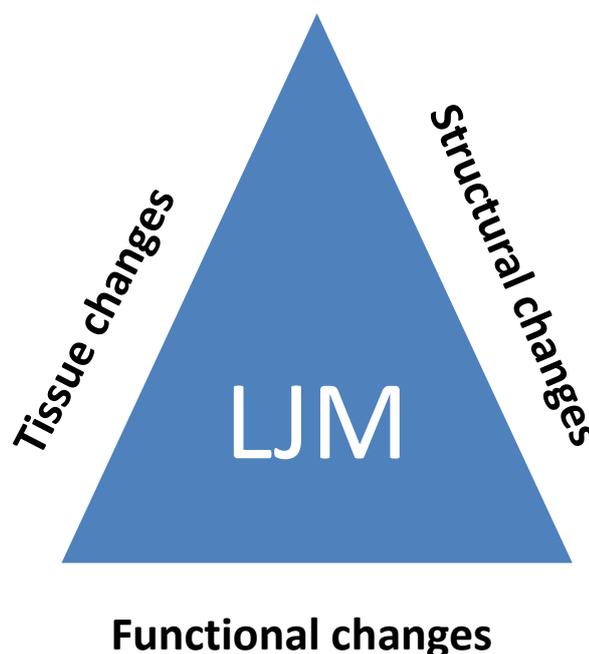
indication of structures and joints affected and the impact on dynamic function, leaving a fragmented understanding of LJM in the foot.

5.2 Constructing a sequence of themes on LJM in the foot.

Examination of the literature has enabled the generation of a conceptual theory for exploring LJM in the foot in professional practice. The literature on LJM in the foot was mapped out from the first recognition in 1957 to 2014 (see Appendix 14). From this, the concept of LJM was constructed to detect common themes and this process permitted the features of LJM to be unravelled and reorganised into meaningful knowledge. The common themes from the literature were organised into a conceptual triad of LJM characteristics to help illustrate knowledge of LJM in the foot. This framework subdivides the characteristics of LJM as it occurs in the foot into three areas seen in Figure 1.

5.2.1. The conceptual triad of LJM characteristics

Figure1 Characteristic features of LJM. This figure shows the three key characteristic features associated with LJM, tissue changes, structural changes and functional changes, each being represented as an equal side of a triangle.



This triad of LJM characteristics were then considered in terms of their progressive impact on the foot, to formulate a hierarchy of the conceptual theory based on available evidence. The conceptual theory holds that LJM has a threefold impact on the characteristic changes in the feet.

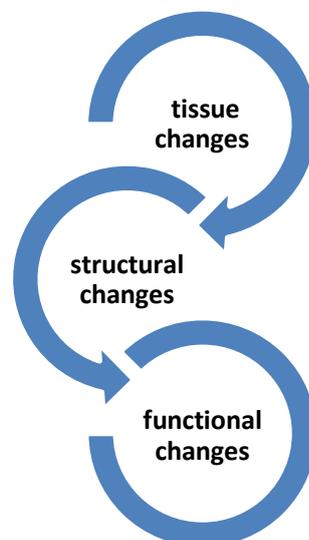
Initially, long term hyperglycaemia causes tissue changes, with thickening of the plantar fascia and stiffening of collagen around the joints and in the skin.

This leads to secondary amplification of the inherent foot shape and structure. The conceptual theory acknowledges the foot shape and structure may pre-date the diagnosis of diabetes.

Finally, the relationship of connective tissue and structural changes impacts on the function of the foot, resulting in a relative change in ankle, arch and forefoot function leading to altered pressure loading of the foot. (See Figure 2 for the hierarchical interaction of LJM characteristics.)

5.2.2 Hierarchical interaction of the triad of LJM characteristics and risk factors

Figure 2 Hierarchy of characteristics. This figure shows the interrelationship of the three characteristics of LJM. The organisation of the features conveys a vertical sequential progress of the LJM from tissue changes to structural changes through to functional changes. It is assumed the LJM characteristics interact with other risk factors which may exacerbate or accelerate the progress of LJM.



The three areas of the conceptual theory for LJM in the foot are likely to be inter-related and other key aspects to consider are risk, ethnicity and biomechanics or morpho-functional elements. In order to understand the role and impact of each theme, there needs to be an appreciation of the timing and relationship of the changes within each theme.

This conceptual theory challenges the assumptions that neuropathy alone impacts on structural and functional changes in diabetes. This concept explores a new original insight into how tissue changes affect structure and function for foot related LJM in the diabetic foot. The triad of characteristic changes in LJM that begins as skin changes, with hardening and thickening of the plantar tissues, progresses to stiffening of the articular structures resulting in limited range of movement, deformity and alterations in function.

5.3 Establishment of an emerging research focus

The literature on LJM was reviewed using an iterative approach, on each occasion trying to view the perspective of LJM in the foot from the conceptual theory. The process confirmed the suspicion that LJM in the foot was not an easily defined entity. In addition, there was difficulty understanding the associations reported in the literature between LJM and foot problems. The literature searches on LJM generated several narrow avenues of evidence, each offering glimpses of the characteristics in the feet. Whilst there were patterns of evidence relating to key elements such as tissue changes due to LJM, and reports of structural and functional alterations, there were no prevailing or convincing conclusions about how to identify LJM in the foot. The range of assessments was variable and it was evident there was an absence of a care pathway for LJM in the foot. The research literature has not provided a comprehensive characterisation of LJM in the foot. This may be in part due to how LJM has been researched, as all relevant research articles employed a quantitative research design. In addition, most of the experimental studies focused on a single parameter of LJM, namely; structure, function or tissue qualities, rather than explore several parameters of LJM.

5.3.1 How the theoretical concept relates to the developing research focus

Investigation of the theoretical concepts for LJM is important to assess if these concepts of tissue changes, structural changes and functional changes constitute the characteristics of LJM

in clinical practice. Abate (2013), Arkilla et al (2003) and Papanas (2010), have attempted to characterise the manifestations of LJM but these do not focus on LJM in the foot, rather LJM as it affects the whole body. Studies on LJM have focused on measuring the relationship between LJM and a range of variables, neuropathy and LJM and pressure and LJM (Abouesha et al 2001; Fernando et al 1991; Frykberg et al 1998 and Viswanathan et al 2002). The aims of these studies have been to measure the effects of LJM rather than define how it is characterised.

As the aetiology and understanding of foot problems in diabetes continues to evolve, there remain questions in the literature about foot related LJM in people with diabetes. The theoretical concept of LJM offers an opportunity for this study to examine if podiatrists characterise foot related LJM in clinical practice according to musculoskeletal changes affecting tissues, structure and function. Ardic (2003) suggests the musculoskeletal manifestations of diabetes are poorly treated compared to other pathologies such as nephropathy, neuropathy and retinopathy. Somai (2011) concurs with this and says in general the treatment of LJM remains largely unsatisfactory and controversial. Treatment pathways have been explored for the wider manifestations of LJM in the body, but it is not fully understood how the mechanisms operate for LJM in the diabetic foot. Complete functional recovery has not been reported in the diabetic foot as a consequence of treatments for LJM. Whilst there are no firm paradigms for the assessment and management of (LJM) in the diabetic foot, LJM remains a poorly understood feature within the literature.

5.4 Exploring real world understanding of LJM in the foot

According to research, limited joint mobility is a potential risk factor for diabetic foot ulceration which then has implications for clinical practice. Previous studies have attempted to measure tissue changes, structural changes and functional changes which are thought to be musculoskeletal features associated with limited joint mobility. No firm agreements exist in the evidence base regarding foot related limited joint mobility or it's clinical assessment. This has the potential to create difficulties for application in clinical practice. The lack of consensus on the characterisation or definition of LJM in the foot is a problem, and has implication for practitioners working in clinical practice. If the literature cannot define LJM it

cannot define how clinicians should assess for it or manage it. If, as the literature indicates, LJM is a contributory factor in the development of DFU, it is vital to obtain a better understanding of the characteristics and complexities of LJM in the foot before the assessment and management of it can be recommended and implemented in practice. For that reason, it is proposed to explore the opinions of podiatrists on the characteristics of limited joint mobility and the application of guidelines in relation to its assessment.

Formulation of research questions

1. What are the characteristics of foot related limited joint mobility in people with diabetes?

The initial research question was not fully answered by the literature review and resulted in the emergence of two more research questions.

2. What are the characteristics of foot related LJM as characterised in clinical practice?
3. Do the perceptions from clinical practise align with the evidence from the literature on foot related LJM?

Subsidiary question

Is it possible to generate a framework in which to comprehend foot related limited joint mobility?

5.5 Research Aims

The primary aim of this thesis is to develop a clearer understanding of foot related LJM in people with diabetes in order to underpin effective clinical management and provide clarity for future research. This thesis marks a new approach in attempting to better understand foot related LJM. The research objectives will aim to fill the need for the essential foundation of knowledge for foot related LJM, which is crucial before further work can be done to explore the area any further.

Secondly this study aims to clearly define foot related LJM in people with diabetes. This definition will be sought by investigating the perceived causes and consequences of LJM and whether it is believed to contribute to DFU. If it is believed to contribute to DFU, the study will aim to establish how this influences the interventions for LJM in order to prevent DFU. The

study will explore the knowledge from the literature and experience of clinicians to unify the knowledge and understanding of foot related LJM. This better understanding of diabetes related LJM in the foot has the potential to positively impact on clinical practice.

5.5.1 Research Objectives:

1. To identify clinician's opinions and experiences of LJM.
2. The conceptual theory on LJM in the foot derived from the literature (page 43) will be cross referenced and analysed alongside the opinions and experiences of clinicians (1).
3. A framework of factors that contribute to LJM will be developed (from 1 and 2) and from the analysis of findings.
4. Opinion will be contained from the same clinicians (1) and refined as necessary

If clinical guidelines are influential in the scope and delivery of diabetes footcare services, their currency should be regularly evaluated in professional practice.

The role of practitioners working in diabetes foot care has evolved.

Perceptions and experience of delivering diabetes care in general practice has received some attention.

Perceptions of podiatrists of delivering diabetes foot care services has not been explored

In order to understand the characteristics of LJM in the foot this research study will aim to develop a clearer understanding of the causes of foot related LJM in people with diabetes in order to underpin effective clinical management and provide clarity for future research. From this deeper level of understanding a clearer definition of foot related LJM will be formulated.

5.5.2 Study aims

This study aims to define foot related LJM in people with diabetes due to gaps in knowledge and understanding in the literature. This will be sought by investigating the perceived causes and consequences of LJM and whether it is believed to contribute to DFU. The study will explore the knowledge from the literature and experience of clinicians in clinical practice to unify the knowledge and understanding of foot related LJM.

The initial research question for this study emerged from my observations working in a diabetes foot clinic with people attending for treatment of diabetic foot ulcerations.

Chapter 6

6.0 Methodology

This chapter will discuss the methodology by initially exploring the personal influences of the researcher. Development of the methodology will be achieved by examining philosophical approaches in research, how the researcher orientates to these approaches and how they align to the study aim. Existing approaches for exploring the phenomena of LJM in the feet will be acknowledged, and will reflect the researcher's personal journey from quantitative to qualitative paradigms. Phenomenology as a philosophy will be examined along with the use of Interpretive Phenomenological Analysis (IPA) as a suitable method for achieving the aims and objectives of the study. The research design, including the data collection and data analysis phases will be explored with consideration to rigour, truthfulness and outcome. Ethical perspectives and the rationale for the selected research design will be discussed and the chapter will conclude by justifying the most appropriate research method to enable the research aims and questions to be achieved.

6.1 Background to the methodology

In order to acknowledge the potential for my personal experience to unfairly skew this element of the research journey, my personal experience will be reflected on to demonstrate self-awareness as a source of bias when considering how the methodological position evolved. The philosophy and methods employed in LJM literature was examined because the inconsistent definition and characterisation of LJM may have been a consequence of employing these methods. It was also important to choose a method appropriate to meet the aims of the study. Creswell (2008) suggested the method should not be selected by the researcher's preference but should reflect the appropriate approach to address the research question(s).

6.1.1 Reflection on the initial research approach

To begin with, the assumptions from a positivist philosophy which employ quantitative research designs were considered as a method for answering the research questions in this study.

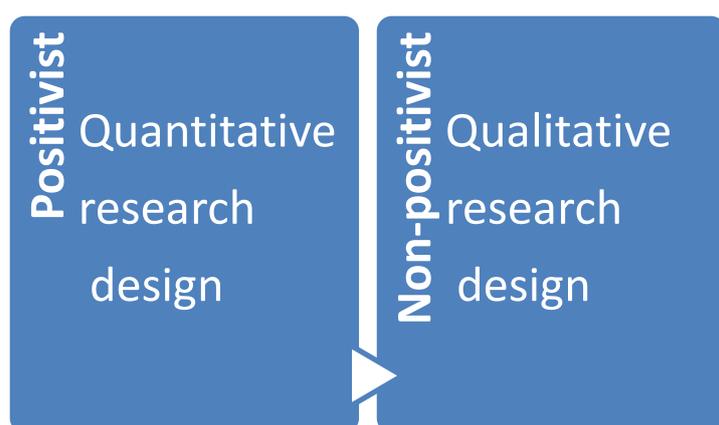
What are the characteristics of foot related LJM? (*in clinical practice?) (*revised question)

Experimental designs have historically dominated the scientific healthcare literature and this has been apparent in the professional literature for podiatrists. This has created a strong influence on my assumptions, perspective and understanding of LJM, which was reinforced by the designs used in LJM literature. The literature review revealed that quantitative research designs dominated this area of interest, Delbridge et al (1988), Fernando et al (1991), Duffin et al (1999), Viswanathan et al (2003), Zimny et al (2004), Craig et al (2008), Lazaro Martinez et al (2011) and Garcia–Alvarez et al (2013). These designs assume a positivistic philosophy which maintains that reality is fixed and objective knowledge is produced through rigorous methodology using research methods with measurable outcomes, Rubin and Rubin (2011). Given I had previous experience of using quantitative designed research, I was able to appreciate the benefits of creating a well-designed quantitative study for examining LJM. Especially given that these designs are said to produce replicable and generalisable results (Polit & Beck, 2012). However, Robson (2011) says there are limitations to the design of research methods aligning to positivist philosophy for understanding phenomena in real world research. Consideration of Robson’s view, means that investigating LJM in a controlled setting may reduce the ability to fully address the aim of this study, which is to establish the characteristics of LJM *in clinical practice*. Furthermore, a quantitative study executed in a controlled laboratory environment may reduce the utility of the findings in the clinical setting. As a result of reflecting and evaluating the current literature on LJM, I began to realise that current LJM knowledge was based on a narrow scope of evidence from quantitative designed studies. I was concerned the philosophy and designs of quantitative research had neglected capturing the views of either patients or experts. I believe opinions of experts and patients are important in generating a holistic understanding the characteristics of LJM. Therefore, my developing concern was 1) there was an absence of approaches using a non-positivist philosophy and qualitative research approaches and 2) there was an over reliance on the use

of positivist philosophy and quantitative research designs. I concluded that this may explain the gap in knowledge and understanding of LJM in the existing literature. Having identified this gap, it became increasingly evident there was a need to 'step back' and recognise how this had changed my perspective on the research approach (see Figure 3).

6.1.2 Change of perspective

Figure 3 Illustration of Positivist and non-positivist research philosophy and research design



The challenges posed to me whilst reviewing the limitations of the existing literature and the reflection on my own experience delineated a change in approach within the research journey. Thinking about the existing research into LJM, I initially accepted the assumptions about foot related LJM and the philosophical approaches used. However, the reductionistic approach employed in previous studies, with tightly controlled designs and attempts to reduce confounding variables, had not clearly established the characteristics of foot related LJM. As such, I felt the approaches involving use of controlled designs did not represent expertise of practitioners, nor reflect the diverse reality of conditions encountered in practice. My concern was the individual expression and complexities of LJM characteristics may be missed using quantitative approaches. Therefore, in contrast to my initial considerations of employing a positivist quantitative approach, I began to consider and map the shift in my approach from positivist to interpretivist approaches, and qualitative designs as a more suitable method for exploring the complex heterogenous characteristics of LJM in clinical practice (See Figure 4).

6.1.3 Personal influences – epistemological position

My occupation has influenced my choices and changing position as a researcher, and in order to explain how this was realised, my roles as podiatrist and lecturer will be explored. Both have an important bearing on my research journey and have influenced my epistemological position and research approach. The complexities of choosing a research approach will begin with personal reflections on my views, reflecting on both professional and personal values. This reflection will illustrate the skills and complexities of working in a clinical and educational environment and how this experience can be crafted into the research approach.

Figure 4 Map of the shift in views from positivism in interpretivism and how that aligns with research philosophies and approaches.

<u>Ontology</u>	<u>Epistemology</u>	<u>Methodology</u>	<u>Methods</u>
<u>Objectivism</u>  <u>Constructivism</u>	<u>Positivism</u>  <u>Interpretivism</u>	<u>Deductive</u>  <u>Inductive</u>	<u>Quantitative</u>  <u>Qualitative</u>

As a podiatrist I believe in holistic patient centred approaches, I respect my patient views, their experience and perspectives when negotiating their care plan. Working as a podiatrist has developed my skills in listening and communicating with others and provided the foundations for developing my reflexive practice skills. I consider these skills essential and immediately transferable to my evolving research approach (see table 7).

In addition, the context of my experience as a podiatrist is important to my research study. I feel that my experience of working in diabetes services offers a good understanding of the challenges faced in providing diabetes care. Through my experience, I am aware of multiple influences on professional practice and admire the amount of energy podiatrists invest supporting the growing number of people with diabetes.

As my career shifted from clinical practice to present day as a lecturer in podiatry, I have maintained a personal interest in the broader context of diabetes and MSK care. My lecturing role has demanded advancement of my knowledge, teaching, learning and assessment skills, in addition to refining my analytical and problem-solving skills. However, it has also required enhancement of my communication skills and the ability to critically reflect and evaluate research. By facilitating students understanding of diabetes and the value of critical reflection, my role has enabled my own reflection on my experience of diabetes care and the challenges associated with it.

Table 7 Skill mapping for application in qualitative research.

This table maps the researcher’s personal views, in addition to clinical and academic skills to the skills required for undertaking qualitative research

Personal views	Skills - Clinical & academic	Qualitative research skills
Deliver holistic care Aspire for quality Reflective practitioner Listen to others Empower others Be authentic Be respectful Value of experience Be kind	Effective communicator Non- discriminatory Health and Safety Ethical Organised Analytical Flexible Problem solving Decision making Appropriate knowledge Assessment and feedback Evaluate evidence	Interpersonal skills Build a rapport Engagement skills Data collection skills Data analysis skills Writing skills Creativity Open minded Reflexive skills Self-critical

One of the challenges in diabetes care is early identification of complications posing a risk for foot ulceration. LJM is one of the complications of diabetes occurring in the foot and it was something I had observed in practice. Despite some alignment of research with my observations in practice, there were no qualitative studies harnessing opinions on LJM from podiatrists in the foot related LJM literature. I began to consider methods for capturing opinions on LJM to grasp a better understanding of LJM. These thoughts were reinforced through reflecting on my role as an educator, seeking views and understanding of knowledge, which in turn drives me to challenge my own learning, knowledge and opinions.

Ancient philosophers like Plato have long since debated the theory of knowledge. More contemporary epistemologists have provided an interpretation of Plato's theory of knowledge highlighting how the theory contrasts between opinion and knowledge as they fall along a line, with opinion at one end and knowledge at the other (Wedgwood, 2018). Plato's theory is important in a modern research context, in appreciating the need to explore both opinion and knowledge, in order to achieve a full understanding of a phenomena. In the context of the literature on LJM in the foot, the knowledge of how LJM impacts on the foot in diabetes is only based on positivistic philosophy using quantitative study designs. Therefore, existing knowledge on LJM is based on a limited research perspective, so, to meet Plato's criteria for the depth of knowledge required to understand LJM, there is a need to explore the "reasoning" and "intelligence" and opinions surrounding LJM.

6.1.4 Holistic approach translated into research approach.

As a practitioner, I believe a holistic approach is essential to obtain insight and understanding into complex healthcare issues. Polit and Beck (2013) suggest the principles of a holistic approach can be translated into the research approach. When embracing a holistic research approach, the individual is valued. In order to frame my research approach, I considered the strengths and limitations of my professional experience and how experience might translate into a method for gathering new knowledge on LJM. My approaches to gathering new understandings of a concept are characterised by the use of conversation to share and exchange experiences. This is a strong skill that can translate into phenomenological research designs that involve using dialogue as a means of gaining new insight. Through the process of

carrying out the literature review, I began to appreciate being a novice researcher, and that I still had much to learn by seeking the experiences of others for a more holistic perspective on LJM. This realisation strengthened and confirmed my view that philosophical assumptions and approaches in the literature relating to LJM were inconsistent with the approach needed to gain a new understanding of LJM. This critical self-reflection was important to see how my professional influences could inform my view as a researcher. Undertaking this reflective process allowed appreciation of the synergies between my values, skills, and beliefs and qualitative research designs.

The skills of listening, communicating, and empathy with others from my professional roles are transferrable into a research context providing the foundations for a shift from novice to expert. This helped formulate my revised approach and to seek an opportunity to adopt a philosophical approach in research more closely aligned to my professional experience and values. My experience, knowledge, and personal views and transferable skills will be the cornerstones of the personal research approach. These qualities are factors that are important in helping to shape research enquiry.

6.2 Philosophy and qualitative research

Qualitative research is underpinned by ontological assumptions about the relationship between the world and human interpretation. My ontological view is situated within a critical realist approach, which assumes some authentic reality exists to produce knowledge (Braun and Clarke 2013). However, as a critical realist I recognise that knowledge is not objective instead, I believe it to be context specific, shaped by social interests, culture and language, which are influenced by the perspective of the individual. A critical realist approach underpins a number of qualitative research approaches.

Table 8 Qualitative research approaches

This table shows some approaches used in qualitative research

Qualitative research approaches		
Grounded theory	Ethnography	Phenomenology

Grounded theory, ethnography and phenomenology are guided by a set of beliefs or feelings about the world and are united by employing a naturalistic approach to the study of phenomena (Bryman, 2012). Willig (2013) described qualitative research as a term covering an array of interpretive techniques seeking to describe, decode, translate, and come to terms with the meaning of certain naturally occurring phenomena in the social world. Research from qualitative designs provides rich, in-depth knowledge when examining human phenomena (Silverman 2013, Bryman 2013).

By studying people's experiences in their real-world settings, qualitative researchers are located in the world of the participants (Robson, 2011). By adopting a qualitative approach, I will be in a position to identify and interpret LJM in terms of the meaning participants bring to it from their own world. However, there is criticism of this approach and findings from studies that have used qualitative methods can be considered highly subjective, and not generalisable to the wider population due to small purposive sample sizes (Polgar and Thomas 2013). However, generalisation is not the purpose of qualitative research as it is considered exploratory rather than definitive, permitting readers to make their own decisions about applicability (Silverman, 2013). Qualitative methods have also been criticised for lacking 'scientific' rigour and for susceptibility to researcher bias threatening dependability of the data. However, the strength of qualitative research can draw on the skills of the researcher, during design, data collection and analysis, objectivity can be increased by adopting critical thinking strategies and reflexive accounts to eliminate bias (Bryman, 2012).

6.2.1 Qualitative approaches

Whilst qualitative approaches have their own traditions and unique characteristics, qualitative researchers are usually united by a desire to explore the subjective interpretation and meaning people give in their everyday lives (Denzin and Lincoln 2011; Willig 2013; Polgar and Thomas 2013).

I felt a qualitative design would permit different perspectives and assumptions about the reality of LJM. I considered a qualitative approach to be valuable in understanding the reality of LJM as a "subjective social" phenomena, which could be elicited by asking what practitioners think. The philosophical assumptions underpinning qualitative methodologies

are more grounded with my clinical views about LJM. Morse (2015) highlighted the increasing use of qualitative methodologies by healthcare researchers, who, like myself, have begun to reject the positivist paradigm. The use of qualitative research methodologies has been successfully developed and emerged as a powerful design in shaping healthcare (Greenhalgh 2016). Qualitative designs have helped to increase understanding of human experience, social behaviour, culture and qualitative methodology can explain elements of healthcare that quantitative strategies are not suited to explore, (Silverman, 2013 and Bryman 2013). The qualitative design provides a distinct advantage over selection of a quantitative design, as it will help uncover the understanding of the phenomena of LJM. Given there is no universally agreed definition of LJM in the foot, the key driving force of the research is to explore the views of people working in the field of diabetes footcare.

Giving voice to leading people in diabetes care by using approaches from qualitative research designs is an important for uncovering new knowledge. This was highlighted by Greenhalgh (2016) who said insight into how practitioners think is not achievable through quantitative research methods. Therefore, a qualitative method was an appropriate choice to permit the collation of rich, subjective experiences of practitioners in clinical practice to address the gap existing between research assumptions on LJM and how it is experienced in clinical practice.

The experience of leading podiatrists in diabetes care was considered a suitable beginning for the research. Koch (1996), states that the starting point of any research enquiry must be whether the philosophical assumptions of a research method are in harmony with the researchers own views. Koch also recommended that researchers appraise the philosophical underpinnings of the methodology being employed, in order to appreciate their influences. This will now be explored in more detail.

6.3 Phenomenology

The intention of a phenomenological methodology is not to generalise findings but to understand the essence of a concept (Priest, 2002). From my professional values and beliefs, I felt the strongest influences on how people come to understand is through the experience of others. The search for knowledge through 'experience' is the common key feature in the methodological approaches positioned within the philosophical discipline of Phenomenology.

Table 9 Phenomenological approaches, assumptions and orientation.

This table offers a summary of common phenomenological philosophical assumptions and the alignment to research approaches

	Phenomenological and philosophical assumptions			
Approach	Husserlian Philosophy	Heideggerian philosophy	Merleau-ponty philosophy	Gadamerian philosophy
Assumptions	Towards a positivist paradigm	Interpretivist paradigm	Post positivist paradigm	Interpretivist/constructivist paradigm
Orientation	Strong epistemological focus	Strong ontological focus	Strong existential focus	Mixed focus

Dowling (2007) offers some helpful advice in navigating the phenomenological schools of thought, and situates phenomenology as an approach, a philosophy and a method that can be used to develop knowledge linking to values and experience (see Table 9). King (2014) identifies the chief aim of phenomenology as increasing understanding of the real-world experience of a phenomenon of interest.

For these reasons, phenomenology resonated strongly with my views and beliefs on how a design which captures experience from practitioners could enhance knowledge and understanding of LJM. The origins of phenomenology can be traced back to Husserl and Heidegger, each with different philosophical assumptions, which underpin the characteristic approaches for the methodology (see table 10). Husserl’s phenomenological approach is descriptive and focuses on the meaning of human experience. Dowling (2007) notes that the Husserlian researcher is expected to suspend their own preconceptions and assumptions in order to make a more objective understanding of the phenomena. This notion is based on Husserl’s fundamental beliefs that to reveal the essence of phenomena, the researcher has to “bracket out” their own pre-conceptions, prejudices and beliefs, in a process called

“phenomenological reduction” (Dowling and Cooney 2012). This belief conflicted with my own views as a holistic practitioner in a healthcare setting. In contrast, researchers who align with Heideggerian philosophy do not bracket their previous experience and understanding (Dowling 2007). Indeed, Heidegger placed importance on context, stressing that human beings cannot isolate themselves from culture, social situations, or experience as cited in McConnell-Henry (2009). Heidegger rejected the process of phenomenological reduction and believed that the researcher’s beliefs, presuppositions and experiences should be incorporated in the interpretation of the phenomena of interest attained through the hermeneutic endeavour (McConnell-Henry et al, 2009). Interpretive phenomenologists using Heideggerian philosophy consider bracketing to be impossible (Dowling and Cooney 2012) .

Table 10 Alignment of philosophical influences with research approaches

This table offers examples of characteristic features of research approaches and how they relate to the philosophical influences.

Phenomenology as a research method				
Philosophical influences	Husserlian	Heideggerian	Merleau Ponty	Gadamerian
Characteristic features of research approach	Descriptive account Preconceptions Bracketing, reduction, epoch Essence of phenomena	Presence in the world Hermeneutic circle Preconceived bias Understanding of experience Interpretative process	Embodiment Existential descriptive nuance Reciprocal Intertwining of researcher and researched	Hermeneutics Fusion of horizons Interpretation Co-creation Reflexivity

This fundamental difference in philosophical approach of interpretative phenomenologists who do not employ bracketing was a much better fit in aligning with my beliefs and experiences. The reason is, that as both as a podiatrist and as a researcher I would find it difficult to uncouple my experience and assumptions when interpreting understanding of the phenomena of LJM from others. The interpretive approach embraces the notion of merging perspectives from both the researcher and the researched. This is usually achieved through the principle of hermeneutics, which refers to the theory of understanding and interpretation of linguistic and non-linguistic expressions. The purpose of interpretive or hermeneutic phenomenology is to gain meaning and understanding of phenomena through the interpretation of the researcher (Smith, 2009).

Researchers who embrace the Hermeneutic philosophy, such as Gadamer, often align within a Heideggerian phenomenology examining conditions in which understanding takes place, (Dowling 2007). Gadamer described the “hermeneutic circle” as a metaphor and believed this is how we come to understand a phenomenon. In practice, this is a back and forth interpretation of text to cogenerate meaning of a phenomenon (Finlay 2009, Dowling 2007). Gadamer described this blending of researcher and participant understanding as the ‘fusion of horizons’ (Jacobs 2014), which is when the researchers’ understanding combines with the real-life experience of the phenomena, creating the best opportunity for interpretation.

Within my study, the hermeneutic philosophy will be used to interrogate the interaction and culture within the study. Therefore, there is a strong connection with phenomenology as a philosophical and research approach and my views and pre-knowledge from the literature will be used in searching for new knowledge on LJM, through real world experience.

6.4 Interpretative phenomenological analysis

In the end, the decision to use IPA is based on a pragmatic appraisal evaluating the relative strengths and limitations of each approach (see Table 11). Whilst different research paradigms make demands on the researcher including research design and the interpretations, it was concluded an IPA approach would provide the best opportunity to explore the understanding of LJM. It is felt that IPA can be used in a design which will ‘bring

to life’ the richness of experience of practitioners to reveal their perspectives about LJM, allowing new meaning and understanding to be achieved.

Table 11 Philosophical approaches and fit with study aims

	Philosophical approaches	Fit with aims of the study
phenomenologists	Husserlian	Weak due to a rejection of bracketing concept and the principles of reduction
	Heideggerian	Strong due to this approach being situated in a meaningful context and affinity with the principle of interpretation
	Merleau Ponty	Moderate due to the concept of researcher and researched being intertwined, however, the aim is not to seek the embodiment of the phenomena
	Gadamerian	Strong due to the hermeneutic approach

The process of recognising my existing professional values skills and beliefs consolidated my thoughts in harmony with the philosophical approach of the interpretivist phenomenological approach IPA (Smith 2009). The IPA approach is underpinned by principles which embrace the value of idiographic element, phenomenological philosophy and the use of hermeneutic analysis. Denzin and Lincoln (2011) say the interpretivist paradigms maintain that reality is not fixed, rather it is subjective, socially constructed and understood through methods employed in a naturalistic setting. The IPA method would capture the subjective reality of LJM from multiple individual perspectives and in addition would provide a rich understanding of LJM within the clinical context. The interpretivist approach would support the need to achieve a more ‘holistic’ understanding, it would fit with my beliefs and would embrace bringing together of views. Benner (1994) stresses the importance that bodily phenomena have on meaning, in the context of the patient or practitioners’ world, defending the notion that clinicians’ experience of LJM would begin to bridge the gulf and add new perspectives and hence understanding about LJM. This notion of grasping the participant’s perception of LJM stems from the Verstehen tradition in sociology. Verstehen is a German derived word to meaning “to understand deeply” and is attributed to the work of Max Weber.

Modern thinkers in phenomenology such as Benner (1994) and Koch (1995) see phenomenology as an emerging methodology requiring adaptations applicable to the contextual setting. Smith's seminal work in 1996, "Interpretive Phenomenological Analysis" (IPA), was developed as a methodology that emphasised discovery, description and meaning rather than prediction, control and measurement. Smith (2009) suggests integrating the experience of the researcher is a justifiable component of a phenomenological approach. This approach advocated by Smith (2009) in the development of IPA strongly resonates with my views on modern application of phenomenological approaches. This is further substantiated by Friesen (2012) who suggests more contemporary phenomenological researchers should and can employ hybrids of the original philosophical interpretations, with the benefit of permitting freedom to improvise in research and practice.

There are several publications by research podiatrists using modified IPA approaches Robson (2015), Morris-Roberts (2014), Scott (2015) Paton (2014), Williams (2008), Hendry (2013), Washington (2016), and Tan (2019). These studies show how IPA approaches have successfully used interviews and focus group designs to explore phenomena in healthcare contexts. Therefore, these methods are considered suitable for the final research design in this study.

6.5 Final research design

Given the research question aimed to better understand LJM in clinical practice, podiatrists will be the preferred participants for inclusion in the study design. The advantages are 1) to enable a unique insight into the cultural values and behaviours of podiatrists and 2) to appreciate how podiatrists interact in a clinical environment with people with diabetes who may have LJM. This professional background provides an authentic perspective when aligning and selecting the study method of choice.

The interpretative strategy will be the primary method for understanding the meaning from podiatrists, because there is no clear reality of LJM as expressed in the feet. No assumptions will be made about the participants' experience of LJM in the natural world of health care practice.

6.6 Why the research is needed - justifying the research approach

There is little published opinion from the clinician's perspective on diabetic foot assessments in the clinical environment. This may be due to the complexity of undertaking research with different cultures, structures, roles and responsibilities for diabetes foot care services. Therefore, this lack of clinical perspective of practice remains an ongoing challenge. The absence of a large scale national or international overview of how clinicians characterise the range of foot problems during the diabetic foot assessment, such as foot related LJM justifies research into this area. LJM is a risk factor that could be identified during a diabetic foot assessment. There is a need for clearer understanding of all risk factors in the assessment of the diabetic foot, such as LJM and how it impacts on DFU. Podiatrists working in diabetes care are well placed to discuss the potential impact of LJM on the foot. Despite the lack of explicit requirements in UK clinical guidelines to assess for LJM as part of an annual foot assessment, it may be LJM is an implicit element of assessment when podiatrists assess the diabetic foot. Therefore, this study proposes to explore understanding of LJM in the foot from a podiatric clinical perspective. This is an essential step to strengthen the context for which future podiatric management of LJM in the foot is delivered.

In order to answer the research questions, the design will need to explore the knowledge and opinions of health care professionals from their experience working in a clinical environment. Their work will need to regularly focus on assessing and treating diabetic foot problems. The population will be UK podiatrists working in the National Health Service within diabetes specialist services.

Table 12 Matching the study aim and research design.

The table summarises the research design and how well these fit with the aims of the study

Aims of the study: Develop a clear understanding of LJM in people with diabetes, and to define the characteristics of foot related LJM	
Research design	Fit with the aims of the study
1)Focus group	Strong
2)Semi structured interview	Strong
3)Delphi survey	Moderate
4)Case study	Weak

It was a concern that the number of examples of real-world experience for foot related LJM may be quite small. Therefore, a shared discussion in a focus group was felt appropriate to help develop and assist in debating the topic within the experience of the group. The focus group design would allow comparison and summary of participant experiences and relate these to the literature on LJM in the foot. The Interpretivist Phenomenological Approach (IPA) Smith, Flowers and Larkin (2009), is most often associated with semi structured interviews as a research method, however, Palmer (2010) Mercer (2012) Smith et al (2009) and Tomkins and Eatough (2010) have identified how IPA can be used for focus group settings to explore “lived experiences” . The strength of the focus group design permits the nuances and subtleties of dynamic group interaction and body language to be interpreted to further illuminate the meaning and significance of experience between participants. The focus group method will permit the researcher to explore how opinions, emotions, thoughts and beliefs are a legitimate approach to understand characteristics of foot related LJM in clinical practice. The nature of the “lived experience” in the research design will be the way in which podiatrists navigate their diabetes specialist services.

Focus groups have been used in the podiatry profession previously in seeking views from experts from the professional body. Stressing and Borthwick (2014) carried out several focus

groups using podiatrists as participants as part of a research design investigating views on workforce redesign policies.

The findings indicated the groups' fears on how "general podiatry care" appeared to be contracted out to private healthcare, with specialist areas such as surgery, musculoskeletal care and diabetes care being retained in the NHS service provision. Stressing and Borthwick's (2014) work is important and the findings may have some bearing on views within this research study. Stressing and Borthwick's participants expressed concern about the workforce re-design as it would create "professional silos" and that this was not beneficial in "unifying the profession". It is felt the focus group is a good strategy to provide an understanding of LJM based on the individual's clinical experiences, beliefs and opinions.

This original work needs to be undertaken to bridge the current gap in knowledge and understanding of foot related LJM. Once new understandings have been generated the area of foot related LJM can be further explored. The outcome of this work will provide a crucial opportunity to develop new contemporary investigations into foot related LJM in people with diabetes.

6.7 Research questions

What are the characteristics of foot related LJM in people with diabetes?

What are the characteristics of foot related LJM as defined in clinical practice?

The purpose of the research is to fulfil the function of exploring the knowledge, opinions and experiences of foot related LJM in clinical practice. This qualitative research must be undertaken prior to exploring this area further.

In order to achieve the aims, research objectives have been formulated. The objectives will first seek to identify the opinions and experiences of LJM in clinical practice. The characteristics described in clinical practice can then be cross referenced to the findings from the literature. The findings from the literature and from clinical practice can be used to formulate clearer understanding of foot related LJM. The outcome of the study will be to develop a framework of factors that characterise foot related LJM in people with diabetes.

Chapter 7

7.0 Method Focus Group

This chapter will introduce the method for the focus group and provide a detailed account of the ethics, consent, recruitment and sampling, with a step by step process of data collection. The method for transcription and data analysis will then be detailed including an explanation of how reflexivity was used to establish trustworthiness and rigour in the process.

7.1 Introduction to the research design

A focus group design was used with the aim of answering the research question. Participants were podiatrists recruited using a purposive sampling method. An IPA approach was employed to interpret and analyse the findings.

7.1.2 The data collection tool – focus group

A focus group was selected as the data collection tool for the study. The design of the focus group was underpinned by the philosophical principles of phenomenology, with a focus on idiographic and hermeneutic approaches within the IPA method. The aim of the focus group was to establish insights into the real-world experience of limited joint mobility from participants working in specialist diabetes practice. The questions were designed to a clinical focus, developed from the literature on LJM in the foot and permitted the emphasis of the project to be focused on finding out as much information as possible about the participant's experiences of LJM in the foot. The expectation was that the participants would have some convergent and divergent views within the discussion.

The approach used for executing the focus group was guided by the practical guides of Krueger (2014) and Braun and Clarke (2006) and Barbour (2007), these texts provide details about when to use focus groups and why. Krueger (2014) suggests focus groups require careful preparation, detailed operational planning for the data collection day/s, briefing of the note taker about the project goals, checking of equipment and finally time allocated for reflection and analysis of the findings.

Recognising the researcher was known to some of the participants presented issues of relational ethics when conducting the focus group. The researcher anticipated the ethics of disclosure of information as outlined by Krueger (2014) as such, was respectful of managing any personal influence by including the presence of a PhD supervisor and field note taker in the process who would could debrief the researcher post -focus group.

In the case of oversharing on a personal or organisational level sensitive information in the group, the researcher was prepared to discourage disclosures that go beyond the legitimate aims of the project. Braun and Clarke (2006) suggest the use of ground rules at the start of the conversation to help mitigate this.

7.2 Ethics

The ethical matters for the research method were considered in relation to the University lone working research code of practice (University of Salford, 2006). Ethical approval procedures were adhered to according to the University academic ethics policy (University of Salford, 2017) and completion of the necessary ethics processes were undertaken as specified by authors institutional guidance in the University of Salford ethics approval framework. A summary of the institutional ethics processes can be seen in appendix 11. Relevant risk assessments were considered for the research study in line with the institutional policies to safeguard against any significant risk to the researcher or participant during or after the process of carrying out the research (University of Salford, 2014). This includes date and version-controlled identification. Together, these documents outlined the requirements in relation to completion of the ethics form, consent form (see Appendix 2), generation of a data collection tool, risk assessment form and patient information sheets (see Appendix 1).

Following ethical approval from the University of Salford (HSCR15/12) (see Appendix 13) members of the North West podiatry specialist interest groups for diabetes, rheumatology and biomechanics were approached with an electronic invitation letter and participant information sheet, (see Appendix 1). Content of the participant information sheet provided relevant information relating to the research and addressed the issues of confidentiality and anonymity as recommended by the author's Institutional Research Code of Practice.

Research governance at the author's institution conforms to the HEFCE Concordat to support research integrity, (Universities UK 2012) and this was used to guide the governance issues in the study. Safeguarding of personal information from participants was achieved by compliance with the institutional data protection policy. These measures ensured any personal data obtained from research participants was processed with due regard for individual privacy and ensuring that personal data remained secure throughout the research process.

All participants were asked to provide written consent to participate in the focus group, (see Appendix 2) consent specifically covered audio recording and the use of individual verbatim quotes. Assurance was specified in the consent process regarding data security, and anonymity was assured for each participant by allocation of a random number for transcription purposes.

All relevant research documentation, including paper information which included personal details of participants was stored securely either in a lockable filing cabinet and electronic data was password protected and stored on the institutional secure drive. Holloway & Wheeler, (2010) state it is important for researchers to store transcript and audio files confidentially to protect identity of the individuals. This was in line with the University recommendations for storage of information in relation to General Data Protection Regulation (GDPR) and the Data Protection Act 2018.

The key concepts for ethical consideration in the focus group design were respect for autonomy, beneficence and non-maleficence and justice (Beauchamp & Childress, 2013).

Respect for autonomy: This concept relates to the need to demonstrate respect for the people in the focus group study in inviting them to self-govern their thoughts and actions for participation in the study. This was achieved by providing written information regarding the purpose of the research in an invitation letter. Participants were permitted to make a fully informed choice on whether they wanted to participate in a focus group. Participants were provided with a detailed participant information letter identifying the aims of the study and were informed of the option for withdrawal from the study (see Appendix 1).

Beneficence and Non-maleficence: This concept stresses that the benefits of the research must outweigh any associated risks (Parahoo, 2006). This was achieved by arranging an educational debriefing of the group of the focus group findings and the evidence from the literature review findings. It was not anticipated that any harm would come to the participants as a consequence of participating in the focus group. The purpose of the focus group was to explore the participants current knowledge and understanding of limited joint mobility. Given LJM is a phenomenon that participants may identify in clinical practice, they were not being subjected to questions on a topic outside of their scope of practice.

The principle of justice is a concept that relates to the fair selection and treatment of participants for the study. In relation to the focus group this was achieved in several ways, in order that all participants were treated fairly and equally by the researcher. Ground rules around listening and respecting views of others were discussed at the start of the focus group which were outlined in the focus group operational plan (see Appendix 3).

7.3 Participants and sampling selection.

Sampling design aimed to recruit a homogenous group, this was favoured as it would provide a shared basis for discussion as indicated by Braun and Clarke (2006). Heterogenous groups were considered less appropriate as the specific topic area of LJM might not be an aspect of their routine care. A diverse range of employment grades in diabetes was preferred in recruitment in order to gather experience from a range of specialist diabetes roles. Podiatrists were the preferred choice of participants to recruit for the research study as they are key professionals involved in managing complex factors contributing to DFU. Given the podiatrists role in routine assessment of the diabetic foot, they were most likely to have experience of LJM in practice. All participants recruited to the focus group had relevant experience of working with people with diabetes and foot problems. Clear consideration was given to ensure there was not a mismatch of the focus group aims with the selection and recruitment of participants. By recruiting participants from an established diabetes clinical interest group, it ensured a focus group discussion was in line with similar conversations for the group members. Purposive sampling permitted recruitment of participants considered the most appropriate to help understand the phenomenon of LJM. Due to the nature of purposive

sampling, the researcher allowed the research question to guide recruitment, and the sample was devised from desirable characteristics.

7.4 Sampling framework

A purposive sample framework considered the demographics of participants, and included the following characteristics; a mixed gender group, podiatry experience in diabetes care (spanning 5-20 years), employed in different NHS locations. This sampling technique is said to help to ensure the trustworthiness of the findings (Barbour 2007, Krueger 2014). The sample was also selected to aid the researcher in developing a detailed understanding of LJM; with participants sharing the lived experience of what LJM means to them in practice. This technique aligns with a qualitative, phenomenological study as the inclusion criteria for participants ensures that those who take part in the study will have experience of the phenomenon being explored.

Some authors, specifically Krueger (2009) and Barbour (2014) recommend that focus group members and the moderator must be complete strangers, however, this will not be achievable, as the researcher and professionals working in this field will have similar interest areas. In fact, familiarity will be helpful in this context due to the trust in sharing knowledge, it will make interpretation easier offering greater insight. The researcher considered the risk of bias from the study focus group and the possibility there are other participants or other special interest groups who may also hold information of the topic area than the selected group.

7.5 Data collection procedure

The characteristics of the research setting were not a barrier to the conversation, as it was the usual location for the specialist interest group quarterly meeting. Hence the environment and geographical setting was not an inhibiting factor for the participants, it was a familiar and private environment.

7.5.1 Operational plan of focus group

An operational plan for the focus group was constructed to guide the conduct of the focus group on the scheduled date. The opening instructions in the operational plan emphasised

the genuine interest in the group's range of experiences with respect to LJM. and that the aim was to learn about their views on the subject.

Ten members volunteered to participate and provided written consent. The focus group was facilitated with an independent observer and field note taker.

The theoretical concepts from the literature on LJM were the basis for creating an effective set of questions for the focus group. The focus group was led using questions (see Table 13) with additional prompts based on the literature and agreed with the wider research team.

Consideration and prompts were given by the moderator to counter issues of limited self-expression due to differing status between the group members.

The researcher acted in the role of the moderator and employed skills transferred from clinical and educational practice, specifically communication and listening skills, these are skills considered essential in conducting focus groups (Krueger 2014; Braun and Clarke 2006 and Barbour 2008).

Whilst there were structured questions, supplementary questions were pursued for clarification or to follow emerging themes by asking for other points of view in the group.

Table 13 Focus group questions

Question 1. What do you think causes LJM?

Question 2. What you think the most important factors are, regarding LJM in the diabetic foot?

Question 3. In your clinical practice, how do you detect LJM in the foot?

Question 4. What does the shape of the foot look like with LJM?

Question 5. How does LJM affect the way the foot works?

Question 6. How does the presence of LJM in the foot affect your management?

Question 7. What role does ethnic background have on LJM in the foot?

The digitally recorded focus group lasted 1 hour, and all participants contributed to the discussion. The researcher transcribed the dialogue verbatim.

Several key skills were employed by the members conducting the discrete aspects of the focus group. This ensured collection of successful meaningful data aligned to the aims of the study.

1. The researcher acted as moderator to lead the group discussion and to be an effective data collector, good listener and communicator (Braun and Clarke 2006). The researcher used Kvale's (2007) metaphor used in interviewer techniques, acting as both miner and traveller" to facilitate the conversational journey with the focus group, to search with them for valuable information.
2. An additional researcher for taking field notes was required and was briefed regarding the aims and objectives of the research study. The experienced note keeper also had experience of running focus groups, had good observational skills and was able to highlight any contributions such as additional non-verbal cues to provide a better understanding of the narrative, essential skills as summarised by Silverman (2013).

In order to fully appreciate the relative strengths and limitations of this design, the researcher accepted all responses from participants would be subjective in nature. Silverman (2013) suggests the researcher should remain receptive to the reality that the subjective experiences/perceptions recruited from other participants would not necessarily be the same.

7.6 Transcription protocol

The researcher transcribed the digital recording of the focus group, aiding familiarisation with the focus group conversation. Transcription was verbatim, whereby every utterance was captured and recorded. This included false starts and stutters, repetitions, speech patterns, ("you know", "like") and remarks such as "right", "yeah" by both interviewer and participants. Also included was time line for pauses, laughter, interruptions and personal comments. Additionally, protocols for preserving anonymity and confidentiality were applied with each of the ten participants. They were identified on the transcript numerically as R1-R10, and the interviewer as I.

A verification process with participants post transcription of the focus group was employed to ensure participants were satisfied the transcript was a true representation of the conversation.

7.7 Data analysis

The participants individually and independently verified the transcription to support the trustworthiness of the data. Some minor amendments were made to remove names of the focus group members when they appeared in the conversation. Following this, the data analysis utilised the stages outlined in the Interpretative phenomenological analysis approach (Smith, Flowers and Larkin 2009) (see table 14). The six stages provided an inductive approach to establish characterisation of LJM in the foot. The six stages of IPA as recommended by Smith (2009) was used to provide transparency in the process identifying main themes within the transcript.

Table 14: IPA model for analysis of focus group data (Smith et al 2009)

IPA stages 1-6
1. Reading and rereading
2. Initial noting
3. Developing emergent themes
4. Searching for connections across themes
5. Moving to the next case
6. Looking for patterns across cases

Whilst the use of IPA in focus groups does not have the same status as its use in interviews, it is possible to adjust the IPA method for group data as recommended by Tomkins and Eatough (2010), and Palmer et al (2010). In order to remain faithful to the principles of IPA the group was initially used as a unit of analysis, then to mitigate the risk of eclipsing the individuals in the group, Tomkins strategy was employed. This consisted of adding an additional iterative loop for the individuals in the focus group. This extra iterative loop required the researcher to look at everyone's contribution holistically, then use a systematic mapping process to see how and where the specific contributions were reflected in the overall thematic summary. This hermeneutic process balanced the individual and the group in the data analysis.

The data from the focus group was interpreted then compared and contrasted against the themes generated from the literature. Barbour (2008) suggested this iterative approach is crucial to establish emerging themes. The conclusions from the data analysis and interpretations would be used to craft a framework understanding the characteristics of LJM in the foot. Generating themes from the data was carried out using a data-driven approach, allowing the themes to emerge from the data. The process was carried out manually by the researcher to pick up on the tone of words and phrases and assign meaning to them. Where there were hesitations, pauses or nuances indicating uncertainty or lack of clarity on something, the researcher was able to interpret this and add rich meaning to how this mattered to individuals in the focus group. The process of understanding the data from the themes was undertaken by producing maps to aid the researcher in identifying the themes. These themes were then be described and explained in relation to the research question. Examples of narrative were used to provide evidence and examples of the themes and enhance the transparency of the interpretive process.

7.8 Reflexivity

The analysis processes were conducted transparently with reference to a reflective diary to ensure the findings had been developed truthfully from the data. This aspect of the analysis was included to increase the credibility of the findings by capturing an authentic account of the researcher's assumptions and reflections. This approach is commonly used as a strategy in IPA research (Shaw 2010, Smith et al 2009). To further increase the trustworthiness of the data, the field note takers transcripts were analysed in conjunction with the emerging themes, this supplementary step adds to the dependability and confirmability of the researcher's analysis process.

The researcher had some common professional identity with the participants, in these cases Parahoo (2006), states the researcher should fully recognise and respect the participant's knowledge and opinion above the objectives of the study. The reflective diary was an effective vehicle to enable the researcher to draw on her own reflections as a podiatrist. It also provided an opportunity to capture the researcher's experience of managing patients with LJM in order to understand the participant's experience of LJM in clinical practice. Thus, the researcher acknowledged awareness of her own thoughts and feelings on the responses to

the questions and how this could bias the conduct of the research. Silverman, (2013) and Shaw (2010), support the use of a reflective diary being maintained by qualitative researchers in order to help recognise and map out any thoughts or feelings which could sway the direction of the study.

Chapter 8

8.0 Focus group findings

This chapter will present the findings from the focus group. The findings will be presented in the form of themes which will be aligned to the narrative emergent from the focus group transcription. Themes will be presented in tables associated with words from the narrative to provide transparency in the process.

8.1 Presentation of findings

This aim of this chapter is to present the findings from the focus group. The focus group transcript was analysed using a modified IPA structure for focus groups (Tomkins and Eatough, 2010). Tables will be used to offer a transparent account of the iterative data analysis process and emergence of themes.

Interpretation of themes was undertaken using the methods embedded within the IPA approach. The interpretation of findings will follow in the discussion chapter to allow comparison with the literature review findings.

8.2 The participants

The demographics of the focus group are provided to offer a background context of the participants and offer an appreciation of the experience of individuals in the focus group. By providing a comprehensive account of the focus group demographics, it gives an indication of the characteristics of the focus group members. It also permits commentary on the frequency and nature of the focus group members' contributions to the themes in the findings. This enables a transparent presentation of the findings in acknowledging any dominant members of the focus group who may have influenced the nature of the responses.

The demographics provide some important perspectives on the range of experience in the group. The range of experience in the group was between 4 and 20 years. This broad range of experience was valuable as it spans the period in the literature when foot related LJM became popularised in the 1990's. The range of specialist titles from the group indicated a high level of professional responsibility for leading and managing high risk patient caseloads

in the public NHS sector. These caseloads will include a high proportion of people with diabetes. Therefore, from the range of participant titles it confidently provides a background of credibility and authenticity to comments alluding to the understanding how diabetes affects the foot in people with diabetes. The focus group participants hold qualifications ranging from Diplomas, through Honours and Masters degrees to PhDs. This range of qualifications within the focus group creates a strong collective knowledge base from which to interpret findings and develop a better understanding of foot related LJM in people with diabetes. Each participant in the focus group was given a letter and number allocation R1-R10.

Table 15 Demographics of focus group.

Gender	Title	Graduated	Qualification	Work in diabetes	Pseudonym
male	Vascular specialist podiatrist	1990	DPodM, BSc, Supp prescriber	15+	R5
male	Advanced podiatrist and team leader	2003	BSc (Hons) MSc	6	R1
female	Specialist podiatrist	2002	BSc MSc modules	-	R3
female	Advanced podiatrist	1991	DPodM, BSc, MPhil	20 +	R4
female	Podiatrist	1999	BSc MSc modules	14	R2
female	Professional lead	1985	BSc MSc	20	R10
female	Highly specialist podiatrist	2000	MSc	8	R7
female	Specialist podiatrist	1998	BSc,	15	R8
male	Consultant podiatrist	1990	BSc, MSc, PhD	20	R6
Female	Staff podiatrist	2009	BSc MSc modules	4	R9

8.3 Analysing the transcript using IPA method

The researcher initially identified assumptions about themes and characteristics which were anticipated prior to analysis of data (see Table 1).

Table 16 Assumptions of researcher prior to analysis

Researcher assumptions about themes and characteristics
LJM characteristics would be defined in relation to structure, function & tissue changes
Clinical guidelines would feature in the conversation
Time constraints might be a consideration
Knowledge of LJM might be poor
Identification of LJM in the foot could be problematic
Education of AHP's may discussed
Organisation of Services will offer context

Analysis of the transcript closely followed the IPA 6 Stage model for analysing data. The method facilitated moving from descriptive findings towards interpretation of the themes from the group and how individuals in the group contributed (Tomkins 2010).

Initially the descriptions and evolving themes from the focus group transcript were developed as a single unit of analysis in a literal descriptive sense. The researcher then considered the themes in relation to the individuals in the focus group to demonstrate a deep level of understanding and knowledge from the transcript from an idiographic perspective.

Stage 1: Reading and re-reading.

- Data from this study was in the form of words, so reading the words required understanding of the characteristics of language and the symbolism of the language, in terms of its meaning and what is understood by the language in context.
- Reading and re-reading was essential to become familiar with the individual's narrative from the focus group transcript. Listening and reading the focus group transcript over and over several times was necessary to navigate a path through the responses in order to begin the process of understanding the participants' perspectives.
- Familiarisation with the data from the transcript was undeniably enhanced by the common understanding of professional podiatry language between the researcher and the participants. Reading and listening to the transcript illustrated that, in knowing the researcher was a podiatrist, participants talked freely, openly and frankly about their real-world working practice with a lack of inhibition in the conversation.

Stage 2: Initial noting.

- This was a detailed and time-consuming stage and Smith (2009) suggests the set of conventions for this stage is debated in IPA, and he advocates the use of innovative ways of modifying IPA.
- The researcher generated descriptive comments and word maps, (see Table 17). This helped to grasp the content of the focus group, discover key characteristics in the data and in the issues discussed.
- Provisional noting, highlighting and comments were identified in the transcript to recognise the knowledge and understanding of the participants (see appendix 4).
- Due to an extensive literature review, there were some assumptive themes from the researcher about likely descriptions that may arise, these are identified in Table 17. The researcher's thoughts at this stage were captured in a reflective diary (see Appendix 10).

Stage 3: Developing emergent themes

- Many of the focus group descriptions did not align to the researcher assumptions as captured in the reflective diary.
- Initially a large number of detailed descriptions were developed to enable understanding of the breadth of the responses from the focus group (see Table 18).
- The descriptive words were identified in an attempt to discover which characteristics were appearing within the transcript.
- Theme development reflected current issues in clinical practice which was important for understanding the real-world knowledge on foot related LJM.
- The emergent themes arose from gathering descriptions of similar characteristics, (see Table 19). This illustrates how the narrative has been analysed in relation to understanding LJM.
- The descriptions and linguistics make a connection with how the participants were using language to construct their characterisation of LJM.

Stage 4: Searching for connections across themes:

- The researcher used the descriptions in Table 18 to authentically capture the connecting language from the transcript. The use of language to communicate the themes was crucial to truthfully reflect the connections across themes.
- In order to explicate the meaning of the themes, appreciation of the professional working context of participants formed part of the analysis. This provides a stronger insight into the participants' perspective and help identify broader connections between the themes.
- Quotes emerging from the focus group served to sum up common concepts and thus common themes (see Table 20). These quotes illustrate a true and faithful representation of the conversation from the focus group

Stage 5: Moving to the next case.

- Initially the descriptions and emergent themes from the focus group transcript were developed as a single unit of analysis.

- The researcher then considered the themes in relation to the individuals in the focus group to demonstrate a deep level of understanding and knowledge from the transcript and to identify where reduction of themes was necessary (see Table 19).
- The additional iterative loop of reviewing the individual responses from the focus group, is important to the IPA process to reflect the idiographic dimension of the IPA approach.

Stage 6: Looking for patterns across cases.

- The naming and refining of specific themes was achieved using three strategies:
 - 1) Searching for patterns across the individual participants
 - 2) Consideration of the field note takers commentary and observations
 - 3) Review of the researcher's reflective diary
- This strategy allowed refinement of themes and served to illuminate the issues around characterising LJM in clinical practice.
- Analysing individual responses and exploring significant quotes in a professional context helped better identify broader connections between the themes.
- The original 9 themes were coalesced into 6 more meaningful themes seen in Table 21. These finalised themes provide a true and faithful representation of the conversation in response to the focus group questions and reflect a uni professional perspective in context with the phenomena under investigation.

Table 17 Overview of Stage 2 and 3 of the IPA approach. This table provides a word map of authentic descriptions from the focus group transcript to illustrate the connection between issues discussed in the focus group and developing themes

Theme 1	Sub themes	Issues discussed	Word map
LJM is not assessed	Time management LJM Painless condition Assessment based on risk Assessment v Screening Influencing factors	Foot screening done in a timely fashion No need to look for LJM not symptomatic LJM fallen off the radar Focus on identifying risk Deformity is seen but not treated Fragmentation of speciality services	Limited, Assessment, Prayer sign, Timely, Speedy, Screening, QOFF points, Indicators, NICE, Risk, Ulceration, Qualified, Deformity, Fragmented, Symptomatic
Theme 2			
Characteristics of LJM in the foot	Ageing and O/A Variable Movement in the foot	Different Rigid foot It affects gait Co-exists with neuropathy	High arch, Claw toes, Solid, Block, Rigid, Variable, Ulceration, Charcot, No shock absorption, Range of motion, Overloading, Forefoot equinus, Ankle, Ageing, Active, Passive, Ankle equinus, Weakness, Gait, Shape, Size
Theme 3			
Impact of LJM in the foot	Not a priority Not looking for it	Patients can live with it Looking for other things (risk factors)	Charcot, Glycation, Tib post dysfunction, Gait cycle, Biomechanics, Range of motion, Pressure, Stress, Structures, Rupture, Compensatory, Shuffling, Cadence, Ataxic, Wide, Stance, Sounds, Different, Neuropathy, Duration
Theme 4	Sub-theme	Issues discussed	Word map
Ethnicity and LJM	Better joint mobility	Family support Previous study findings Less Charcot	Mobility, less amputations Fewer ulcers, less Charcot Family, neuropathy differences

Theme 5			
Real world for LJM	Missed opportunity	Exercise and physio surgery	Footwear, Orthotics, Exercise
Theme 6			
Ownership of knowledge and skills	Wound care Guidelines	Offloading Quick test for LJM Biomechanics skills Ulcers and wound care	MSK, Biomechanics, Offloading, MSK assessment, Gap, Flagging up process
Theme 7			
Identifying LJM in foot	Guidelines	Prayer sign Use of goniometer	Simple test, Screening, Education, Biomechanics Understanding, Skills
Theme 8			
Foot Deformity	Guidelines footwear	Variable Assessment /screening	Deformity–footwear interface, Referral Woolly area
Theme 9			
Justification of role	Guidelines	QOFF point Biomechanics skills	Services Diabetes world MSK clinician

Table 18: Observations from respondents. *This table provides an illustration of the number of occasions individuals contributed to the focus group, the descriptors they used and the observations derived from the individual's narrative contributions.*

	Frequency speaking	Descriptors	Observations developed from nuance of language
<u>R1</u>	62	Underassessed, NICE, Range of motion, foot shape, pain, gait, duration of diabetes, ethnicity, neuropathy, MSK, biomechanics, offloading, surgery, confidence, decision making, wounds, assessment, risk, footwear, deformity, foot protection, guideline.	<ul style="list-style-type: none"> • Confident in sharing views and responding • Willing to critically appraise guidance • Reflected on limitations in MSK services
<u>2</u>	35	Underassessed, prayer sign, GP, risk factor, goniometer, range of motion, ankle joint, subtalar joint, neuropathy, ethnicity, mobility simple test, physio, exercise, deformity.	<ul style="list-style-type: none"> • Focused responses around risk factors • Keen to emphasise the need for a simple test for LJM • Confident discussing range of motion
<u>3</u>	48	Biomechanics, ulcer, offloading, risk deformity, Charcot, gait, weakness, shape, fracture, neuropathic gait, ethnicity, culture, family, importance, orthotics, referral MSK, MDT, stretches, course, deformity, shoe, classify.	<ul style="list-style-type: none"> • Identified need for more biomechanical assessment, and MSK assessment • Gait issues and weakness • Don't see much Charcot in their locality
<u>4</u>	61	Screening, speedy, prayer sign, high risk, limited joint mobility, rigid foot, complications, solid, foot, gait, cycle, biomechanics shearing, unstable, neuropathy, ataxic. LJM & neuro together ethnicity, research, mobility ulceration, referral, orthotics, prevention, assessing, exercises, stretching, intervention, deformity.	<ul style="list-style-type: none"> • Emphasised time constraints and impact on screening • Confident on presentation of rigid foot, gait changes, neuropathy and altered mobility, linked to ethnicity • Discussed early intervention, orthotics and referrals
<u>5</u>	43	Fallen off the radar, foot checks, time, range of motion ulcers, ankle joint, subtalar joint, rigid variable different, plantar fascia, stress tension, pressure structures, callus Charcot, shuffling gait, cadence, heavier gait, offloading rocker soles, exercise, foot screening, assess arthritis complication, no community focus on LJM, MSK, flagging up evidence based intervention, association, priority, subjective over reporting, under reporting, beliefs.	<ul style="list-style-type: none"> • Confident LJM was off the radar in diabetic foot assessment • Strong opinion that range of motion relevant in LJM • Discussed changes to plantar fascia • Gait associated with neuropathy • LJM characteristics had different presentations • Pleaded for more evidence and more MSK

<u>6</u>	19	Foot screening, ulcer, foot assessment, MDT, screening, ageing, osteo arthritis, Hallux abducto valgus and rigidus, neuropathic glycation, Charcot offloading, rigid, foot, mobility, prevent, redistribute, surgical, orthopaedic, deformity, risk, shoes.	<ul style="list-style-type: none"> • Quiet knowledgeable person • Differentiated between screening and assessment • Suggested there was greater need for prevention • Differentiated between LJM and aging process. • Articulated aetiology of LJM – glycation of collagen. • Discussed offloading, surgery footwear and deformity
<u>7</u>	18	Fragmented specialities, biomechanics, diabetes assessment, preventative, pressure, subtalar joint, Charcot, ethnicity, ulcerated, high risk, limited joint mobility, screened, offloading, orthotics, footwear, simple test.	<ul style="list-style-type: none"> • Highlighted frustration at fragmentation of Services • Suggested a Simple test needed for LJM • Identified the need for more preventative care
<u>8</u>	14	Tendons, rigid neuropathy, high arch, not much movement, funding ,deformity, shoes, footwear, NICE, risk, woolly area.	<ul style="list-style-type: none"> • Descriptive narrative on characteristics of diabetic rigid foot • Got the sense this person had issues with NICE guidance and trying to interpret what deformity meant.
<u>9</u>	5	Ulcer rigid education wound care biomechanics re-education, biomechanics skills not the best, off loading.	<ul style="list-style-type: none"> • Reflective practitioner, talked about education for patients and practitioners. • Suggested improving biomechanics knowledge
<u>10</u>	11	Clinical experience, referral, neuropathy, muscle strength, weakness.	<ul style="list-style-type: none"> • Someone seeking validation of knowledge – suggested it came down to clinical experience. • Discussed the interaction between neuropathy and muscle weakness

Table 19 Summary of nine focus group themes.

This table provides a narrative summary of the nine initial themes developed from the IPA analysis of focus group transcript

<p>LJM is not assessed. The participants initially expressed a sense of LJM being under assessed in clinical practice. Several subthemes seemed to explain this, in terms of time management and guideline constraints. The focus appeared to be on risk assessment for foot ulceration and LJM was described as being “off the radar”.</p>	<p>Characteristics of LJM in the foot. The group described a range of characteristics in relation to LJM in the foot. Crucially, that it is variable, different, but that they most often see a rigid foot in clinical practice. The group felt LJM co-exists with other conditions such as deformity, neuropathy and ageing.</p>	<p>Impact of LJM in the foot. The group offered knowledge on the impact of LJM in the foot. Despite this, the key issue was that LJM is not a priority, furthermore the group were in agreement they were looking for other things.</p>
<p>Ethnicity and LJM. This was debated briefly with minimal experience verbalised in the group on ethnicity. Of the participants who contributed there was a clear confident response that joint mobility was generally better in the Asian population and there was clear evidence to justify this.</p>	<p>interventions for LJM. The group discussed interventions for LJM, with hesitant suggestions of exercise as an option. The group did not appear confident engaging with the concept of prescribing exercise, their view was to refer for physiotherapy for exercise.</p>	<p>Ownership of knowledge and skills. The group regarded their time spent in clinical practice was on wound care. There was a clear message that current patterns of service provision meant that podiatrists’ skills for managing LJM sat in the MSK arena and not within diabetes service provision.</p>
<p>Identifying LJM in the foot. The group were confident and knowledgeable about the prayer sign. One member of the group talked about use of goniometer to assess range of motion to identify LJM in the foot. It was not considered standard practice to assess for LJM during a standard foot assessment for people with diabetes. The group talked about the need for a simple clinical test for LJM in the foot.</p>	<p>Foot deformity. There was some debate how deformity was assessed, the impact of this in relation to LJM and its impact on predicting the risk of foot ulceration. There was considerable acknowledgement of the subjective nature of assessing for foot deformity. Discussion of footwear was also an element of this theme.</p>	<p>Justification of role. The focus group concluded by discussing fragmentation of services, living in a diabetes world and the impact of clinical guidelines. There was a sense that more education was needed on LJM and a test to enable them to engage with this as part of their assessment.</p>

Table 20 Quotes from the nine focus group themes.

This table Maps the initial nine focus group themes and illustrates this with quotes from the transcript.

Initial theme	Quotes to explain the evolved theme
1. Under assessment of LJM	"It'd fallen off the radar a bit, people didn't bother any more"
2. Characteristics of LJM	"I think it can be very variable" "...quite subtle sometimes." "I think in reality it's a lot of different shapes and sizes..."
3. Impact of LJM	"I think when you're working in ulcer clinics which...we probably are, probably ninety percent of the feet are rigid." "nearly all the patients I used to see with forefoot wounds had limited joint mobility."
4. Ethnicity	"I think they have better mobility in the, certainly the Asian population than they do in the, er Caucasian population" "We definitely found that they had better mobility"
5. Interventions for LJM	"you could live with limited joint mobility and have no problems"
6. Knowledge and skills	"working in a high-risk clinic where we only see people with, with the complications of diabetes I would say nearly everybody's probably got limited joint mobility as well..."
7. Identifying LJM	"assess range of motion of various joints and the, you could use a goniometer" "range of motion at the MP joint or ankle joint,"
8. Foot deformity	"That's a really woolly area you know" "According to the NICE guidelines though if they've got a foot deformity, they automatically go into the admit, increased risk category"
9. Justification of role	"we are in a diabetes podiatry world all very focused on the wound and it's sometimes getting that MSK person there"

Table 21 Final focus group themes.

This table provides a summary of the final five themes and how they are coalesced from the initial emergent themes, it also maps to the responses from the participants in the focus group.

Final themes coalesced	Focus group themes mapped to participants
(1) Fallen off the radar	R1, R2, R3, R4, R5
(2 & 4) Pass the LJM glasses please	ALL
(3 & 5 & 9) This is the real world	R1,2,3,4,5,6,7,8,10
(7 & 8) We need a recipe book	ALL
(6) The awakening	R1,2,3,4,5,9,10

Chapter 9

9.0 Discussion of focus group

This chapter will present a discussion and interpretation of the themes from the focus group. To enable an authentic understanding of the participants' world and their experience in professional practice, the researcher will give voice to the individuals in the focus group. To enhance the dependability of the themes, the narrative from the field note taker and the researcher's reflective diary will be discussed in the interpretive process. The chapter will end by summarising the impact and relationship of focus group themes to podiatry professional practice and conclude by identifying the need to better understand the issues and influences on professional practice.

9.1 Review of study aims

The aim of the focus group design was to identify the characteristics of LJM as experienced in clinical practice by podiatrists. The gap in the evidence defining and characterising LJM was observed by the author at the start of the research journey and was a key motivating factor in developing the synthesis of literature on LJM in this study (see Chapter 5). This synthesis of literature was translated to an evidence based conceptual framework (see Chapter 5) which showed LJM as being characterised by tissue changes, followed by structural and functional changes.

The qualitative research design met the aim of the study by permitting a focus on the experience of LJM and gave the cathartic benefit of giving voice to the participants. By focusing on the participants' experience of LJM, it allowed the findings to be compared to the conceptual framework in Chapter 5 derived from the evidence-based research. Taking a qualitative approach distinguishes this study from experimental LJM studies, and adds a new understanding due to its phenomenological emphasis on LJM.

Looking across the focus group themes, the knowledge and experience of LJM within the group was impaired by an inconsistent characterisation in the research evidence base with no reliable assessment and diagnostic technique to translate into practice. This uncertainty

surrounding LJM was exacerbated by other demands and complex influences on healthcare services, resulting in the participants focusing on other aspects of practice.

9.2 Theme 1 - Fallen off the radar

This theme offered a powerful insight into the focus group world in relation to their non-engagement with LJM. I would consider the quote from which this theme emerged as a “shining gem” as defined by IPA researcher (Smith 2011). “The gem” is used as a concept for symbolising valuable information in qualitative research, usually characterised as a short utterance or passage within a transcript. The words in a “shining gem” are strong and shine a light on the deeper meanings within the narrative. This shining gem captured much more than what appears superficially, that LJM was being relatively ignored in clinical practice.

“I think it’d fallen off the radar a bit, people didn’t bother any more” R5

The uncertainty of the prefix “I think” in the quote and the nuance of language is an example which captures the behaviour of how participants frequently sought validation from focus group members when sharing their experience of LJM in practice. This theme has multiple facets; it reflected the experience in the focus group, it was expressed in the past tense and it describes an observation about the practice of other “people”. It suggests there was a time when LJM was on the radar for people. The research literature reveals LJM came onto the podiatry radar when Delbridge (1988), suggested LJM in the diabetic foot was associated with neuropathic ulceration. LJM stayed on the radar when Fernando et al (1991) found a correlation between high foot pressures and LJM in the diabetic foot. Sustaining the interest in LJM as a factor in DFU genesis was realised by Veves (1994), Frykberg et al (1998), Duffin et al (1999) and Boyko et al (1999) with their use of goniometry to measure LJM in the foot. By the next decade, LJM was still firmly on the radar, with Chuter and Payne (2001), Viswanathan et al (2003) Zimny et al (2004) still using goniometry, and other researchers beginning to shift away from this as a reliable measure of LJM. Abouesha et al (2001), Craig et al (2005) and D’Ambrogi et al (2005) employed ultrasound to assess tissue characteristics of LJM, and Turner et al (2007) moved to a functional perspective to measure LJM using dynamic 3D kinematic analysis. The research from 2000-2010 demonstrating a shift in the type of measures for LJM may have signalled uncertainty and changed clinicians’ views for retaining

LJM on their radar of practice. The pivotal factor which may have pushed LJM off the radar is the research from the last decade, from Lazaro Martinez et al (2011) , Garcia Alvarez et al (2013), Guitotto et al (2013) and Deschamps (2013). These studies challenge the assumptions of measuring foot mechanics and joint mobility in people with diabetes. Each of these studies concluded it was difficult to differentiate between foot deformities that pre-dated diabetes, age related foot changes, foot function and mobility and characteristics of diabetes related LJM.

The benefit of reviewing the literature on LJM over several decades illustrates how podiatrists are influenced to change practice over time in response to the evidence base. Individuals within the focus group clarified how they were concentrating on other aspects of foot assessment in their diabetes service because the focus of assessment was other risk factors for diabetic foot ulceration.

Given the concluding lack of characterisation of LJM in the literature, it was possible to understand and appreciate the participant responses when they expressed views that LJM is not a priority, and why it was under assessed and had fallen of the radar for participants in this focus group.

9.3 Theme 2: Pass the LJM glasses please

Pass the LJM glasses is a metaphorical theme which reflects the difficulty participants had in identifying the characteristic changes associated with LJM, and indicated that participants felt there were different presentations of LJM in clinical practice. The conceptual framework in Chapter 5 suggests LJM in the foot is likely to involve a complex interplay of tissue changes (Frost et al 2001) with several structural (Guiotto et al 2012) and functional features (Gelber et al 2014). The characteristics of LJM was discussed by participants in relation to the changes identified in the evidence based conceptual framework confirmed that LJM was characterised in clinical practice relating to changes in tissue, with functional and structural changes.

In IPA when the researcher makes sense of the participants making sense of their world it is called the double hermeneutic, of which this theme is a good example. This difficulty the participants experienced in defining the characteristics of LJM manifested itself as a lack of

confidence in describing LJM, observed by both researcher and field note taker, despite participants knowledge aligning with the characteristics described in the literature.

The diverse views of the characteristics of LJM mirrored the findings from the literature on LJM. Participants described the range of LJM characteristics from their experience and concluded that LJM did not have a fixed appearance,

"I think in reality it's a lot of different shapes and sizes..." R1.

R4 highlighted that foot rigidity was a common finding, suggesting that

"...when you're working in ulcer clinics... probably ninety percent of the feet are rigid."

The discussion within the group triggered recall of personal experiences and helped provide multiple perspectives and new discoveries on LJM which emerged from debate with others. Several participants discussed clinical pathologies they considered co-existing with LJM, deformity, neuropathy and ageing, which reflected the challenges identified by Lazaro Martinez et al (2011), Garcia Alvarez et al (2013), Guitotto et al (2013), and Deschamps (2013). The group were particularly vocal that defining foot deformity was subjective and problematic. This suggests participants' difficulty identifying LJM is consistent with Crawford et al (2013) findings that LJM is difficult to characterise and define.

The focus group conversation was punctuated by brief silences indicating a discomfort with a realisation of uncertain clinical knowledge. This was countered by use of humour helping to lighten the conversation and providing a nuanced signal to the group to laugh about subsequent comments. For example, when asked about what the foot would look like in LJM and if there was a classic shape the responses were:

R6: "I don't think they exist..."

R5: "Maybe in a slide though".

R6: "...unless you see it in a slide, yeah?"

All: [Laughs].

R5: "There's one in London somewhere."

R3: "I've got one."

This “group banter” conveyed a humorous objection to the researcher regarding their opinions of the phrase “classic foot shape” suggesting this term does not reflect the reality in clinical practice. However, the implicit acknowledgement of the phrase suggests there may exist professional myths perpetuated by some experts in the professional field.

The conclusion of the group that there was a diverse clinical presentation of LJM reflected the participants varied experience in specialist diabetes practice. This level of experience of working in diabetes services was a strong feature of the next theme and illustrated the strive and sacrifice in the world of the podiatrists.

9.4 Theme -This is the real world

Consistent with an IPA approach (Smith, Flowers and Larkin, 2009) as adapted for focus groups (Tomkins and Eatough 2010) the researcher drew on her own reflections, both as a podiatrist and her experience of managing patients with LJM, to interpret the findings of this theme.

“This is the real-world” theme represents a consensus by focus group participants in the context of their specialist diabetes roles and how they meet the demands of a diabetes service in terms of what they do. The concept of LJM as a contributory factor to DFU was a strong feature of the research literature in the decades between 1990 to 2009, compared to the period between 2010 and the present day. Consequently, participants in the focus group appeared to hold the knowledge and understand the risk of LJM and its potential contribution to DFU. However, all participants agreed assessment and diagnosis of LJM was not currently a priority in the assessment of the diabetic foot. This suggested there was a more powerful reason for LJM being off the radar in the real world. Assessment for LJM is not a recommendation in current NICE guidelines (DH 2016) for annual diabetic foot assessment. It is likely this was a dominant influential factor for the participants not assessing LJM in routine diabetic foot assessments. This is despite LJM being a identifiable risk factor in IWGDF (2019). Individual participants were very frank and open about not looking for LJM in clinical practice, for example,

“...you could live with limited joint mobility and have no problems” R5

R3 when talking about mobility said

“that’s not the important part for us”

This theme required some implicit understanding of the dominant influences on clinical practice for these participants (podiatrists) working in diabetes services. The researcher drew on her own understanding of the role and responsibilities of diabetes specialist podiatrists. In the U.K health sector, there is a cultural acceptance that diabetes specialist podiatrists are expected to reference and understand the latest recommendations in UK NICE guidelines for the prevention of foot problems, as gold standard practice for managing people with diabetes. Recommendations in NICE clinical guidelines (DH, 2016) mattered in the lifeworld of participants working in diabetes services, as it helped guide their practice.

This is evidenced by comments such as,

“if you’ve got somebody at an increased risk you should see them every six months” R8.

This theme reflects how in the real world, podiatrists are faced with the challenge of complex clinical decision making and striving to align with clinical guidelines.

Participants emphasised that time spent in diabetes clinical practice was resoundingly managing wound care issues.

“we are in a diabetes podiatry world all very focused on the wound” R3

Despite guidelines influencing practice in the lifeworld of these participants, they recognised the limitations and difficulties in interpretation of guidelines, for example when assessing foot deformity,

“each of us has interpreted that one guideline very differently” R5.

Therefore, there appeared to be some professional difficulty in application and interpretation of certain aspects of NICE guideline NG19 (DH 2016). This difficulty appeared to be hampered by the pressures on the participants performing their role under time constraints. The

participants articulated the pressures of time resulted in service provision being invested in current wound management rather than prevention.

“we’re not looking for that limited joint mobility and prevention” R4.

If this is interpreted in the literal sense, the notion of not doing anything preventative seems at odds with the philosophy of prevention and management of diabetic foot problems in both UK and international guidelines.

The deeper interpretation is that these participants have pragmatically prioritised the assessments outlined in NG19 (DH, 2016), and LJM has been sacrificed as a potential risk factor for DFU due to its absence in the guidelines. This means these participants have rejected the recommendations in IWGDF which suggests joint mobility should be checked as part of an annual diabetic foot assessment. The problem of variability in the different methods and grading systems affecting the content of diabetic foot screening guidelines from an international perspective was identified by Formosa et al (2016) making it difficult to compare and recommend a single guideline as standard practice.

The difficulties experienced by participants in the real world were not confined to interpretation and use of guidelines. Participants shared the negative consequences of their experience of specialities in podiatry,

R7 “the specialities if you like are a bit more fragmented”.

Use of this term fragmented, suggests that the specialities are broken and are in need of repair. This interpretation was substantiated by another participant, who offered a solution

R3 “it’s sometimes getting that MSK person there”

For these specialist diabetes podiatrists, the sacrifice of current specialist diabetes service provision which was dominated by guidelines, created an additional need for LJM to be directed to MSK specialist team members not within diabetes service provision.

Whilst this is not directly related to characterising LJM, it offers another perspective on why LJM was off the radar.

9.5 Theme 4 We need a recipe book

This theme related to the interrelationships and needs of the group, specifically a desire for more research and guidance on LJM with a meaningful clinical application. The participants hands on experience assessing LJM was low, partly driven by lack of explicit guidance to assess for it in practice, lack of opportunity, time pressures and constraints of service provision. There was a recognition at individual and group level, that knowledge of LJM was not applied to their practice. One participant expressed the need for a solution.

“we want a simple test that’s maybe looking at, maybe a couple of joints that might just give us that highlight to limited joint mobility, a quick solution on how to assess limited joint mobility in the foot” R4.

Other participants concurred with this, and this gave the impression of a collective agreement that there was uncertainty describing, ordering, and measuring characteristics that would distinguish LJM in people with diabetes. It was evident from the focus group conversation that there was some emergence of dynamic problem solving within the group, which also illustrated a desire to solve the issue of not knowing how to identify and assess LJM.

“We need a recipe book” seemed a suitable lay term, as an example of how people search for a recipe book if they are unsure of the ingredients to bake a particular type of cake. Participants were unsure of the fundamental key ingredients that made up the LJM cake; what were the flour, eggs, sugar and butter that would help identify LJM?

For this theme, the researcher cross referenced the field notes undertaken to confirm the sense that the participants needed confidence, support and a mechanism in which to recognise and treat LJM. Within this theme, the interrelationship between members of the focus group may well have influenced the perceived lack of confidence in the conversation. The status and roles of more experienced individuals in the focus group may have unintentionally stifled explicit discussions on the less experienced individual’s confidence level. An example of this occurred via disclosure by one participant of previous experience in assessing for LJM in a research study, creating a sense of authority in the focus group conversation. This authentic disclosure likely reinforced this individual as having a position of higher status within the professional group. There was no attempt to directly challenge the

individual with research experience, and it is impossible to interpret if it reflected a healthy respect within the culture of the profession, or a silent resentment.

When people in a group feel threatened by a lack of knowledge or experience, they may use a number of strategies to cope. Humour was used on several occasions between the focus group individuals.

When asked about how to manage LJM in clinical practice,

R1 "Yeah, refer for colleague's opinion" {laughs}

R1, paused after the comment which was a signal, giving permission for the rest of the group to laugh.

The laughter after the comment reveals a more latent meaning, which is much more significant than the surface of the utterance. The phrase suggests a discomfort with the reality of needing to seek help from others. The laughter reveals what Smith (2011) refers to as a "secret gem" – the behaviour of laughing has a twofold function - 1) seeking support from the group, that in fact, management of LJM is something they would not know how to manage and 2) a self-deprecating way of acknowledging the limitations of their knowledge. Within this theme, there were several examples where the stimulus of someone disclosing their experience served to help others to connect with the conversation. This in turn helped them reflect and make sense of their own experience.

9.6 Theme 5 The awakening

This theme represented a change in dynamic in the conversation which occurred between participants towards the end of the focus group. The description of the theme illustrates the reflective and self-critical nature of the conversation. It captures how participants became awakened to the reality of their world where LJM was not an important issue from an assessment or intervention perspective,

R4 "we really should be assessing for it better"

"And even if we identify it at some level we're not doing anything unless it's a problem" R4

The conversation in this theme was dominated by discussion of the influences in professional practice for podiatrists. Participants' conversation suggested they had become acutely aware of the influences and limitations of their service, the influence of guidelines within their professional culture and the limitations of working in a specialist role boundary. Individuals discussed how service design had fragmented their experience of practice into two distinct professional specialist areas of diabetes and MSK. The participants questioned whether design of services was detrimental from a professional development perspective and whether or not this had deskilled them,

R9 "...because we've become focused on wound care, we, we sort of forget bits we've learned".

Participants suggested two solutions in their awakening, that education was needed on LJM in order to develop current knowledge and more research to improve awareness and engagement in clinical practice. R3 also suggested an MSK practitioner was needed in their "diabetes podiatry world" for an "MSK assessment".

This theme provides an important insight into the discomfort the participants experienced, associated with uncertainty of knowledge on LJM. This uncertainty is illustrated below, in the short extract between two participants when discussing the process of offloading the foot and its potential impact on further reducing joint mobility.

R1 "It's a double-edged sword isn't it really, you need to off-load to remove, to heal the ulcer..."

R4: And then you need...

R1: ...but by off-loading you're reducing...

R4: ...to look at the bio...

R1: ...limited...

R3: But we don't really need the joint mobility at that stage do we...

R1: No.

R3: ...that's not the important part for us

The hesitancy and incomplete responses make the quote from the transcript messy to read. But getting into the messiness allowed the researcher to understand how individuals in the

group were challenging their understanding with other members of the group, regarding their clinical reasoning for offloading and the impact this might have on limited joint mobility.

9.7 Summary of themes.

The themes add an important and unique contribution to understanding the views of some podiatrists on LJM characteristics within the context of their own clinical practice. The qualitative approach allowed the researcher to unearth themes which provided new insight into the experience of LJM in clinical practice. It also provided an opportunity to consider the impact of discord between research evidence, clinical guidelines and the practical reality of current podiatry practice.

The interpretation of the uncovered themes established an understanding of LJM as characterised in clinical practice, and this was important in relation to the research question. The themes suggest that for these podiatrists, the assessment of LJM has been lost from their assessment process and that this may be influenced by several factors. Previous research by IWGDF (2019) suggests LJM is important and should be assessed clinically, but uncertainty in the evidence base regarding the precise ingredients which make up the LJM cake are reflected in several themes, “we need a recipe book” and “pass the LJM glasses”. The variability in LJM assessment in studies translates in this study to professional hesitation and a lack of confidence in assessment of LJM in practice. “This is the real world” theme suggests that, for these podiatrists, LJM was being relatively ignored in assessment routines, with difficulties defining it, clinically assessing for it, pragmatic factors affecting time, and a guideline driven practice culture. Collectively these offer important insights into the influences on these podiatrists not just in terms of their understanding of LJM but the influences on their professional practice. Podiatrists in this focus group were left feeling they could be doing more, as evidenced in “the awakening” theme.

The nature of the “lived experience” for the podiatrists meant they had to navigate a constrained and frustrating path. The constraints were due to policy, time and the funding of the service. The implications of the themes are that lack of LJM assessment in practice may be

interpreted as being influenced by practice driven guidelines, or it may reflect the time constraints with patients when undertaking assessments. According to the participants, diabetes footcare provision was focused on managing wounds at the sacrifice of other assessments. There is no recommendation to assess for LJM as a risk factor for DFU in UK NICE guidelines NG19 (DH 2016) which may be the most significant influencing factor for these participants. LJM was not prioritised by these participants and might explain the perception that LJM has “fallen off the radar”. This is important since IWGF (2019) suggests the need for assessing loss of joint mobility and conflicting views between guidelines that shape professional practice perhaps justifies efforts to resolve the disparity. Lack of explicit recommendations in UK guidelines may be a barrier to practitioners developing or adopting a method for assessing for LJM in practice.

Interpretation of the theme “the awakening” suggests practitioners need help to develop skills to identify and manage LJM and its potential to contribute to risk of DFU. However, having the time and freedom to develop new skills may not be consistent with guideline-driven practices and further work might be needed to help resolve tensions between factors affecting professional practice.

9.8 Study Limitations

The interrelationship between members of the focus group may well have influenced the conversation and responses to questions. Every effort was undertaken to map where the individual themes aligned or diverged and if group themes evoked responses from individuals. This process of making transparent individual themes helped identify if an individual was making a single point or if they were responding to other members of the group.

There was a risk in using IPA for focus groups, it is a less obvious traditional choice as it can reduce the ability to authentically reflect the idiographic component within the approach. The complexity arising from the dynamic interaction between participants made the analysis more challenging, however, the focus group design stimulated sharing of more experiential reflection than might have been achieved in one to one interview.

The researcher used strategies suggested by Tomkins and Eatough (2010) to mitigate the risk of losing the idiographic component. To balance the individual and the group in the analysis process the researcher employed a back and forth hermeneutic analysis and additional iterative loops for the individual. This ensured the researcher looked at each individual's contribution holistically, and used a systematic mapping process to see how and where the specific contributions were reflected in the overall thematic summary.

Focus group dynamics added an additional positive dimension to the analysis process, however, listening to multiple voices and reading multiple views from the focus group transcript created some difficulty in developing an appreciation of all ten individual phenomenological accounts.

This was a homogenous focus group and a number of complex social and contextual relationships between members of the group may have affected the accounts offered by participants. The participants' responses may also be influenced by the structure and content of the research questions. The shared experiences, disclosed by some members in the focus group may have shaped the accounts offered by other participants in the group. Some accounts of uncertainty over features of LJM appeared to open up conversations in the focus group. Other accounts of previous research experience in assessing LJM appeared to close down the contributions that might have been made by others.

The active nature of pre-existing relationships between individuals in the focus group may have influenced what experiences were shared in the group. Other IPA researchers have suggested alternative protocols to help IPA researchers working with focus group data if they wish to analyse participants' life experience whilst capturing the social context of their experience in a shared environment. Ultimately focus groups create some difficulty because the experience of the individual participant is embedded in a complex dynamic conversation.

The purposive sampling of participants from a specific geographical area means this may not be a representative of a wider population of podiatrists working in diabetes care. That said, this study has achieved its aim of exploring some podiatrists' opinions on the characteristics of limited joint mobility as defined in current professional practice.

9.8.1 Conclusions

Despite research indicating loss of joint mobility is important for assessment of the diabetic foot, the participants in this study suggest it may be lost from routine practice. This may be due to a lack of standardised test for it, in addition to unclear prognostic implications from the literature, and the subjective nature of detecting it. Until there is greater clarity and agreement on how to quantify LJM in the context of identifiable foot characteristics, it is unlikely to be included in the diabetic foot assessment and screening processes. Indeed, since screening may be performed by non-podiatrists the uncertainty around detection of LJM creates a difficulty for application in professional practice.

Chapter 10

10.0 Narrative review of the literature on professional practice

This chapter identifies, evaluates and reviews selected literature related to the research question on professional practice. It will present a theoretical model to illustrate the influence of focus group themes on the search strategy for the literature review on professional practice for podiatrists. The literature will be discussed in relation to the theoretical model to establish an understanding of the influences on professional practice in a podiatry context. It will discuss how the limitations in the literature restrict the understanding of professional practice from the perspective of podiatrists. The chapter concludes with the need for insight into the real-world context of podiatrists in professional practice.

10.1 Perspectives of professional practice from the focus group

Whilst the research question for the focus group related to real world experience of LJM, there was emerging content which related to professional practice. Given that professional practice issues featured strongly in focus group themes, it justified further examination of pertinent literature. The perspectives of professional practice from focus group themes will 1) inform the literature review strategy to guide the breadth of the search on professionalism for podiatrists and 2) inform the next stage of work. For professional practice themes see table 22.

Table 22 Focus group themes relating to professional practice

This table shows the themes which emerged from the focus group on limited joint mobility. The right-hand column of the table provides a brief explanation of the theme in the context of professional practice.

Focus group themes	Meaning of the theme in the context of professional practice
This is the real world	There was a consensus from participants regarding the meaning of their professional role, the role expectations and cultural norms in podiatry. There was an acknowledgement of the need to respond to the demands of the diabetes service in a real-world setting. This also reflected the challenge of combining complex

	clinical decision making for their patients, whilst ensuring they met clinical guidelines, was a powerful message.
We need a recipe book	<p>Participants expressed a desire for more research evidence to guide their podiatry practice. Importantly they expressed need for guidance on how to translate research into a meaningful clinical application.</p> <p>Participants articulated that this conversion of research into practice would also be influenced by experience, time constraints and service provision.</p>
The awakening	The participants demonstrated reflective practice in the discussion process. They recognised the limitations of working in a professional silo and discussed the issues of role boundaries in podiatry. Participants showed an awareness of their professional culture, limitations of specialist working and reflection on defined roles within podiatry services.

Aims of the narrative review

To identify the range of influences on professional practice for podiatrists.

Objectives of the narrative review

The objectives are

- 1) To examine the literature on professional practice in a podiatry context
- 2) To introduce readers to the research available and inform them of the strengths and weaknesses of current literature.
- 3) To provide an understanding of professional practice from the literature.

10.2 Narrative literature review

The literature will be presented as a narrative review, which provides the opportunity to assess, appraise the outcome of the focus group study and synthesise this with relevant literature on professional practice for podiatrists. The benefit of using a narrative review is that a variety of sources can be included, such as key developments within the history of the podiatry profession, educational narratives, political, social and economic influences, national policies and professional agendas in addition to research perspectives. This gives an opportunity to draw information together to help contextualise professional practice for podiatrists from a broad perspective.

Whilst the initial focus was on literature obtained through use of the search terms identified in the method (see Table 23 and 24), the literature was also reviewed using an iterative approach to permit exploration of developing areas relevant to professional practice (not identified in the original search terms). The justification for this approach aligns to the study aims to increase the understanding of professional practice, which may require use of supplementary search terms to obtain further explanation. The knowledge gathered from this approach will permit professional practice to be viewed from a range of existing and new perspectives. This will permit assumptions in the literature to be challenged in order to provide new perspectives on professional practice.

10.3 Literature search strategy

The literature search method employed a focused approach to identify, and retrieve studies drawn from multiple sources for the purpose of locating information on professional practice. The purpose of this was to detect and synthesise information leading to a better understanding of professional practice, to identify any areas for future study, and to develop knowledge for professional practice.

10.3.1 Inclusion and exclusion criteria

Publications were included if they referred to *influences and podiatry *influences and podiatry profession *podiatry and professional practice.

International and UK studies were included. Studies were excluded if they were not in English. Studies were excluded if the focus was on nursing, dental or allied health care or general practice. Interprofessional studies including other allied healthcare professions were considered if podiatry was included as part of the research sampling.

Surveys, cohort studies, reviews, systematic reviews, quantitative and qualitative studies, commentaries, guest editorials and unpublished theses were all considered.

Studies that used a qualitative approach were of particular interest to provide a descriptive understanding of practice and how professionalism is constructed and interpreted within podiatry literature.

Search terms used were:

Boolean operators AND, OR were used where appropriate to combine terms and phrases. Supplementary terms used were; using combinations of *and *or.

Multiple sources were searched for literature concerning the research question, databases were: Cochrane Library for Systematic reviews, Cumulative Index for Nursing and Allied Health Literature (CINAHL), MEDLINE (Index Medicus), Google Scholar, Science Direct, ProQuest, PubMed, NHS evidence, Web of Science and Scopus. Salford Library data base was searched for subject specific journals, including Diabetes Care, Journal of American Podiatric Medical Association, Diabetic Medicine, and Journal of Foot and Ankle Research. Additional sources were accessed which included websites specific to the Department of Health (DH), National Health Service (NHS), NHS England, the College of Podiatry website and its professional publication Podiatry Now, and published and unpublished theses.

Restrictions, limits and filters were applied to focus the literature and align with the scope of the research question.

Table 23. Search engine example and filters for professional practice period 2008-2018

Search engine	Search terms	Filters	No of papers
ProQuest Central	Podiatry and professional practice and views	Full text, peer reviewed, English, Date range 2008-2018, Journal of foot and ankle research,	61

This was repeated with the same filters except with a date range of 1998-2008 with no returns of papers from the same journal. It was repeated including the search term *workforce.

Table 24 Database search and search terms for professional practice.

This table shows the influence of terminology in different decades impacting on the number of papers retrieved.

Search engine	Search terms	Filters	No of papers
ProQuest Central	Podiatry and professional practice and views and workforce	Full text, peer reviewed, English, Date range 2008-2018	158
		Date range 1998-2018	208

Initial review of the literature suggested professional practice issues related to a number of areas which were external and intra professional in nature. These areas were organised into themes (see Table 25) to summarise the full scope of influences identified within the literature and the potential impact on podiatry practice.

10.4 The influence of national and political agendas on professional practice

The environment in which a podiatrist works as a primary source of employment will be an important consideration in shaping the real-world experience of professional practice. For the profession of podiatry there are a greater number of external social drivers and internal influences on professional practice from political agendas, NHS regulatory agencies than when Borthwick (1997) reviewed professionalisation strategies twenty years ago. A literature search suggests there are a number of drivers with the potential to influence professional practice summarised in table 25.

Table 25 External drivers and internal influences on professional practice

This table shows the external and internal drivers which impact on clinical practice. The drivers have been subdivided into political NHS clinical and professional drivers to demonstrate the breadth of influencing factors on professional practice.

POLITICAL DRIVERS	QUALITY DRIVERS	CLINICAL DRIVERS	PROFESSIONAL DRIVERS
Health & Social care Act	CQC Monitor	NICE guidelines	HCPC
NHS constitution	National outcomes	Local pathways	COP
DOH policy	framework	Local policies	Values and ethics
Francis enquiry		Research	Professional development

10.5 Professionalism in podiatry

The work on professionalisation strategies in podiatry in UK practice has largely been developed from Borthwick’s 1997 PhD thesis. Borthwick’s work is important, as it was the first to identify the growing influence of government health policy upon podiatric service provision, the influence of the changing NHS organisation and how these factors impinged on the professionalisation of podiatry. Since the inception of podiatry (or chiropody) as a distinct health profession, there has been exponential development of practice, moving from the provision of general footcare into the current plethora of specialisms, such as diabetes, musculoskeletal care and surgery. This professional growth has been influenced by government health policy, the changing ethos of public health care services and maturing professionalisation within the podiatry community (King, Nancarrow, Borthwick and Grace, 2015 and King, Borthwick, Nancarrow and Grace, 2018). Due to the growth and development of podiatry as a profession, the characteristics of what constitutes podiatry practice has changed over time, and the literature suggests many factors have influenced this change. Several notional characteristics describe professionalism for podiatry, autonomy (McIntyre 2015), status of the individual (Vernon, Borthwick, Nancarrow, Farndon and Walker 2005 and Borthwick 2009) and identity of self (Du Toit, 2011, Barbaro-Brown 2013). Other factors also influence the profession of podiatry, including development of specialist roles and special

interest (Davies 2015), identity as a podiatrist, (Borthwick, 2018) charismatic authority (Bacon and Borthwick, 2013) and role boundaries (Nancarrow and Borthwick 2005) and (King et al 2015). More recently, researchers have chosen to explain how the professionalisation of podiatry can be framed sociologically as well as practically (King et al 2018). King et al (2018) attempted to explain how this framing of the profession can help podiatrists rationalise and understand their struggles relating to competing role boundaries. This may imply the process of being socialised into professional practice for podiatrists must begin in the educational setting. Burford (2014) argues the concept of professionalism is problematic in an educational context. His focus group findings of trainee paramedics, undergraduate occupational therapists and podiatrists revealed perceptions on professionalism were constructed around three domains. 1) personal qualities or characteristics/s, 2) inter-personal experience, through interaction and co-creation with others, and 3) societal – institutional expectations, aligned to organisational cultures and norms.

10.6 Influences on podiatry

10.6.1 influence of professional bodies

The practice of a podiatrist is regulated by the professional statutory body, the Health and Care Professions Council. The College of Podiatrists is the leading professional body representing podiatrists in the UK. Together, they are important in shaping the standards of education for podiatrists, in addition to supporting and representing the profession of podiatry at a national level in the UK. The College of Podiatry and Health and Care Professions Council play a key role in providing guidance on the standards of education and training and proficiency for podiatrists. This ensures Podiatrists are competent to practice as a professional in their workplace.

The College of Podiatry provides a view that podiatrists “.....*prevent, diagnose, treat and rehabilitate abnormal conditions of the feet and lower limbs and that Podiatry’s input has long been recognised to reduce amputation rates in patients with high risk factors for foot ulceration.*” Parliamentary briefing paper (College of Podiatry 2013). However, whilst this description captures the impact of podiatry in high risk care, it doesn’t provide any insight

into how podiatrists manage their skills and knowledge within their working infrastructure. For podiatrists the professional regulatory bodies HCPC and COP emphasise the importance of evidence-based practice in contemporary podiatric practice.

“We promote guidelines and standards of practice that are evidence based, ensuring patient safety and clinical effectiveness with a focus on outcomes.” <http://www.scpod.org/about-us/>

10.6.2 Influence on podiatry -guidelines and evidence

Earlier findings from the focus group suggests responding to service demands and service provision in diabetes services equates to time spent managing complex diabetic foot ulcerations as a priority, with limited scope of practice invested in musculoskeletal assessments. This was because for some podiatrists, specialist diabetes services appear to be aligned to the NICE clinical guidelines for the care of foot problems (DH,2016) which may provide some justification for restricting scope of practice. However, the professional practice of podiatrists may also be driven by a greater demand for services than can be met and this is evidenced by the increasing number of newly diagnosed cases of diabetes each year. The latest figures show that the number of diabetic patients in the UK has reached 3.6m (Diabetes UK). In addition, there are huge challenges in delivering healthcare services for an increasingly elderly population (Right time, Commissioning for Care 2102 DH). As such podiatrists are making complex clinical decisions and prioritising service provision with limited resources and whilst under severe time constraints. The ramifications of making these complex clinical decisions are that sacrifices have to be made, for example rejecting assessing for less common foot complications because they are not evidenced in clinical guidelines. This pattern of clinical decision making by utilising clinical guidelines has some parallels with the study undertaken by Williams et al (2013) within the specialist field of rheumatoid arthritis. This study revealed crucial information on the level of engagement with guidelines and there were some barriers to the use of guidelines for non- specialist practitioners. These barriers were due to lack of understanding and the level of detail and length in the guidance. However, specialist practitioners had a positive engagement with the guidelines to enable appropriate referrals to rheumatology teams. Therefore, complex clinical decision making is a key aspect of professional practice for specialist and generalist practice. The findings from the focus group

and literature appear to suggest NICE clinical guidelines (DH 2016) are seen as the standard by which foot care services are assessed and judged, making them an influential factor in competing with research for the implementation of evidence-based practice.

When it comes to considering the adoption of new knowledge and skills into professional practice - this should be driven by evidence. The use of research evidence in clinical practice can be difficult to translate, however this seems to have been achieved by the vehicle of clinical guidelines. In the UK national guidelines are produced by a well-respected organisation NICE and affiliated to the Department of Health. As such, some podiatrists appear to have readily accepted these as the standard for implementation in practice. This raises concerns about the ease with which practitioners are willing to accept the information in clinical guidelines. These documents are published and reviewed on a cycle with a lag period for the inclusion of most recent evidence. There is a missed opportunity for practitioners to challenge the content of guidelines in the knowledge that real world practice cannot be easily so defined or restricted to a pathway. This point is also made by Formosa (2016) who argues that clinical guidelines are based on limited low-quality evidence and calls for closer evaluation of the evidence included in screening guidelines. This reinforces the need for podiatrists to challenge how guidelines have come to dominate professional practice and ask what impact they have had on service transformations. However, for these podiatrists working in professional practice they communicated a need for guidance to enable them to manage evidence. Whilst Sackett (2000) condemned the use of cook book medicine, Greenhalgh (2017) has recently published on the implementation of evidence based practice. As a prolific writer in evidence based healthcare, the emergence of this book suggests there is a need to provide some support for practitioners in how to manage and apply evidence in clinical practice. This is echoed in the findings by Williams (2013) study in the use of clinical guidelines for rheumatoid arthritis. Therefore, understanding of how to manage evidence may be a common issue for a number of healthcare professionals.

10.6.3 Influence on podiatry - health policy

The Five Year Forward View (NHS England, 2014) set out a vision for the NHS with revised models of care. The Long-Term Plan 2019 (NHS England 2019) continued to embrace the

philosophies of the FYFV and expanded on the models by advocating more collaboration of healthcare professions and promoting the importance of effective leadership in achieving good outcomes. The impact of these policies required podiatrists to engage with transformation and redesign of services affecting both the provider of care and the patient receiving care. For the profession of podiatry, being able to respond to these external influences requires the skills to implement change in their real-world environment. Therefore, to harmonise service provision there is a need to understand the strategies employed by podiatrists in professional practice for responding to external social influences.

The Five Year Forward View (NHS England, 2014) proposed that over a 5 year period healthcare services should look at new models of care, increased prevention and public health with evaluation and redesign of services to improve efficiency. The review provided clear messages for health and social care services (including podiatry) to become more agile and flexible to respond to local needs.

For existing professional practice, Farndon's (2016) survey provided a snapshot view of patient characteristics managed by the UK podiatry workforce. This demographic evaluation suggests podiatrists are engaged with managing patients with complex health issues and multiple medical conditions. The most frequent were diabetes (19%), osteoarthritis (16%) and heart disease/disorders (13%). These conditions reflect some of the UK's recognised long-term health conditions which are high on the national public health agenda. Despite this, Farndon's study found only 6% of patients were given public health advice. Perhaps this is a limitation of the survey design with public health being only an itemised treatment option. Increasing engagement with Public Health agencies may be important for planning the future of the podiatry profession. Also important for future planning is understanding the impact of national health trends and population projections. In 2018, Public Health England published the Health Profile for England which included population projections from the Office for National Statistics. In 2017, the percentage of the population aged 85 and over was 1.35 million, which is 2.7 times greater than in 1971. By 2023, the number of people aged 85 and over is expected to rise to 1.54 million. The size of the population at the older age bracket is important for podiatrists, as older people are more likely to develop dementia, diabetes and MSK conditions (Public Health England 2018). These conditions and the upward trend in

obesity will continue the increased demand for health and social care, including podiatry services.

10.6.4 Influence on podiatry - organisation, workplace and role boundaries

Podiatry graduates transitioning into the workplace have to develop real world professional practice skills and respond to the external influencing factors impacting on practice. The organisation of the work environment and the factors influencing how podiatrists operate are important aspects of professional practice. Currently, there is a lack of evidence in the literature of the views from podiatrists on the internal and external influences that drive podiatry professional practice. Lack of narrative and discussion within the literature from the perspective of podiatrists is a risk for the podiatry profession because employers' expectations and public awareness of national health policy will impact on services delivered by professionals. This has the potential to create disparity between key stakeholders in the organisation and delivery of care from podiatrists.

Professionals' practice has to be responsive to organisational changes which impacts on role boundaries. Nancarrow and Borthwick (2005) analysed the dynamic boundaries in the healthcare workforce. She emphasised how the impact of dynamic boundaries between disciplines had a direct impact on the workforce in healthcare. This study proposed a number of directions that the workforce could change and the implications of these changes in healthcare practice. Within podiatry there has been a significant blurring of role boundaries and extension of role boundaries in the last decade. This was explored by Stressing and Borthwick (2014) who carried out focus groups and interviews within the professional body of podiatry to better understand the impact of role flexibility on general podiatry practice. The views of the participants were that the emphasis in the NHS was on enhanced specialised roles with generalised podiatry perceived to be gradually moving towards the private sector. The significance of organisational culture, needs, service provision and professional practice has been explored by Nancarrow and Borthwick (2005). She suggests professional practice has to be responsive to organisational changes as it impacts on professional role boundaries with an increased blurring of professional roles. This is an important concept for podiatrists to grasp, as Nancarrow and Borthwick's (2005) analysis of dynamic boundaries between disciplines,

suggests it has a direct impact on the workforce in healthcare. Changes in professional roles for podiatrists have been evident in the last few decades. Given the outcome from Stressing's (2014) work, Nancarrow and Borthwick's (2005) earlier recommendations may underestimate the current complex reality of podiatry roles in the UK.

10.6.5 Influence on podiatry - identity, status and specialist roles

Du Toit (2011) suggests for a professional programme such as podiatry, professional identity is apparent as early as twelve weeks into the programme. Babaro-Brown also referring to professional identity, states there are influences on how a podiatrist develops as a professional. These influences may be positive or negative and situated internally or externally to the profession. Understanding how identify, status, leadership and specialist roles impact on professional practice is important for student podiatrists but also to appreciate whether professional experience influences professional identity and professional opinions. The impact of specialism with the profession of podiatry has been discussed by Bacon and Borthwick (2011) and Davies (2015) this has importance for visibility of effective leadership and role models for succession planning and the next generation of podiatrists.

Within a profession such as podiatry, the motivation to develop a social identity with a specialist group offers status and prestige (Babaro-Brown 2013). This aligns with Stressing's findings which suggested that specialist roles within podiatry are perceived to have a high status and are desirable, with a perception that generalist roles were low status.

10.7 The influence of workforce planning

Scenario planning for diabetes services was highlighted by McCardle (2008), in relation to maximising capabilities of the podiatry workforce, as a way forward for services in diabetic foot care. The model of podiatry led specialist footcare services has significant impact, as diabetes-related lower limb amputation reduction is correlated with effective foot care services provision (McCardle, 2008). In addition, a recent systematic review (Edwards et al 2017) examined the recommended evidence for the management of foot health for chronic long-term conditions. The highest proportion of guidelines and recommendations were for

diabetes foot health. Specialist areas such as rheumatology musculoskeletal assessment and podiatric surgery had significantly lower levels of research evidence, guidelines and recommendations. The repercussions of low levels of evidence in some specialist areas may have a detrimental impact on the sustainability of podiatrist's professional involvement in specialisms such as MSK services. This is despite strong evidence of the need for MSK services, with general MSK conditions accounting for 22.1% of total burden of morbidity (Global burden of disease, 2016). Regardless, only 1 in 5 people consult their GP about MSK problems. This pattern of under reporting is mirrored in MSK foot problems. According to Menz (2010), there may also be an unmet need for podiatry led MSK services. In this study, 40% of the sample reported foot pain, but only a quarter sought consultation. The findings from Menz's study suggest a number of factors influenced their participants decision not to consult about foot pain. Similarly, McCulloch, Borthwick, Redmond, Edwards and Villaneuva (2018) interviewed podiatrists to understand the barriers to provision of podiatry services for people living with arthritis and foot problems. The study concluded that improving understanding about the effectiveness of podiatry for key stakeholders and service users was vital for improving eligibility for care, transformation of services and to sustain ability of the profession.

The profile of professional practice for podiatrists may be reflected in the increased incidence of chronic long-term health conditions which represent a global health burden. This may have influenced the trajectory of professional development within podiatry, with the emergence of specialist posts and specialisms in diabetes, rheumatology and musculoskeletal care, podiatric surgery.

10.8 Reflection on podiatry professional practice

Contemporary literature suggests that the following factors are influential upon podiatric practice; identity of self, (Du Toit, 2011; Barbaro-Brown, 2015) status (Vernon et al , 2005; Borthwick, 2009) charismatic leadership (Bacon and Borthwick, 2013) and specialist roles (Davies, Bennett, Nancarrow and Cuesta- Vargos, 2015).

It was apparent from the focus groups and narrative review of literature that professional specialities and fragmentation of services within the NHS had created silos within silos. This realisation is a culture that the group identified with. The literature suggests there may be

some influences on podiatrists' ways of working and common assumptions in certain specialist practice. The literature also revealed some potential for professional dichotomies regarding role boundaries within the profession but with little discussion on how to resolve aspects of professional growth and development. This finding from the literature is significant for professional practice as it embodies the principles of reflection in practice and embraces the need to change and respond to workforce and role developments. The concept of professionalism within healthcare has received some attention as a complex concept (Burford et al, 2014). The professional practice of doctors, nurses and allied healthcare practitioners will share some cultural characteristics due to commonality of delivering and managing services around patient care. However, whilst the multi professional practitioners may share cultural characteristics, there may be some unique professional features with distinctively different ways of working for podiatrists.

The evidence that characterises elements of professional practice for podiatrists is relatively low. In addition, there is little understanding of individual podiatrist's experience of modern professional practice in the UK. This study will aim to provide better understanding of the complexities of professionalism and factors influencing contemporary podiatry practice.

10.8.1 Conclusions from the narrative review

The literature suggests that as the profession matures, develops and diversifies, there continues to be opportunities for podiatrists to provide care in both the private and public health sectors. Standards from the professional bodies state it is essential that podiatrists remain current with research evidence for their professional practice. It would seem advantageous for podiatrists to understand changing health policy and public health needs, be acquainted with transformative service models and organisational needs through effective leadership. In addition, it seems essential podiatrists respond to the fast growing influence of social media and marketing of professional services. The influence of social media and having a digital professional profile is fast becoming a desirable expectation of health care professionals.

Despite these observations from the literature, there are no reports of the experience of podiatrists who work within these current complex environments of professional practice. Therefore, there is a need to look at the real-life experience of professional practice from the perspective of podiatrists. This requires the design of a study aiming to provide better understanding of the complexities of professionalism and factors influencing contemporary podiatry practice.

10.9. Translating the narrative review and focus group themes into a conceptual framework

The findings from the narrative review of literature was compared with the focus group themes relating to professional practice and four key aspects emerged: responding to external social influences, clinical decision making, managing evidence and reflective practice. These aspects will be considered as the corner stones of professional practice. The interrelationship of the cornerstones of professional practice and the focus group findings can be seen in Figure 5.

Figure 5 The conceptual framework for professional practice.

This shows the interconnected relationship between the four focus group themes and how these relate to the four cornerstones of professional practice. "This is the real-world" practice relates to responding to external social influences and clinical decision making. "We need a recipe book" relates to managing evidence and "the awakening" relates to reflective practice.



The role and purpose of the framework is to draw together the professional practice themes from the focus group and the findings from the narrative review of literature on professional practice. The philosophy and attributes reflected in the conceptual framework should align to the scope of practice for the professional discipline of podiatry. The conceptual framework cornerstones should embrace professional values but allow for development and improvement and professional growth. Within the four cornerstones there may be supplementary issues and personal attributes which will aid understanding of professional practice. Therefore, the conceptual framework will assist in forming the basis of exploring a research design which aims to better understand professional practice.

10.9.1 Using the conceptual framework to design a study for professional practice.

In order to develop a research design, the term 'professional practice' will be examined, it will be important to understand what professional practice is as a concept for podiatrists, whilst also incorporating how professionalism operates at an individual level. The study will use the four cornerstones of the conceptual framework as a guide to develop the research questions which will be answered in the study. Professional practice in the context of this research

relates to the nature and scope of work the podiatrists undertake as defined by their role and type of service. The research approach aims to understand the influences on professional practice by exploring the nature of podiatrists' lived experience in the context of their workplace and service provision.

10.9.2 Justifying the need for a professional practice study

The practice of podiatry has developed rapidly over the last few decades and the increasing profile of public health polices provides more opportunity for the professional scope of practice to progress. The implications of this are the need to understand what knowledge, skills and attitudes are required in podiatry practice to effectively navigate the complex and frequently changing landscape of healthcare.

The practice of health care is complex and frequently involves a number of individual practitioners, in a number of settings, using a range of interventions. In order to understand podiatry professional practice, it is essential to look at how individual practitioners identify with the profession. The experience of practitioners in relation to professional practice offers a new position to better understand delivery of care to the patient, where quality can be being monitored, evaluated and improved.

The educational model for the profession of podiatry is in a state of flux in England, with employers and educational organisations discussing and deploying strategies to shift from a University based curriculum to an apprenticeship model. This means on the one hand, the profession is poised to move forward and develop, on the other hand, it is potentially under threat from the changing structures in the NHS in health care finance and delivery. These views are especially relevant to professional practice as the review of skill mix in the NHS continues with a growing presence of associate practitioners for AHP's and the nursing profession.

It could be argued that it is impossible to understand the profession of podiatry when the definition of the scope of practice in podiatry itself is unclear.

Development of research which has purposely sought podiatry views and experiences of professional practice is a fairly recent trend. This is demonstrated by the dearth of literature

in professional journals, most literature appearing in the last two decades. The perspectives of podiatry experience of professional practice remains a novel concept which justifies further examination.

The profession is currently being challenged in many ways and the quality of podiatry services is of central importance to those who deliver and receive the service. The value of podiatry in specialist areas such as diabetes and MSK has been demonstrated by McCardle (2008) and McCulloch (2018) and these examples are important in reflecting what podiatry services can achieve. The appeal of professional practice should not be overlooked as the outcomes and quality of the podiatry service delivered is ultimately the way by which a service and profession is judged and valued. The profession of podiatry must be able to demonstrate unequivocally that it delivers a high-quality service with sound quality assurance strategies, allowing its services to be measured. Having a high-quality service strategy is vital to enable the profession of podiatry to survive and remain firm in the field of health care.

To understand professional practice for podiatrists it is important to identify the aspects and explore how this may be expressed in order to understand how this can be used for professional growth and development. The shortage of literature on professional practice for podiatrists indicate more work is required to yield a better understanding of podiatry from a real-world perspective. This will offer further clarity for individuals who may benefit from gaining an insight into understanding the contemporary influences on professional practice for podiatrists.

Aim and purpose of the work:

This second phase of the study will explore the opinions, knowledge and beliefs of podiatrists in the context of their professional practice. Their views will be sought on the factors that influence their professional practice. This work will reveal views to aid understanding of the experience of working in professional practice and the perceived influences affecting service provision. Analysis of the findings will illustrate the level of consensus or disagreement between the interviewees to provide valuable insights into working practices. The outcomes

of the analysis will be compared to the proposed conceptual framework to assess for suitability.

Objectives

- To identify the opinions of podiatrists working in professional practice of their service provision
- To obtain insight into the opinions of podiatrists on managing evidence in professional practice
- To discover what kind of information affects clinical decision making during a podiatry consultation
- To explore what opportunities practitioners use to reflect on clinical practice
- To find out practitioner's views on external influences that drive service provision
- To understand the motivations and influences within the profession

Chapter 11

11.0 Methods - Professional Practice.

This chapter will introduce the method for exploring professional practice for podiatrists. It will provide an account of the ethics, consent, sampling and the process of data collection, transcription and analysis. It will explain how the six stages of the IPA method will be used following transcription to analyse and illustrate the findings.

11.1 Introduction to the method

The aim of this study was to understand the experiences of podiatrists with respect to professional practice.

The objectives of the study were to;

- 1) Undertake individual semi structured interviews of podiatrists stratified by experience.
- 2) To better understand professional role of podiatrists based on individual experiences
- 3) Identify the factors that influence professional practice for podiatrists.

11.1.1 Data collection tool semi structured interviews

The semi structured interview was selected as the data collection tool and an IPA approach was used to guide the structure and conduct of the interview and subsequent analysis process. For the researcher to produce a good quality interview with trustworthy findings, the starting position and assumptions of the underlying theory should be identified. For this study that begins with phenomenology, and this underpinning theory will guide the interview. Since the inception of IPA (Smith, 1996) the scope, growth and influence of IPA has grown nationally and internationally in professional fields beyond the origins of psychology. The use of IPA by Williams (2008) broke ground in providing a new perspective for researchers examining experiences in podiatry practice. In the spirit of IPA being used in a flexible and adaptive manner, other research podiatrists have been influenced by this approach, Hendry, Gibson, Pile, Taylor, DuToit, Burns and Rome (2012) Paton, Roberts, Bruce and Marsden (2014) Scott, Turner, Baird, Barn and Hendry (2015) Washington and Williams (2017) and Tan, Horobin and Tunprasert (2019)

In approaching this study from an IPA perspective, it assumed the understanding of professional practice for podiatrists is best understood by accessing the space between the podiatrist's experience and myself as the researcher; it is in this space the attempt was made to interpret and gain insight into the world of podiatrists. Doing this work is essential, because it is also the audience who are as important as the participants and researcher in adding an interpretation to the understanding of professional practice. In carrying out this study, it will be assumed that there are several interpretations to every question. As such, it will be assumed there is no universal truth or lie and no singularity considered as a definitive reflection of professional practice.

11.2 Ethics

The ethical matters for the research method were considered in relation to the University research lone working code of practice (University of Salford 2006). Ethical approval procedures were adhered to according to the University academic ethics policy (University of Salford, 2017) and completion of the necessary ethics processes was undertaken as specified by the authors' institutional guidance in the University of Salford ethics approval framework. A summary of the institutional ethics processes can be seen in Appendix 11. Relevant risk assessments were considered for the research study in line with the institutional policies to safeguard against any significant risk to the researcher or participant during or after the process of carrying out the research (University of Salford, 2014). This includes date and version-controlled identification. Together, these documents outlined the requirements in relation to completion of the ethics form, consent form (see Appendix 7) generation of a data collection tool, risk assessment form and patient information sheets (see Appendix 6).

These institutional documents formed the standard requirements of the researcher including date and version-controlled identification.

Relevant risk assessments were considered for the research study to safeguard against any significant risk to the researcher or participant during and after the process of carrying out the research. All relevant research documentation, including paper information which included personal details of participants was stored securely in a lockable filing cabinet and electronic

data was password protected and stored on the institutional secure drive. Pseudonyms were allocated to each participant to respect their personal anonymity.

11.2.1 Key ethical concepts for semi structured interview

Use of semi structured interviews permits a detailed engagement with a small sample size. The intimacy of the one to one conversation permits an environment in which the participant can express their thoughts and feelings to the researcher.

The interplay between the interviewer and interviewee requires careful management to encourage disclosure of personal stories from experience, whilst also anticipating any risk of discomfort in sharing these stories. Interviews require the cultivation of conversational skills, requiring curiosity and enthusiasm, but not intrusion.

Although it was accepted that no harm would come to the participants as a result of being recruited to the study, discussion of experiences in professional practice may induce some feelings of discomfort during the interview process. The interview approach allowed time for participants to think, reflect and speak without interruption. Also present was the freedom to pause, suspend or terminate the interview at any time during the conversation.

It was also important to acknowledge the ethical responsibility of the researcher to respect the pre-existing professional relationship between the participants and researcher. This is sometimes referred to as relational ethics and may have an influence on the conduct of the interviews and the analysis and interpretation of the findings. It may raise concerns about a risk of response bias of the interviewer. The benefits of a pre-existing relationship between researcher and participant can help secure a rapid rapport in the interview process. A further benefit of the shared professional background is a common understanding of the phenomena being researched.

The researcher would use skills developed from her own professional experience in crafting the interviews to ensure any pre-existing relationships with participants was leveraged into trust and respect during the interviews. Kvale (2007) emphasizes that in this process,

qualitative interviewers must act either as miners who work as collectors of knowledge, or as travellers that construct knowledge in social processes.

11.3 Sampling

The sampling design aimed to recruit a heterogenous group; this was favoured as it would provide a broader perspective on speciality areas in the discussion. A diverse range of employment grades was desirable in recruitment in order to gather experience from a range of roles. Podiatrists were the preferred choice of participants to recruit to the research study.

11.3.1 Sampling framework

A purposive sample framework considered the demographics of participants, and included the following characteristics; a mixed gender group, different amounts of experience, specialist scope of practice, non-specialist scope of practice, employed in different NHS locations.

11.3.2 Recruitment process

Following ethical approval from the University of Salford (HSR1617-161), (see Appendix 12) members of the specialist interest groups diabetes, rheumatology, biomechanics (n=50) were provided with an electronic invitation letter and participant information leaflet. The letter invited them to participate in an interview, provided contact details of the researcher and invited those interested in participating to ask questions about the study.

Participants were podiatrists from North West England podiatry special interest groups.

A purposive sampling framework was used to strategically sample podiatrists from different groups with different levels of experience across speciality and non-speciality areas of clinical practice.

The demographics of the participants were a mixed gender group, with podiatry experience spanning 1-25 years, based in general, diabetes and MSK practice in different NHS locations. Participants were all aged over 21 years, able to read and speak English and able to provide written consent.

11.4 Procedure

Through the intense process of exploring the topic of professional practice and being immersed in the education of podiatrists, the researcher had evolving knowledge on the subject. The IPA approach fully acknowledges the influences of the researcher's experience and how her knowledge is a fundamental aspect of interpretation of the findings. Findlay (2009) suggests undertaking phenomenological research is like going on a voyage of discovery whereby researchers do not always know where it may take them.

For IPA the participant is the "experiential expert" and the interview process will be conducted in a manner that facilitates the participant in leading the conversation. The aim of this approach is to allow the interviewer to enter the participants' lifeworld and to help create a comfortable interaction.

The interview procedure includes questions generated in the form of an interview guide which has several benefits. An interview guide would mitigate the risk of difficulties that might be encountered such as participants who are reserved in their responses. It could be used if interviewees conversation digressed from the research question being asked. The guide would be used flexibly in the interview process allowing an approach suited to the interviewee's style of response. The sequence of the questions would be changed depending on the response of the interviewee.

The interviewer will demonstrate attentive listening skills and the ability to employ appropriate use of probes to learn about the lifeworld of the participants. This is to ensure there is a depth to the conversation with participants otherwise there is a danger of the data being too thin for analysis.

The participants experiential expertise is the sole focus of attention for the interviews and as such the interviewer will be focussing on the responses from the participants and refraining from expressing her view which may impose the researcher's pre-existing concerns or views on the participant.

The aim of this careful planning and preparation prior to conducting the interview is to assist the participant to move to a response which permits disclosure of experiences which include authentic and affective dimensions.

11.4.1 Operational plan

The semi structured interviews were led using questions developed from themes within the literature on professional practice. Additional prompts created by the researcher were agreed with the supervision team. The interviews took place in a familiar quiet environment to provide time and space permitting individuals the freedom to express their unique experiences of podiatry practice.

11.4.2 Interview questions

- 1) Can you tell me about your current job role please?
- 2) What are the kinds of patients you treat?
- 3) Can you explain what factors influence your practice?
 - What do you do day to day as a podiatrist?
 - Tell me about your service provision?
 - Can you identify any barriers? Limitations?
 - Can you identify any positive influences?
- 4) In your opinion what are the professional influences that affect podiatry practice?
 - E.g. professional bodies or others?
- 5) In your opinion what are the other external influences affect podiatry practice?
 - E.g. independent bodies professional groups policies or guidelines
- 6) In your opinion, what are the priorities in podiatry practice?
- 7) In your view, how does podiatry practice need to develop?
- 8) What do you feel you need to develop your professional practice?
- 9) Are there any questions you expected me to ask today that I didn't?
- 10) Do you have any questions for me?

11.5 Transcription protocol

The researcher transcribed the digital recording of the interviews aiding familiarisation with the focus group conversation. Transcription was verbatim, whereby every utterance was captured and recorded. This included false starts and stutters, repetitions, speech patterns, ("you know", "like") and remarks such as "right", "yeah" by both interviewer and participants. Also included was time line for pauses, laughter, interruptions and personal comments. Additionally, protocols for preserving anonymity and confidentiality were applied.

A verification process with participants post transcription of the interviews was employed to ensure participants were satisfied the transcript was a true representation of the conversation. Pseudonyms were used to represent the individual participants. The participants individually and independently verified the transcription to support the trustworthiness of the data and no amendments were made.

11.6 Data analysis

Following transcription, the data analysis utilised the stages outlined in the Interpretative phenomenological analysis approach (Smith, Flowers and Larkin, 2009).

The IPA six stage approach was selected to provide transparency in the process of actively identifying and developing the main themes within the transcript (see Table 26). The interpretation of the transcript was theoretically sensitized to the IPA principles of phenomenology (Smith et al 2009) hermeneutics (Friesen, 2012) and idiography (Larkin, 2006). This part of the analysis process attempts to understand what matters to the individual participants as inspired by their life world, thereby offering a strong experiential perspective.

Data was analysed using the six stages IPA approach (see Table 26).

Table 26 Six Stages of IPA analysis

Six Stages of Analysis (Smith et al, 2009)
1 - Reading and re-reading transcripts and listening and re-listening to recordings
2 - Initial noting
3 - Developing emergent themes
4 - Searching for connections across emergent themes
5 - Moving to the next interview
6 - Looking for patterns and themes across the interviews

Interpretative Phenomenological Analysis (IPA) was used as a dynamic process in which to view the individual participant's experience; the researcher's experience would be actively employed in the interpretation process to make sense of the participant's sense making (Smith et al., 2009).

Initial data analysis would involve reading and re- reading the participant's own reflection of experiential practice in order to identify developing themes. It was then possible to interpret them in the relevant and wider context of professional practice.

The IPA method employed would be an iterative process with sensitivity given to the individual and any converging cross case themes. Manual identification of themes using a print out of transcripts and coloured pens would be used as a method of analysing themes rather than using electronic software packages. The transcripts would be visited multiple times, each time

going back and forth within the data to identify the nuances of language within the transcript. This is consistent with the hermeneutic principle of interpreting the text or written word.

11.7 Reflexivity

The process of analysis should also include reference to the researcher's reflective diary to ensure the findings from the interview transcripts were developed truthfully from the data. Incorporating reflexivity in the analysis was included to increase the credibility of the interview findings by capturing an authentic account of the researcher's assumptions and reflections (Shaw 2010). This approach is commonly used as a strategy in IPA analysis (Smith et al, 2009) to further increase the trustworthiness of the interview data. This supplementary step adds to the dependability and confirmability of the researcher's analysis process (Tomkins and Eatough 2010).

The researcher had some common professional identity with the participants as a podiatrist and the researcher recognised and respected that the participant's knowledge and opinion would take precedence over the objectives of the study. The reflective diary would be an effective vehicle to enable the researcher to draw on her own reflections as a podiatrist. It would also provide an opportunity to capture the researcher's experience in professional practice. Thus, the researcher could acknowledge awareness of her own thoughts and feelings on the responses to the questions and how this could bias the conduct of the research. Silverman (2013) supports the use of a reflective diary being maintained by qualitative researchers in order to help recognise and map any thoughts or feelings which could sway the direction of the study.

11.7.1 Summary

The researcher was conscious of the strengths of semi structured interviews as a qualitative research method in the health disciplines in trying to grasp a better understanding from its participants. However, she was also aware that the interaction only gives a snapshot of the participants' experience. Therefore, the researcher would bear in mind the data from

interviews will not be held to be the truth, but a meaningful interpretation of the experience of the participant set in a time bound and person bound context.

Chapter 12

12.0 Findings of interviews – professional practice

This chapter will present the findings of the individual interviews. The findings will be presented as themes emerging from the interview transcriptions. Cross case themes will be presented first which represent convergence between participants, finally divergent themes will be presented.

This aim of this chapter is to present the findings from the interviews. The interview transcripts were analysed using an IPA approach. Tables will be used to offer a transparent account of the iterative data analysis process and emergence of themes.

Interpretation of themes was undertaken using the methods embedded within an IPA approach. The interpretation of findings will be presented in the discussion chapter to allow comparison with the literature review findings.

12.1 Participant demographics

The demographics of the interview participants are provided to identify the individual's workplace role and responsibility and an appreciation of the experience of individuals in the focus group. By providing a comprehensive account of the individuals, it gives an indication of their characteristics prior to analysis of the transcript. This enables a transparent presentation of the findings in acknowledging any characteristics of individuals and how it may have influenced the nature of the responses.

The demographics provide some important perspective on the range of experience in the group. The range of experience in the group was between 4 months and 25 years. This broad range of experience was valuable as it provided sufficient heterogeneity to gain insight into

low and high levels of experience. The roles and responsibilities range from individual people operating at a high level of professional responsibility for leading and managing, through to newly appointed individuals in the public NHS sector. The caseloads of individuals were important to understand the context of the services the individual was involved with and the proportion devoted to specialist care. As such the range of participant roles provides a credible and authentic distribution of typical positions podiatrists carry out within the public sector workplace. This was important to gain a broad perspective of professional practice. The participants hold qualifications ranging from Diploma, to Honours degrees and Masters degrees. This range of qualifications creates a broad range of experience and knowledge from which to interpret findings and develop a better understanding of professional practice for podiatrists. Each participant was assigned a pseudonym.

The tables in this section are used to display the iterative process of emerging themes for the five participants. Cross case themes show areas of commonality which stem from the individual participant themes. Demographic information and the professional background of the participant gives an important context to the experiences of podiatry practice (See Table 27).

Table 27 Demographics of participants for professional practice interviews

<i>Pseudonym</i>	<i>Background of professional experience</i>
<i>Stuart</i>	<i>Specialist practitioner in orthopaedic triage and has over 25 years' experience in the MSK field.</i>
<i>Matthew</i>	<i>General podiatry practice and high-risk patients and has 9 years' experience and undertakes some private practice work.</i>
<i>Layla</i>	<i>Graduate podiatrist and works in general podiatry practice and has begun undertaking some private practice work, 4 months experience.</i>
<i>Julie</i>	<i>Specialist practitioner in orthopaedic triage and has over 15 years' experience in the MSK field.</i>
<i>Fiona</i>	<i>Podiatry practice which is largely high-risk patients, has 5 years' experience and undertakes some private practice work.</i>

12.2 Assumptions of the researcher prior to analysis

Given the identification of themes from the narrative literature review on professional practice, there were some assumptions held by the researcher about issues that would arise; these and the researcher's thoughts were captured in a reflective diary (see Appendix 10).

12.3 IPA stages of Analysis

The six stages of IPA (Smith et al, 2009) were used in the analysis of interview transcripts. Application of Stages 1 – 4 allowed an in depth understanding of Stuart's transcript as the first case. Four initial themes were identified from Stuart using cluster words to understand the importance and connection within each theme. Names were given to the themes reflecting what mattered to the individuals. The analysis of transcripts for Matthew, Layla, Julie and Fiona followed the same stages as Stuart.

Stage 1 Reading and re-reading.

- Reading and re-reading was essential to become familiar with the first narrative from Stuart. Listening to and reading the transcript was necessary to begin the process of understanding the individual perspective of professional practice.
- In knowing the researcher was a podiatrist, Stuart talked freely, openly and frankly about his real-world working practice with a lack of inhibition in the conversation.
- The nuances and emotions relating to the choice of descriptions was evident.

Stage 2 Initial noting.

- The researcher generated cluster words for the interview with Stuart which illustrated the content of the conversation, and helped discover key characteristics in the data and issues discussed.

- Provisional noting, highlighting and comments were identified in the transcript to aid analysis.

3 Developing emergent themes

- The cluster words were developed into themes for Stuart.
- Mapping of the cluster words helped discover which characteristics were appearing within the transcript. This contributed to theme development, reflecting current issues in professional practice
- The emergent themes arose from gathering descriptions of similar characteristics
- The descriptions and linguistics make a connection with how Stuart used language

4 Searching for connections across themes:

- The researcher captured connecting language from the transcript to the themes
- The professional working context of Stuart formed an important part of the analysis.
- Quotes emerging from Stuart served to sum up common concepts and thus themes (see Table 29) These quotes illustrate a true and faithful representation of the conversation

Stage 5 Moving to the next case.

- Initially the descriptions and emergent themes from Stuarts transcript was developed
- The researcher then considered other individuals.
- The process of 1-4 was then repeated for the other individual interviews.
- Reviewing the individual responses was important to the IPA process to reflect the idiographic dimension of the IPA approach.

Stage 6 Looking for patterns across cases.

- The naming and refining of individual themes were achieved by

1) Searching for patterns across the individual participants

2) Review of the researcher's reflective diary

This strategy served to illuminate the issues within the themes.

Analysing individual responses and exploring significant quotes in a professional context helped better identify broader connections between the themes.

These finalised themes provide a true and faithful representation of the interviews

Table 28 Cluster words and initial themes for participants

This table shows how the cluster of words from the interview transcript related to the initial interview themes for each participant.

Stuart	Theme 1 Service	Theme 2 Specialise	Theme 3 Influence	Theme 4 Scrutiny
Cluster words	<i>service, treatment, pressures, MSK adapt, improve</i>	<i>role, individual, experience, speciality, leader, skills guidelines,</i>	<i>opportunities, team, targets, public health, social media, guidelines, education</i>	<i>perception, frustration, lack of understanding, being scrutinised, patient care, future career</i>
Matthew	Theme 1 Team	Theme 2 Identity	Theme 3 Experience	Theme 4 Opportunities
Cluster words	<i>management, leader, office politics.</i>	<i>High risk service, lack of leadership, frustration, inefficiency, wounds</i>	<i>influences, skills, knowledge, confidence, MSK perception</i>	<i>education, professional growth private practice, identity</i>
Layla	Theme 1 Expectations	Theme 2 Confidence	Theme 3 Service	Theme 4 Influences
Cluster words	<i>processes, systems and guidelines, time</i>	<i>role, identity, perception, leader, mentor, team, knowledge ability</i>	<i>public health, speciality, barriers opportunities education</i>	<i>social media, patient, story, private practice, future reflection</i>
Julie	Theme 1 Service	Theme 2 Expectations	Theme 3 Role model	Theme 4 Team
Cluster words	<i>MSK service, referral, high risk, podiatry</i>	<i>diabetes, complaints, patient surgery, challenges</i>	<i>footwear, gender barriers, frustrations change, resentment</i>	<i>cost, positive, guidelines self-development, reflection, GP</i>
Fiona	Theme 1 Patients	Theme 2 Personality	Theme 3 Influences	Theme 4 Development
Cluster words	<i>service treatment experience influence people</i>	<i>identity experience time education of patients, service, skills cost</i>	<i>responsibility, process, professional as an educator, students</i>	<i>role of leaders, personal learning style, personal development needs, social media</i>

The initial themes in table 28 were examined in relation to the transcript and reviewed as part of the iterative IPA approach (Eatough, Smith in Willig and Stainton-Rogers 2010) and to give voice and provide some interpretation (Larkin 2006) of the theme. The second iteration of the themes provides more meaning and gives a better understanding of what mattered to each individual in the context of podiatry practice as recommended by Eatough (2010). It also served to search for connections between the themes as indicated in the IPA six stage process (Smith et al, 2009). The final themes for individual participants are illustrated in Table 29.

Table 29 Final themes for the participants

This table shows the final themes from the interview transcript for each participant.

	Final Theme 1	Final Theme 2	Final Theme 3	Final Theme 4
Stuart	It's all about the service	Specialisation is key	Lots of changing influences	Dealing with scrutiny
Matthew	Team talk	Woundcare, again!	It's a catch 22	
Layla	Process and systems	Grappling with confidence	What does it look like?	
Julie	Service silos	Give them what they want		Walking on quicksand
Fiona	Sharing patient stories	It's all personal	People are important	Not doing enough

The results of the analysis are presented in Table 30 for individual participants, in addition to cross-case themes, which are convergent themes common to the participants. Exemplars in the form of quotes will be used to illustrate each theme and demonstrate truthfulness of the data in the discussion (see Chapter 13). Divergent themes are represented as boxes with no asterisk, these demonstrate issues which have an individual meaning to the participants.

Table 30 Individual participant themes and how they relate to three cross case themes

*This table shows how the individual themes relate to the three cross case themes – as indicated by asteriks 1) * 2) ** and 3) ****

Pseudonym	Theme 1	Theme 2	Theme 3	Theme 4	Cross case themes
Stuart	It's all about the service	Specialisation is key*	changing influences**	Dealing with scrutiny***	1.Safe in our silos* 2.Stretching and sense making** 3.Steering or sailing?**
Matthew	Team work **	Wound care, again!*	It's a catch 22		
Layla	Process and systems*	Grappling with confidence***	What does it look like? **		
Julie	Service silos*	Give them what they want***	Walking on quicksand**		
Fiona	Patient stories**	It's all personal	Our work culture*	Not doing enough***	

Table 31 Collective themes from participants and cross case themes

This table shows a merging of the convergent themes represented as cross case themes

Collective themes from participants	Cross case themes
Specialisation is key, * Wound care again! Processes and systems, Service silo's, Our work culture	Safe in our silos
Changing influences ** Team talks What does it look like? Walking on quicksand Patient stories	Stretching or sense making
Dealing with scrutiny and strategies *** Grappling with confidence Give them what they want Not doing enough	Steering or sailing

Table 32 Evidence from the literature and superordinate themes

This table shows the association between evidence from the literature and the cross-case themes.

Evidence theme from the literature	Superordinate themes
Status (Vernon et al, 2005, Borthwick 2009) Identify of self (Du Toit, 2011) Specialisation (Davies, 2015) Autonomy (McIntyre, 2015)	Safe in our silos
Blurring of roles (Nancarrow and Borthwick, 2005) Changing influences (Borthwick, 2009) Workforce issues (Stressing and Borthwick, 2014)	Stretching and sense making
Charismatic leadership (Bacon and Borthwick, 2013) Scenario planning (McCardle,2008) New opportunities in MSK (Menz, 2010) Podiatry and arthritis care (McCulloch et al , 2018)	Steering or sailing?

Chapter 13

13.0 Discussion of interview findings

This chapter will employ the tenets of IPA namely idiographic, phenomenological and interpretive analysis to give voice to the individual participants and make sense of the themes. The cross-case themes will be interpreted to understand the meaning in relation to the literature on professional practice. Finally, the findings will be explored to establish their relevance to the participants in the practice setting.

In the fragmented world of service provision, it is challenging to present an answer to the full range of influences on a professional practice. However, the findings present some interesting perspectives on practice, which can illustrate the complex skills and knowledge required in podiatry practice.

This discussion affords a deeper examination of the interview themes identified in the findings. It interprets the influences on the participants in professional practice. The interpretation in this discussion also attends to the thematic issues in relation to the research question, providing an opportunity to consider the impact of discord between research evidence, national and local policies and the practical reality of current podiatry practice. Observations made from the researcher's reflective diaries helped illuminate the human stories behind the participants responses which was captured in the individual themes and superordinate themes, reflecting optimism and aspirations, despair and frustrations. Several of the participants reflected on their conversation after the interview, commenting on how liberating it was to have the opportunity to discuss being a podiatrist and current issues in their practice.

13.1 Discussion of themes for individual participants.

13.1.1 Stuart's Story

Stuart's conversation focused on service design and specialist service provision, reflecting the theme "It's all about the service". His role and responsibilities were in an MSK specialist service and he compared himself to a medic, employing orthopaedic triage skills, reflecting a

high status and expertise. Aspiring to high status roles was identified by Vernon et al (2005) Borthwick (2009) and Stressing and Borthwick (2014) as desirable in professional practice for podiatrists. However, Stuart's conversation suggested the consequences of senior status are higher expectations of service quality and greater personal scrutiny. Stuart was alert to organisational needs and the need to influence clinical quality. This translated to what he described as "pressures" of the service. He normalised these pressures as part of the routine expectations of his job.

"There's erm, pressures in our service to make sure that we are doing things correctly because we are taking the role of what would normally be a medic"

Stuart had clear views about the culture of practice within the MSK speciality, suggesting evidence from research papers influenced practice because MSK guidelines were, "not as good" compared to diabetes and rheumatology clinical guidelines. This view resonated with the thesis findings from the focus group, where clinical guidelines had a greater influence in diabetes specialist services. The use of clinical guidelines and influence on practice has been explored in rheumatology (Williams, 2013) but not across the specialist areas of diabetes, rheumatology and MSK.

Borthwick (2009), Bacon and Borthwick (2013) and Davies et al (2015) independently identified how specialisation in podiatry has positively assisted the development of the profession. Stuart's status as MSK specialist was a reflection of development in the profession, and whilst he was clear about the dynamic evolution of MSK specialist service from traditional podiatry services, he felt his managers had less understanding about these boundaries,

"when you get to a certain level of management, like we've got our team lead, and probably above that, the understanding of what we do is very grey. Even though we've been going a long time, cos we were quite a generalist specialist service and we're not a podiatry service and we're not a physio service, once you get to a certain level, managers struggle to see that".

The notion of role boundaries being dynamic in allied healthcare is not new and was previously considered by Nancarrow and Borthwick (2005) as a continuous feature of modern healthcare. Over a decade after this publication, Stuart described managers struggling to grasp this notion. Evolving professional roles were a feature of new models of care within the Five-Year Forward

View (NHS England 2014) and service redesigns will continue to impact on future podiatry roles. Stuart's views were shaped by his involvement in service redesign programmes, driven by strategies such as first contact practice (NHS England 2019). Stuart talked about the obstacles when writing new NHS service contracts. There was a sense of resistance in Stuart's tone of voice regarding newly proposed strategies, stemming from the lack of understanding about the specialist MSK service and how it had evolved,

“there's barriers and limitations when it comes to rewriting the contract. I can't do with them. They're trying to do something now which is just a bit...mad. But because there's some lack of understanding of what we've done, where we've come from, and what we actually do.”

Stuart was resistant to the concept of first contact practice (NHS England 2019) and expressed a concern that the agenda was incongruent with the service model he worked within. He suggested wider negative implications of the agenda on other professions, voicing concerns it would leave them isolated. Stuart suggested valuable peer support from related professionals would be lost for AHP's working as first contact practice within a GP surgery.

“...national agenda to look at AHPs as first line practitioners, mainly podiatry, mainly physio, for MSK, so they sit in a GP practice and see all the MSK patients. That doesn't really fit with our orthopaedic triaging. Because it's a step before that? But I don't think it's a great idea for any profession cos it leaves them very isolated”

In contrast to his views on first contact practice, Stuart appeared positive about the role of integrated care teams and appeared to see some tangible positive opportunities for podiatry to be “influencing” these teams, providing better care for patients with long term conditions.

13.1.2 Matthew's Story

Matthew's central theme was team talk, which impacted on his other themes. The conversation suggested Matthew struggled with people “causing trouble” in one of the teams in his workplace; he described them as being “unhappy”. Matthew spent time discussing the influence of the team, offering an example where it had directly impacted his opportunities and professional interest and ambitions in specialist biomechanics rotations. He was clearly uncomfortable with the team incompatibility, and despite not specifically challenging it, his tone of voice suggested frustration with established organisational culture and social norms

which permitted dominant behaviour of some team members. Until recently, the sociology of allied health professions and its impact on role boundaries had a relatively low profile in the research literature, however, Nancarrow and Borthwick (2005) and King et al (2018) have considered the impact for podiatrists. Matthew's experience suggested social norms within his department allowed repeated negative impact on professional and service development,

"and it was one, it was one, it sounds like I'm being really bitchy here...it just feels like I'm gossiping about someone that's not here, so with the biomechanics rotation, it was one person in particular made such a fuss that they were not getting through it at a time the whole thing just got pulled and no-one could do it. But that's happened before with other things"

Matthew talked about other people who he didn't know within the organisation, he referred to them as "the ones who make the decisions". For Matthew these people were not visible, and he believed this lack of transparent leadership was a problem for the service.

"I don't know who they are, I've never seen them they are just up there somewhere. Lack of leader is a big stumbling block in our service".

Matthew's special interest and preferred career direction was MSK. An interest or specialised aspect of practice appears to be an important dimension of professional practice for podiatrists. A survey by Davies et al (2015) identified MSK, diabetes and podo paediatrics as leading specialisms for Australian podiatrists, which reflects similar specialist domains of practice in the UK health sector. However, for Matthew, attaining MSK experience in his workplace was a barrier and two factors may be influential 1) working in a service where teams don't have harmonious relationships and 2) an absence of professional leadership. Despite seeking MSK experience, Matthew sounded mentally exhausted in his attempts to convince his team leader to facilitate experience in MSK clinics,

"With regards to if you wanted to expand the scope and you wanted to get into the MSK side of it, within the NHS that's just impossible. "

It was disheartening listening to Matthew's frustrations, partly because of the lack of MSK experience, but because he was undertaking work that didn't relate to his career aspirations. His dissatisfaction related to his workload being dominated by management of wound care in high risk groups,

"In the NHS it's just woundcare, woundcare, woundcare..."

Matthew felt the general public's opinion of the profession of podiatry was poor due to the high volume of generalist practice in his service. Matthew's view that generalist podiatry was a lower status role than specialist areas of MSK, Diabetes and Podiatric Surgery was expressed by podiatrists in Stressing and Borthwick's (2014) study. Perhaps Matthew's perception of generalist practice being low status was the catalyst in motivating him to pursue a Master's degree with a specialist MSK focus. Achieving the Masters would give him greater academic status, with currency to convince his manager of his vision to invest in services with a greater MSK focus in order to develop preventative roles for podiatrists.

"I think they should really try and ... our patients a lot more than just taking anyone and the MSK side, I know I'm a bit biased, but I think that would, I think that, as a preventative, would be huge really."

The conversation with Matthew concluded with him expressing his doubts that there would be service redesign or migration towards specialists' provision within his team. It seemed Matthew was resigned to working in a service dominated by generalist practice which aligned with the skill set of the team. Therefore, despite Matthew's aspirations for greater specialist MSK status, his needs were being oppressed by the dominance of other members of the team.

"If they just went specialist, they could lose three quarters of their staff straightaway which...can't happen."

13.1.3 Layla's story

Layla was a new graduate and her conversation reflected a desire to develop a sound understanding of the processes and systems in the healthcare system. Her inexperience and cautious approach meant she was grappling with gaining confidence in her abilities. Layla was concerned about struggling and, in her opinion, she was "suffering" from a lack of mentorship. The use of the word suffering suggests Layla was not finding it easy to integrate into her professional role and it was causing her some discomfort. Layla's experience suggests meeting organisational demands whilst understanding what it means to be a podiatrist in professional practice is difficult. The challenge for Layla is establishing professional role boundaries and flexibility in the local podiatry workforce. Nancarrow and Borthwick (2005) and King et al (2018) have drawn attention to the issue of what dynamic role boundaries mean for podiatry. However, more work is needed on translation into practice to equip the next generation of

podiatrists with the skills to navigate the challenges and resistance they may experience when faced with changing role boundaries.

“It’s the processes and the systems that I have kind of struggled with more rather than the clinical aspects.”

A further example of Layla’s struggle to fit in related to competence using clinical guidelines and she expressed reassurance at seeing guidelines being implemented. Her expectation that guidelines were an integral feature of professional practice suggests Layla perceived importance in interpreting guidelines. She gave an example of having to “wing it” in her role and her response was filled with self-doubt about her competency, preventing her from exercising professional autonomy. Layla’s hesitancy to embrace her professional autonomy differs from McIntyre’s (2015) view which suggested autonomy is an enviable feature of professional practice for podiatrists. Layla’s hesitancy may have been compounded by an incident relating to the non-completion of an administrative task and described being, “picked up” on the matter. Her use of language reflected the impact on her confidence, made worse by a gap in her mentorship due to staff sickness. Layla’s voice suggested she felt vulnerable as a consequence of absent mentorship and she offered examples of coping strategies by staying in work late. Layla was reflective on her experience in practice thus far, she was self-critical and self-aware of her personal characteristics and how that impacted on her professional role in podiatry services.

“I think it’s down to my own personal characteristics and personality traits, I like a bit of order and control and when things aren’t in order and control, I do have a tendency to get flustered and that’s what my self-reflection is really around.”

Layla was authentic and brave in discussing her vulnerabilities; it was a privilege and it was humbling. As she described the need to manage her personal characteristics, it was difficult not to encourage her to see the value of her self-reflection skills and how this would be a huge benefit in her professional practice.

“there’s kind of a psychological aspect of that that I need to kind of manage as well, just like my kind of character, personal characteristics, because I’m pretty sure that the theory I’ve

learnt here does equip me to do it, to do the job ably, but it's the self-doubt which is a personal thing."

Layla was articulate in describing aspects of NHS service and patient care, and had worked in a previous role in quality improvement. Occasionally her replies and language reflected aspects of her previous role, describing the need to be "nimble" and "agile". Layla was analytical as she had an appreciation of different service models and the need for engagement with national initiatives, and in her conversation, she sometimes disassociated herself as a podiatrist.

Perhaps this was a strategy to counter her feelings of anxiety in her new role, allowing Layla to use her knowledge and skills from her previous role to make sense of podiatry services in a more detached manner. This was illustrated by her comments articulated in the third person.

"there is the opportunity for podiatrists to specialise, and be effective specialists in their profession, erm, to take some of the workload off other medical professions. But it needs to be a national initiative, it needs to be using those pathfinders really, and then understanding really what the barriers are to delivering effective service models in other areas really because I've got a feeling that there are very different barriers across, across the country."

13.1.4 Julie's Story

Julie expressed frustration at what she believed to be an unnecessary repetitive and costly reorganisation of the NHS with changes in service structures creating instability for people working in the organisation. She appeared exasperated that everything kept changing in the NHS and used a metaphor "*like walking on quicksand*" to symbolise and convey her frustration of working in an ever-changing NHS organisation, in which she was never standing still. Julie had a lead clinical role in MSK services, she was experienced and had an excellent grasp of the expectations of her organisation. Julie discussed specialist areas of the podiatry profession, such as MSK, high risk, diabetes and wounds services. Julie identified problems with the structure of services, suggesting as services have evolved, so has the segregation of podiatrists working in the specialist services. Julie was concerned and fearful of podiatrists becoming deskilled in MSK services, and believed podiatry services had a greater focus in high risk care.

Julie's perceived threat of skill erosion was identified by King et al (2018) as a response by professionals to changing workforce boundaries.

Despite some obvious fear, Julie embraced the notion of a collaborative specialist model, which was in keeping with the models of care in the Five-Year Forward View (2014) and the NHS Long term Plan (2019).

"I think there needs to be more integration between the diabetes and the musculoskeletal, because they are not exclusive, they have to cross over for prevention more than anything."

Despite not working in "wound care", Julie felt a responsibility to understand the complications of diabetes, giving by way of example, her skills and knowledge in doppler use. She was less confident in the MSK skills of diabetes specialist podiatrists. This may reflect her local experience, but her views echo the lack of confidence expressed by the focus group participants on the MSK assessment and management of LJM in the diabetic foot. Nonetheless, Julie held diabetes service models in high regard, and emphasised the value of a team approach, which was important to Julie.

Belonging to a MSK speciality afforded Julie status, a sense of identity, and connection to other likeminded professionals. She described being lucky working with physios and consultants and considered herself a "role model" and "a wealth of knowledge" for lower grades and other professionals. Julie's status and experience gave her more freedom to discuss the strengths and limitations of NICE guidelines in MSK specialist practice. However, in contrast to Stuart, she gave a positive example of using of NICE guidelines in consultation with patients, but felt their use may be limited due to misinterpretation,

"So, I printed off the NICE guidelines so sometimes they can be of use, because you can say look, here in the NICE guidelines it says that it is not a first line treatment. So, we can use guidelines in a positive way. On the flipside of that new NICE guidelines for back pain can be used, can be misinterpreted."

Julie's role and responsibilities in specialist MSK practice included footwear conversations with patients and in her experience could result in disagreement or a conflict of opinions. Meeting patient expectations had become a source of tension for Julie, largely due to the expectations of her organisation that she should prevent patient complaints.

“Well one of the biggest things is our manager is, erm, is... We mustn't get complaints. That's our biggest thing more than anything. We bend over backwards to make sure we don't get complaints off patients.”

The influence of the organisational culture around avoiding complaints, left Julie feeling like a “salesperson.” She felt patients placed a low social value on her professional knowledge and skills. Patients also made assumptions about her status due to her gender, believing she had a lower status and surrogate role to her male colleague, despite an equal title, and this mattered greatly to her. Borthwick recently (2018) alluded to the role of professional titles in affirming professional identity. Recognition of the symbolic power of professional titles such as “consultant” and “surgeon” has meaning in the hierarchy of medical professions. Although Borthwick’s (2015) point was in the context of podiatric surgery, parallels can be drawn with the importance of titles and identity for podiatrists working as MSK specialists.

13.1.5 Fiona’s Story

The conversation with Fiona was characterised by storytelling to illustrate her experience of working with colleagues, patients and students and how this influenced her professional role and opinions. Fiona’s transcript was challenging to transcribe, because she shifted around in her conversation and offered lengthy diverse responses. Fiona spoke passionately and energetically and her conversation was peppered with examples of managing challenging and complex patients, reflecting her preferred practical learning style.

“Yeah, I learn from doing rather than just watching or reading up on anything. I can read the theory side of everything but it doesn't really click until I do”

Fiona emphasised her people skills and professional competence and indicated she was a hard-working enthusiastic person who was committed to her professional development in podiatry. She had a strong sense of herself as a healthcare professional and was keen to pursue new opportunities. The people in her care were a strong influence in Fiona’s experience about her practice. One comment showed Fiona’s sensitive approach to her professional role, which illustrated empathy and compassion and was a powerful perspective on the importance of holistic care,

"I'm not just there to cut nails, I am there as a human being and that's a good thing."

Fiona discussed student placement and its influence on her professional practice, considering it as an integral part of her role. Fiona was clear on her expectations of the students, believing they should be ready for the challenges and time constraints of placement and emphasised experience as an important commodity in student learning.

"I am expecting a lot from them, the new starters, because they have just been educated, and it is fresh in their mind. They have just had the most up to date research given to them"

Fiona questioned whether students were exposed to the realities of professional practice, or the carefully selected "easy going" aspects, suggesting inadequate preparation of students in the profession. Fiona attributed this to the working environment and individual practitioners with insufficient opportunity and time to teach students.

"I think one of the barriers I think, as well is we don't seem to actually mind working with students but I don't think people are ... they are not given the opportunity to really teach as much"

Fiona discussed the personality of professionals in practice, and how that influenced her. She suggested podiatrists should employ a strategy of seeking out fellow colleagues with compatible personalities to enhance and motivate their practice. Fiona went on to discuss the influence of a consultant in her locality who inspired her, by encouraging the integration of podiatrists into meetings and involving them in vascular service provision. She was animated and enthused, which appeared to be an important factor in motivating her to explore opportunities to get involved in clinics. Fiona's experience is similar to the phenomena of charismatic authority identified by Bacon and Borthwick (2013) in the context of the diabetes specialist podiatrist. This phenomenon might be an important aspect of practice in motivating the next generation of podiatrists to push the boundaries of the profession,

"We are diagnosticians of the lower limb. People need to know that, that it's not just nail cutting any more".

13.2 Superordinate themes

Three elements of practice from the cross-case analysis were considered the most important patterns in professional practice and these were classed as superordinate themes. The superordinate themes featured both similarities and differences between the participants and they captured the parts relating to the influences of their organisation on professional practice. The themes add to the existing body of knowledge on professional practice by capturing how personal attributes and self-perceived levels of autonomy, competence and relatedness distinguish the individual's motivation in practice. These aspects are features of self-determination theory (Deci and Ryan 2000) and may be of value in future research to explore how the psychological needs of podiatrists' impact on professional practice. This suggestion stems from observations of participants, some of whom appeared to exhibit greater personal resilience to workforce pressure and demands, as expressed in their approaches to clinical practice.

13.2.1 Safe in our silos

Safe in our silos theme characterised the participants' experiences and feelings regarding the desirability of status to define their areas of specialist professional practice. Stuart, Julie, and Matthew shared experiences and values indicating a belief that working in specialised podiatry practice was safe. The safety of the silo related to the sense of relatedness and connection with other professionals who identified with working in a similar speciality. However, those with non-specialist roles, Fiona and Layla, did not convey the same sense of stability or status as those who worked as specialist podiatry practitioners. Specialisation and defined roles in podiatry practice appear to be important internal and external markers of career development and allow practitioners to define their professional identity, exercise professional autonomy and declare their special interest.

The term silo was used as a symbolic theme, to convey the working experience of Julie and Stuart working in defined areas of podiatry practice and how Matthew and Fiona aspired to be in similar roles. However, silos are a static, stable agricultural structure designed to store grain or feed. The phrase "working in silos" has been used in healthcare with negative

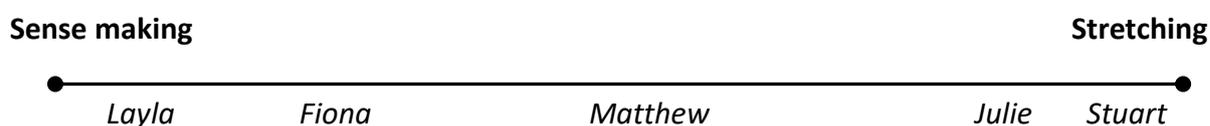
connotations, interpreted as working in isolation and not engaging with progressive dynamic team work. The difficulties with the notion of silo working for large organisations like the NHS, is a lack of collaboration and integration of groups. In order to improve care for patients and reduce the fragmentation of the workforce in healthcare, various reforms by NHS England (2014 ; 2019) have been employed to build bridges between groups to move from silos to synergy. One of the challenges in modern healthcare is achieving more integration and co-ordination amongst services to improve future care for patients, (NHS England long term plan, 2019). Therefore, for Stuart and Julie, their specialist silo had limited long term stability, reflected in the resentment of Julie that she was “walking on quicksand” due to an ever changing healthcare landscape and changing dynamic role boundaries on the horizon with First Contact practice (NHS England 2019). Comments on the working culture and knowledge operating between specialities appeared different and recognisable to the participants, suggesting the existence of different working silos, further complicating navigation of professional practice. The intra cultural differences in specialist podiatry practice have not been challenged in current literature and offer insight into developing methods to supporting change in professional practice. Research from King et al (2018) suggests the type of professional resistance observed in this study was common. Membership of specialisms are seen as desirable and a strength helping health care professionals with their social identity. It is not clear from this study or previous research what the motivations are influencing professionals to belong to a specialist group and it may warrant further work.

13.2.2 Sense making and stretching

The theme of sense making and stretching can be thought of as a linear continuum representing the relative position of individuals in their personal and professional development.

Figure 6. Sense making and stretching continuum

This figure shows the relative position of the participants on the sense making and stretching continuum



The sensemaking and stretching continuum as a theme and notional concept is important for positioning the podiatrists in this study. Layla and Fiona were at the sense making end of the continuum, with Matthew having made more progress with his personal development, hence he is positioned in the middle. Julie and Stuart are positioned towards the stretching end of the continuum as their experience indicated they were stretching themselves as specialists and leaders in their roles within professional practice. Nancarrow and Borthwick (2005) recognised the blurring of professional boundaries for AHP'S as inevitable as organisations change over time. The position of sensemaking or stretching appeared to be influenced by local services designs, plus organisational and national workforce needs. Both Nancarrow and Borthwick (2005) and Stressing and Borthwick (2014) examined workforce changes and emphasised the need for podiatrists to be flexible and agile in responding to organisational change. The participants' responses, attitudes and experiences illustrate that Layla and Fiona were sensemaking and Stuart, Julie and Matthew were stretching. Stuart and Julie's stretching were illustrated by mixed responses and engagement with service change, reflecting more experience dealing with change. Their stretching position was due to extrinsically motivated factors at organisational and national strategic level. This could be a reflection of their accomplished status and greater level of experience, generating higher expectation and demand in their professional roles. Layla and Fiona used different strategies in their sensemaking activities which could be attributed to their different personalities, learning styles and experiences. Matthew appeared to be transitioning between sense making and stretching, as he has sought solutions and strategies to move towards his professional role in MSK practice.

13.2.3 Steering or Sailing

The steering or sailing theme is symbolic of the roles and responsibilities that would occur on a ship, with the less experienced participants metaphorically "sailing" and those with leadership qualities and roles "steering." Despite differing roles and levels of responsibility, there were similarities in organisational expectations for all participants who were operating in a demanding clinical environment.

Matthew, Fiona and Layla were focused on “sailing” due to a combination of factors including, lower levels of experience, lower grade banding and lower skill level. This was in addition to Mark and Layla having some additional layers of low confidence, self-doubt and frustration. Fiona had a higher degree of self-confidence as evidenced from her pursuit of seeking out opportunities with people who inspired and motivated her. Bacon and Borthwick (2013) identified how important charismatic leadership was, by providing an important role model to motivate and support development of specialist diabetes practice. There have been several noteworthy trailblazing podiatrists at the forefront of development for the profession of podiatry in rheumatology, diabetes, surgery, and it is vital to have continued leadership and succession planning for future generations of podiatrists. Stuart and Julie had specialised knowledge skills and their roles placed them in a strong position to “steer” future podiatrists to become MSK specialists. However, even with the requisite specialist knowledge, this alone may be insufficient to successfully steer the next generation of podiatrists into ever changing contemporary healthcare landscape. It is therefore imperative that leadership skills are fostered within specialist services to enable development and growth. In addition, current leaders in specialist practice will need to harness the skills of change management, as an important driver within the UK health services.

13.3 Summary

The themes brought to life the experiences of the participants and through their narrative, and it was possible to gain insight into what influenced professional practice for podiatrists. The superordinate themes illuminated the evidence in the literature, highlighting further challenges in specialist practice and leadership roles, which remain an influential feature of professional practice for podiatrists. The podiatrists who were interviewed are working in UK professional practice at a time of austerity and rapid service changes. As such, these podiatrists may be experiencing some crisis of confidence in professional knowledge and skills, influenced by the current challenges and demands of healthcare services. When reflecting on the participants’ conversation, some of them were fearful and resistant to change, leaving them questioning whether their professional knowledge skills were adequate to fulfil the purpose of their role and meet the demands of modern healthcare services.

The specialisation of services is a huge influence on professional practice and means professional knowledge must be matched to the changing characteristics of podiatry practice and uncertainty, complexity, and conflict are a constant threat to the evolution of the professional role. For these podiatrists, professional practice was about dealing with the problems in generalist, MSK and diabetes specialist services. As these podiatrists reflected on their practice, the concept of their profession is changing and it is not always understood by others.

Research suggests podiatrists have engaged with the transformation of services in the UK public healthcare sector. Changes in how, who and when care is given has been driven by an increased demand for care due to an ageing population, an increased need for specialist diabetes care, the need for efficiency savings and a limited public budget. This discussion offers a timely opportunity to consider professional practice for podiatrists and presents an important contribution to understanding the views of some podiatrists within the context of their own professional practice.

Chapter 14

14.0 Critical review of thesis

This chapter will critically review the thesis and evaluate its utility for professional practice. It will discuss opportunities for translating the thesis findings into professional practice. The chapter will also include a critical reflection into the conduct of this research, in terms of the process and the new knowledge and understanding gained from this body of work.

14.1 Review of the thesis journey

My thesis journey afforded the privilege of gaining insight into the world of podiatrists which aimed to develop a clearer understanding of foot related LJM in people with diabetes and to explore the opinion, knowledge and beliefs of podiatrists in the context of their professional practice.

14.1.1 New Experience based understandings of practice

For the specialist diabetes podiatrists in this thesis, their knowledge of LJM echoed the characteristic changes captured in the theoretical model seen in chapter 5. The shared knowledge from the podiatrists provided some confirmation of what we already know about LJM from the literature. However, using a phenomenological approach was an important aspect of this thesis, revealing that musculoskeletal assessment of the foot in specialist diabetes practice was not a priority, because podiatrists were busy focusing on other assessments. It was difficult to understand the reasons for this, but the findings revealed NICE clinical guidelines (DOH 2016) were a dominant force influencing scope of assessments in practice for these podiatrists. In my own professional experience, it was not apparent prior to the thesis journey how much the professional culture of diabetes practice for podiatrists had changed since leaving my honorary post in 2013, with a much greater division in scope of assessment between the specialities of diabetes and musculoskeletal practices. Listening to the participants in my study sharing the reality of what I perceived to be a 'guideline driven practice' challenged my own views on podiatry, where autonomy is an essential feature of my professional practice. My perception of this apparent impingement on autonomy was

enlightened by McIntyre's (2015) paper which offered a meaningful definition of autonomy for podiatrists into a professional and clinical dimension. So that, professional autonomy reflected the extent to which an individual could control the factors impacting on their work and clinical autonomy, the freedom to make clinical decisions to achieve the best outcome. This triggered a realisation that my own knowledge of podiatry and professional autonomy was out of touch with current practice, creating the stimulus for changing the direction of my thesis. This helped develop a greater sense of awareness of the validity of my professional knowledge and the position of my doctoral study.

14.1.2 Fresh perspective of influences on practice.

The narrative review on professional practice challenged my previously held views on the influences of status, autonomy and leadership on professional practice and was a great motivator to continue pursuing insights into this area. By immersing myself in a phenomenological approach with its focus on idiography and hermeneutics, it was possible to explore these influences further, to gain a deeper insight into podiatrists' perspectives on professional practice. It illuminated what had previously been identified in the literature by Nancarrow and Borthwick (2005) Borthwick(2009) and King et al (2018) regarding the influence of change and dynamic needs of modern healthcare. In addition, the iterative hermeneutic process within the IPA method involved a back and forth reading and interpretation of the transcript to afford a new understanding that podiatrists are struggling to make sense of changes needed in the workforce, creating frustration and resistance. Overall, these podiatrists gave the impression they accepted without question their roles in delivering services with no desire expressed to lead service change. I think given that AHP career structures in the UK public sector appear to have flattened, podiatrists have become inured to the culture of letting things happen to them, losing their leadership skills in the process.

14.1.3 Personal development in the research journey

Completing this thesis presented challenges in my personal development as a researcher, but generated many benefits including advancement of qualitative research skills. Grasping the underpinning philosophy of phenomenology and how that translated to methods and analysis

was difficult but was overcome by investing time in developing my self-reflection skills. Development of reflexive skills enabled me to achieve a unique interpretation and hence insight into podiatrist's experience of specialist diabetes, MSK and non-specialist professional practice. The result is a thesis that offers an authentic insight into the influences and challenges that impact on podiatrists in professional practice.

The qualitative approach employed in the thesis offered sensitivity to the professional context of podiatry. The interpretation was faithful to phenomenological principles by focusing on the experiences of podiatrists. The idiographic focus of IPA was more difficult to achieve in the focus group than the interviews due to the difficulty analysing the dynamics of the conversation. However, by employing reflexivity skills and remaining true to the hermeneutic endeavours of the IPA approach this increased the overall trustworthiness of findings. The thesis findings will resonate with some members of the podiatry healthcare and academic audience, as the concepts illuminate issues previously described in the literature. The credibility of this study in relation to allied healthcare practitioners other than podiatrists is unknown, however due to the close relationships of AHP's in professional practice, it may be of some interest.

14.2 Issues emerging from the thesis

- Now is the time for podiatrists to develop expertise in leading change management to meet the demands of their organisation in responding to national and local strategies
- The podiatrists in specialist roles or with leadership skills should use their influence to plan and encourage continued growth and development of the profession
- The philosophy within podiatry is to be unquestioning in delivering care, therefore, there is an opportunity for podiatrist's voices to be heard and converted into tangible proposals generating new leadership roles for the next generation of podiatrists.

14.3 Limitations of the thesis approach

The limitations of the approach related to the sample size for each speciality area and non-speciality which was small, however the use of small sample sizes aligned well with the IPA approach.

The sample was drawn from the UK public healthcare sector, therefore the findings are not representative of the UK private sector podiatry population.

The geographical representation was limited to the NW of England. Therefore, the same experiences might not be obtained across England. Nor was it possible to consider the findings from this thesis to be representative of what might be experienced in the devolved countries of Wales, Scotland and Northern Ireland.

14.4 Leading voices in the profession

The research within this thesis suggested podiatrists welcomed the opportunity for their voices to be listened to, as a beneficial means to express the hopes fears and joys of their real-world practice. The notion of patient voice in patient public involvement has been an important feature in models of modern healthcare practice in the NHS England Five-year forward view (2014) and The NHS Long Term Plan (2019). However, in their place of employment, it is not known if these podiatrists had any mechanisms to allow their voices to be heard. Therefore, podiatrists need a series of mechanisms which could be powered within the podiatry profession, to harness the voices of its members. These mechanisms could have a research or practice-based steer, to enable professional engagement with the aim of capturing views, via special interest groups, social media forums and organisations in order to collectively lead future change.

In addition, leading voices in the profession in both the public and private sector are well placed to advise the professional body (The College of Podiatry) on how to look at the cultures embedded within the profession, and to establish if this is a good foundation to embrace the changes and skills needed for a future podiatry practice. Some of the solutions for future proofing the profession may require a shift in conventional thinking to attract people into the profession who can develop a broader range of skills which transfer to different roles, organisations and sectors, that are not traditional, nor vocation specific.

Identifying individuals within the profession with leadership behaviours would be an important strategy, in planning growth and development of the profession. These issues have been explored by Wylie (2009), defining transformational leadership as a set of behaviours

including charisma, individual consideration, intellectual stimulation, inspirational motivation, vision, and high moral and ethical standards. This compliments the principles of leadership evident in Bacon and Borthwick's (2012) charismatic authority model, which has been successfully employed in podiatry. However, Wylie's work provides some tangible attributes to the concept of transformational leadership, which would help offer some scaffolding to build new leadership. It is likely the profession needs to garner qualities from both Bacon and Wylie's concepts for opportunistic growth. It is important also that any future plans to draw on leaders' voices in the profession, should reflect both private practice and public healthcare needs. Especially given the talent and success of podiatrists in developing multiple private practices in the UK, which provide an important pool of positive role models to inspire future generations of podiatrists. The experience of podiatrists in private practice is crucial in obtaining an understanding of the diversity and opportunities developing in this sector. If autonomy levels are greater in the private sector, the experiences and influences impacting private practice podiatrists will be very different and must be explored in future work. There can be no doubt that increasing the visibility of podiatrists in leadership roles from diverse sectors, is crucial to motivate and encourage the prospect of professional growth and development.

14.5 Change management

The thesis raises questions about how the profession can move forward in the ever-changing healthcare landscape. The experiences of these podiatrists in the public sector indicates a need to nurture podiatrists to be pro-actively involved in influencing change, in addition to designing and transforming services. Previous research by Nancarrow and Borthwick (2005) has advocated the need for podiatrists to be agile and flexible to the needs of their organisation. This study suggests podiatrists are responding to the expectations of their organisation and this is a source of discomfort. This could be due to intra professional resistance to change, or lack of role models in podiatry who can demonstrate the kind of transformational leadership skills highlighted by Wylie (2009), to positively manage change in the profession. The charismatic model of authority has proved successful in propelling diabetes specialist practice into a high status role for over a decade. However, it may have inadvertently contributed to promoting working silos within the profession, which has

deskilled podiatrists MSK competencies in diabetes practice and polarised career progression routes. Perhaps the profession has made a mistake of naively remaining wedded to a charismatic model of authority, which may be failing podiatrists in the demands of an ever changing, transformational workforce culture. An alternative model of practice would be to have leadership roles which embrace collaborations between specialist practice, offering greater strength and unity in for the profession.

The findings from this thesis offer a new understanding and a recommendation for the profession to step back and observe whether practice has become reactionary rather than proactive. This may be a symptom of a lack of podiatrists holding visible leadership roles and too few podiatrists in the profession possessing transformational leadership skills. Undoubtedly, the next generation of podiatrists must graduate equipped with change management leadership skills to navigate the demands of moving healthcare landscape. It is incumbent on education providers to embed and foster these skills and the philosophy of change in undergraduate education and work placement experience. For education providers, it is difficult to predict what the future of podiatry looks like and how to ensure continued professional growth. The possibility of more changes in healthcare is certain and it is difficult to know if it will become manifest in podiatry services. It would be wise to be brave and anticipate the future by scanning the horizon for technological innovations for indications of new opportunities.

14. 6 Future recommendations

Patient and customer foci are a common feature of healthcare, and the values, visions and strategic objectives of organisations generate external expectations and a demand on podiatrists, as employees, to fulfil values as they translate to patient care and service provision. All of these have consequences for satisfaction, learning, performance, personal experience, and well-being in the workplace. The research within this thesis indicates the need to harmonise podiatrist expectations and expectations of employers and service users, which could be factors motivating the behaviour of podiatrists and culture within the profession. As such, further work may be indicated to explore the relative autonomy of podiatrists as professionals in their employment, and how it impacts on their motivation and ability to act

effectively with patients in the healthcare environment. This work would be advantageous for employees, if the roles and responsibilities of a podiatrist are consistent with a person's values in order to meet patient needs. It would be beneficial to podiatrists, knowing how to meet the needs of employers, to offer benefit to their personal and professional development in addition to satisfying workplace demands.

In terms of specialist professional practice, some questions remain around how to support podiatrists in complex decision making. How do they integrate research into practice and how is this balanced against the influence of clinical guidelines? Research by Williams (2013) indicates that some podiatrists find benefit to the use of clinical guidelines when managing footcare for people with rheumatological conditions. However, Formosa et al's (2016) critical evaluation of ten diabetic foot screening guidelines exposed the variability in the recommendations of guidelines, signalling the limitations of their utility in practice. Therefore, podiatrists who lack the freedom and skills to question the recommendations of guidelines in practice face a threat to their professional growth because they will lose their professional and clinical autonomy. A culture of practice which continues to heavily rely on clinical guidelines may limit the future scope of practice of podiatrists, generate constraints upon professional autonomy, and in the long term, this manner of working may disable the diagnostic skills of podiatrists.

14. 7 Conclusion

This is a time of change within public healthcare in the UK, which presents challenges, opportunities and greater demands on podiatrists. Podiatrists are expected to provide efficient specialist services, to deliver on public health targets and to maintain high standards of care. The findings within this study allow us to understand some of the current perceptions and experiences of UK podiatrists in professional practice

At an individual level, this study afforded participants an opportunity to reflect on their podiatry practice and the result is a new insight into participants feelings about podiatry. This study shares podiatrists' experiences of professional practice, provides examples of their individual ability to respond to the demands of a service, how they situate themselves in

specialist or non-specialist service, to expose their qualities as team players and to act in leadership roles. Through this study, it has been possible to appreciate how organizational needs influenced how the participants engaged with their area of work.

The superordinate themes in this study reveal that podiatrists have engaged with the transformation of services in the UK public healthcare sector, but they have done so in response to change rather than by leading change. In addition, the themes reflect the difficulty lead podiatrists experience in exercising autonomy in their specialist roles due to organisational expectations and limitations of service provision. It is difficult to quantify the impact of health policy and changing organisations on future leadership roles in professional practice. However, the podiatrists in this study are employing a range of strategies to adapt to the increasing demands of external factors influencing professional practice. In order to learn from themes in this study, the findings from this research will be used to seek new opportunities to influence professional interest groups and professional bodies to raise the awareness of the need to invest in leadership in podiatry. In addition, the research findings will inform the pedagogical approaches in undergraduate podiatry education, to enhance the curriculum in developing the profile of graduates with the requisite leadership skills for professional practice.

Appendix 1

Participant information letter



Thank you for taking the time to read this information sheet.

Title of Study: Exploring Podiatrists opinions, knowledge and beliefs about limited joint mobility (LJM), in the feet of people with Diabetes.

Name of researcher: Veronica Newton.

Purpose and name of award: PhD thesis.

I would like to invite you to take part in a focus group. Before you decide please take the time to read the following information carefully. This will ensure you understand why the research is being done and what it would involve for you. Ethical panel approval has been sought from the College of Health and Social Care, University of Salford.

What is the purpose of this study? The research is exploring limited joint mobility LJM which may affect the foot in Diabetes. The purpose of the focus group is to seek expert opinion on LJM in diabetes. This information will establish the level of consensus or disagreement from the focus group. This focus group information will be examined in relation to the published literature on LJM in the feet.

Why am I being asked to take part? You have been asked to take part as you are considered an expert in the field of Diabetes foot care. In addition you belong to the North West Clinical Effectiveness Group (NWCEG).

Do I have to take part? It is up to you to decide. The study will be described to you and I will go through the information sheet. You will be asked to sign a consent form to show you agree to take part. You are free to withdraw at any time without giving a reason.

What will I need to do if I take part? You will attend a focus group on the same day as NWCEG meeting. You will be given the opportunity to leave the meeting should you not wish to take part in the focus group. The focus group will last one hour. The focus group will take part in the University of Salford. You will be asked for consent to digitally record the focus group conversation. Field notes will be taken during the focus group. The primary PhD Supervisors will be present at the focus group to observe. You will be asked to provide information on your professional qualifications, years of experience working in diabetes care and current job title. Any names recorded during the course of conversation will be anonymized during transcription and pseudonyms will be employed during the write up of the thesis. At the end of the focus group, the researcher will provide a presentation of findings from the current literature on LJM in the foot.

What are the possible risks of taking part? There are no known risks to taking part in this focus group. Whilst it is not anticipated, should the focus group discussion generate any distress to you, then appropriate professional support will be made available if required.

What are the possible benefits of taking part? We cannot promise the study will help you, but the information from the study will help to increase the understanding of LJM in the foot for people with Diabetes.

What if there is a problem ? We do not foresee any problems, however, if you have a concern about any aspect of this study, I will be happy to discuss them with you. Veronica Newton Tel: 01484 473787 (work) Email v.newton@hud.ac.uk

Will my taking part in this study be kept confidential? The information collated from you will be in the form of a digital recording and written information from a brief survey. This information will be strictly confidential. Your name will not be written on any survey information so you cannot be recognised. All names will be changed to protect your personal details. Research Supervisors will have access to the data as part of the PhD supervision process. All information will be stored in a secure folder on the researchers Personal K: drive at the University and on a password protected encrypted USB stick The information collected will be retained for a minimum of 3 years in line with the College Ethics panel recommendations. Results will also be stored in the University data repository. . The information will be used for in the write up of a PhD thesis with the aim of increasing understanding of LJM in the foot.

What will happen if I don't carry on with the study? If you withdraw from the study you can choose whether the data collected up to that point can be collected, or if you prefer to have your opinions removed from the findings.

What will happen to the results of the research study? The results can be made available to you at the end of the PhD process. In any publications you will not be individually identified.

Who is organizing or sponsoring the research? This research is part of a PhD study at University of Salford.

Who to complain to if I am unhappy? If you are unhappy or concerned with any part of this study then please speak to my lead supervisors in the first instance, in line with University complaints policy. Dr Andrew Findlow, email: a.h.findlow@salford.ac.uk Tel: 0161 295 0037 Dr Anita Williams, email: a.e.williams1@salford.ac.uk Tel: 0161 295 7027

Once again, thank you for reading this letter.

Kind regards

Veronica Newton.

If you decide to take part, please keep this information sheet and please sign a consent form.

If you would like more information please speak to Veronica Newton or her supervisors.

Appendix 2

Research Participant Consent Form

Title of Project: Exploring Podiatrists opinions, knowledge and beliefs about limited joint mobility (LJM), in the feet of people with type 1 and type 2 Diabetes.

Ethics Ref No:

Name of Researcher: Mrs Veronica Newton

(Delete as appropriate)

- I confirm that I have read and understood the information sheet for the above study (version x- date) and what my contribution will be.

Yes	No
-----	----

- I have been given the opportunity to ask questions (face to face, via telephone and e-mail)

Yes	No
-----	----

- I agree to take part in the interview

Yes	No	NA
-----	----	----

- I agree to the interview being tape recorded

Yes	No	NA
-----	----	----

- I agree to digital images being taken during the research exercises

Yes	No	NA
-----	----	----

➤ I understand that my participation is voluntary and that I can withdraw from the research at any time **without giving any reason**

Yes	No
-----	----

➤ I understand how the researcher will use my responses, who will see them and how the data will be stored.

Yes	No
-----	----

➤ I agree to take part in the above study

Yes	No
-----	----

Name of participant

Signature

Date

Name of researcher taking consent Veronica Newton

Researcher's e-mail address v.newton@hud.ac.uk

Appendix 3

Focus group: Operational plan 21.4.15

Participants: 8 (estimate)

Environment: University of Salford, Building, Room

Equipment:

Chairs x 12.

Tables x 4

Digital recorder x 2 and microphones

Extension lead

Extra Batteries

Paper cups

Refreshments

Flip chart paper, blue tack and pens

Writing pad and pens

Name badges (stickers)

Laminated signs for the door

Research team: Moderator (VN),
Field Note taker (AG),
Observer and Primary supervisor (AF) .

1) Pre- focus group preparation and planning

Roles and responsibilities will be agreed in advance of the session The field note taker (AG) will be briefed by the moderator (VN) on the theoretical framework of

the project and the aim of the focus group. VN will provide the focus group questions to AG in advance of the session, offering an explanation of their order and justification of themes. During the focus group, the field note taker will take notes according to a pre-determined and agreed structure. These notes will be used to debrief the moderator at the end of the focus group.

Room preparation. The room will be organised by VN and AG with seating in a circular shape with two central tables one to house the refreshments, the other with the recording equipment. All equipment, digital recorders and microphones will be tested prior starting the focus group. Laminated signs will be placed on the external aspect of door to minimise the risk of room interruption and distractions during the focus group. Ventilation of the room including ability to moderate the level of heating will be checked to ensure optimal comfort of room prior to starting the focus group. A flip chart containing the key focus group questions will be visible during the focus group. Name badges will be pre-prepared for the participants.

2) Supplementary planning and preparation

Location of toilet facilities will be highlighted to participants prior to commencing the focus group. In the event of a fire alarm during the focus group, the digital recording will be paused and a safe evacuation procedure will be followed. Recommencement of the focus group will continue when it is safe to do so. Telephone access will be checked in case of an emergency.

3) Opening statement

Welcome and introductions. Good afternoon and welcome to this focus group conversation. Thank you for giving up your time today it is very much appreciated. Can I please do some introductions, my name is Veronica Newton, I am a registered Podiatrist, part time lecturer with an interest in LJM in diabetes and how it affects the feet. My role here is as a PhD student and this focus group forms part of my research. I will be guiding the conversation today. Also present is Andrea Graham who will be a field note taker. Andrea won't ask you any questions, but will be making notes to help me analyse the conversations from today. Andrea will provide a summary to us at the end of the conversations, to give you the opportunity to confirm and add any additional information. Dr Andrew Findlow is my primary research supervisor and he will be here in an observational role.

- 4) Overview of topic. Our topic today is LJM of the feet in people with diabetes. The results from this focus group will be used to help me develop a framework for LJM in the feet.
- 5) Participant recruitment. You were invited today because of your known interest in diabetes and foot care. I am interested in your experiences and views on LJM in the feet of people with diabetes.
- 6) Guidelines
 - Please can we work on a first name basis today? I have provided name badges to help me remember your names. Please be assured of confidentiality, I won't use any names in the results.
 - Please let me reassure you there are no right or wrong answers today. I am genuinely interested in different points of view, so please feel free to share them. If you don't need to agree with others, that's fine, but please listen respectfully as others share their views. Please feel free to direct the conversation to each other during this process. My role as moderator will be to guide the discussion.
 - You will notice we have two digital recorders, to help me analyse the conversation it would be helpful to only have one person speaking at a time please.
 - Mobile phones, can we please put them on silent? I understand if you must respond to a call, please do so as quietly as possible and rejoin us as quickly as you can.
- 7) Begin recording and start by asking the first question.

Insert focus group questions.
- 8) Summarising section. Once all pre-determined questions have been asked, the moderator will provide a verbal summary of themes discussed by the focus group. This will help the group pull together some of the thoughts and concepts that have emerged from the focus group. It will give them an opportunity to confirm the summary and identify any points or issues that may not have been covered by the dialogue or to clarify any responses previously given. The field note taker will advise and aid the moderator in this process. The group will be invited to make final closing comments on the verbal summary, provide any consensus (or not) on themes and offer additional information should they wish.
- 9) Closing statement. The group will be advised the focus group is now complete and they will be thanked for their contributions. A secure written summary of the transcript will be produced and offered to the participants for checking

Appendix 4

R3: ...in diabetes we talk about MDT don't we, all the time, you know, and you're getting your diabteologist there and, but we don't very often have that, that musculoskeletal podiatrist there and we are in a diabetes podiatry world all very focused on the wound and it's sometimes getting that MSK person there and, so as a, as a group of podiatrists that's something we could, where we could develop it if you wanted, and having that MSK assessment really.

R2: Yeah, we want something simple er, you know, a simple test that's maybe looking at, like I said before, maybe a couple of joints that might just give us that highlight to limited joint mobility, at the moment, like I say, we do the Prayer Sign, to show it happens but it's, but nobody's told us how to find it exactly in the foot erm, so somebody to come up with a, a quick solution on how to assess limited joint mobility in the foot erm, and then like you say involving physio or whatever just to come up with some maybe simple exercises that might improve it

Appendix 5

Invitation letter to take part in a study

Title of Study: Exploring the influences on professional practice in Podiatry.

Name of researcher: xxxxxxxxx.

Purpose and name of award: PhD thesis.

This is an invitation letter, for full details of the study, please read the enclosed participant information sheet about a study I hope you will consider volunteering for.

I would like to invite you to take part in an interview at your convenience at the University of Salford Podiatry interview space which is a safe, private comfortable environment for an interview. Please read the following information carefully. Ethical panel approval has been sought from the research ethics committee at the University of Salford. You have been asked to take part as you belong to one of the North West Clinical Effectiveness Groups (NWCEG).

What is the purpose of this study? To seek your opinion on current podiatry practice.

Do I have to agree to this invitation? It is up to you to decide. The study will be described to you and I will go through the participant information sheet if you decide to take part.

What will I need to do if I take part? You will attend an interview lasting 45 minutes this can be on the day of your NWCEG meeting if this is at the University or a date of your choice. You will be asked for consent to digitally record the interview conversation. Any names recorded during the course of conversation will be anonymized during transcription and pseudonyms will be used in the write up of the thesis. If you would like to take part in this study please can you contact me or my supervisors in the first instance via email xxxxxxxxxx

Thank you,

xxxxxxx.

name of supervisors xxxxxxxxxx

Appendix 6
PARTICIPANT INFORMATION SHEET (Version 1)

Title of study: Exploring the influences on professional practice in Podiatry

Name of Researcher: anon
[Anonymise for initial approval]

Invitation paragraph

I would like to invite you to take part in an interview. Before you decide please take the time to read the following information carefully. This will ensure you understand why the research is being done and what it would involve for you. Ethical panel approval has been sought from the research ethics committee at the University of Salford.

What is the purpose of the study?

The purpose of the interviews is to seek Podiatrists opinion contemporary professional practice. This information will establish the key factors which influence current professional practice. This interview information will be examined in relation to the published literature on professional practice.

Why have I been invited to take part?

You have been asked to take part as you belong to one of the North West Clinical Effectiveness Groups (NWCEG).

Do I have to take part?

It is up to you to decide. The study will be described to you and I will go through the information sheet. You will be asked to sign a consent form to show you agree to take part. You are free to withdraw at any time without giving a reason.

What will happen to me if I take part?

You will attend an interview at the University of Salford will be offered on the same day as your NWCEG meeting. You will be given the opportunity to leave the meeting should you not wish to take part in the interviews. The interview will last a maximum of one hour. You will be asked for consent to digitally record the interview conversation. You will be asked to provide information on your professional qualifications, years of experience working and current job title. Any names recorded during the course of conversation will be anonymized during transcription and pseudonyms will be employed during the write up of the thesis. At the end of the interview, the researcher will answer

There are no travel reimbursements for attending the interview, however you will be offered a £10 shopping voucher in appreciation of your time.

What are the possible disadvantages and risks of taking part?

You will not be disadvantaged in any way by not taking part. There are no known risks to taking part in this interview. Whilst it is not anticipated, should the interview discussion generate any distress to you, then appropriate professional support will be made available if required.

What are the possible benefits of taking part?

We cannot promise the study will help you personally, but the information from the study will help to increase the understanding of current professional practice for podiatrists.

What if there is a problem?

If you have a concern about any aspect of this study, you should ask to speak to the researcher (**insert name and contact number**) who will do their best to answer your questions. If you remain unhappy and wish to complain formally you can do this by contacting the Research Supervisor/Principal Investigator (**delete as necessary and insert name and contact number**). If the matter is still not resolved, please forward your concerns to Dr Susan McAndrew, Chair of the Health Research Ethical Approval Panel, Room MS1.91, Mary Seacole Building, Frederick Road Campus, University of Salford, Salford, M6 6PU. Tel: 0161 295 2278. E: s.mcandrew@salford.ac.uk

Will my taking part in the study be kept confidential?

The information collated from you will be in the form of a digital recording and written information from a brief survey. This information will be strictly confidential. Your name will not be written on any survey information so you cannot be recognised. All names will be changed to protect your personal details. Research Supervisors will have access to the data as part of the PhD supervision process. All information will be stored in a secure folder on the researchers Personal drive at the University and on a password protected encrypted USB stick. The information collected will be retained for a minimum of 3 years in line with the University recommendations. Results will also be stored in the University data repository. The information will be used for in the write up of a PhD thesis with the aim of understanding professional practice.

What will happen if I don't carry on with the study?

If you no longer wish to be involved in the study and/or would like the information you have provided to be removed, you can request this by contacting the researcher xxxx by email (xxxx@xxxx) within 4 weeks of the date of your interview.

What will happen to the results of the research study?

The results can be made available to you at the end of the PhD process. In any publications you will not be individually identified.

Who is organising or sponsoring the research?

This research is being organised within the University. There are no research sponsors for this research.

Further information and contact details:

Researcher Contact Details (XXXX)

Appendix 7

CONSENT FORM

Title of study: Exploring the influences on professional practice in Podiatry.

Name of Researcher: anon

[Anonymise for initial approval]

Please complete and sign this form **after** you have read and understood the study information sheet. Read the statements below and yes or no, as applicable in the box on the right hand side.

- | | | |
|----|--|------------------------------------|
| 1. | I confirm that I have read and understand the study information sheet Version [2], 04.09.17 for the above study. I have had the opportunity to consider the information and ask questions which have been answered satisfactorily. | Yes/No
<input type="checkbox"/> |
| 2. | I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my rights being affected. | Yes/No
<input type="checkbox"/> |
| 3. | If I do decide to withdraw I understand that the timeframe for requesting data to be destroyed is <i>4 weeks</i> after your interview. | Yes/No
<input type="checkbox"/> |
| 4. | I agree to participate by <i>being interviewed, and understand the interview will be audio recorded.</i> | Yes/No
<input type="checkbox"/> |
| 5. | I understand that my personal details will be kept confidential and will not be revealed to people outside the research team. | Yes/No
<input type="checkbox"/> |
| 6. | I understand that my anonymised data will be used in the researcher's thesis/ research report, other academic publications and conferences presentations. | Yes/No
<input type="checkbox"/> |
| 7. | I agree to take part in the study: | Yes/No
<input type="checkbox"/> |

Name of participant

Date

Signature

Name of person taking consent

Date

Signature

Appendix 8

Risk Assessment Form

All projects must include a risk assessment. If this summary assessment of the risk proves insignificant, i.e. answer no to all questions, no further action is necessary. However, if you identify risks you must identify the precautions you will put in place to control these.

1. What is the title of the project?

Exploring the influences on professional practice in Podiatry.

2. Is the project purely literature based? NO

If YES, please go to the bottom of the assessment and sign where indicated. If NO, complete question 3 and list your proposed controls.

3. Please highlight the risk/s which applies to your study:

Hazards	Risks	If yes, consider what precautions will be taken to minimise risk and discuss with your Supervisor
Use of ionising or non-ionising radiation	Exposure to radiation /NO	Obtain copy of existing risk assessment from place of research and attach a copy to this risk assessment summary.
Use of hazardous substances	Exposure to harmful substances YES/NO	Obtain copy of existing risk assessment from place of research and attach a copy to this risk assessment summary.
Use of face-to-face interviews Interviewees could be upset by interview and become aggressive or violent toward researcher	Interviewing; Own classmates=Low risk No Other University students=Medium risk No Non-University personnel=High risk No	NB: Greater precautions are required for medium & high risk activities Consider: <ul style="list-style-type: none"> How will contact with participants be made - i.e. do not give out personal mobile no., home number or home email, etc. Location of interviews – to be held in a safe environment, e.g. University building, workplace What support will be available, i.e. will anyone else be available to assist if you call for help, etc. e.g. colleague knows where interview to take place and telephoned when completed and safe-

		<p><i>what action to take after certain time if not phoned</i></p> <ul style="list-style-type: none"> • <i>How to deal with aggressive/violent behaviour, what precautions will be taken to prevent this from happening?</i>
<p><i>Use of face-to-face interviews</i></p> <p><i>Participants or interviewees could become upset by interview and suffer psychological effects</i></p>	Yes	<p>Consider:</p> <ul style="list-style-type: none"> • <i>What initial and subsequent support will be made available for participants or interviewees?</i> • <i>What to do if researcher uncovers information regarding an illegal act?</i> • <i>What/who will be used to counsel distressed participants/ interviewees, what precautions will be taken to prevent this from happening?</i>
<p><i>Sensitive data</i></p>	<p><i>Exposure to data or information which may cause upset or distress to Researcher</i></p> <p>/No</p>	<p>Consider:</p> <ul style="list-style-type: none"> • <i>What initial and subsequent support will be available to the researcher</i>
<p><i>Physical activity</i></p>	<p><i>Exposure to levels of exertion unsuitable for a individuals level of fitness</i></p> <p>No</p>	<p>Consider:</p> <ul style="list-style-type: none"> • <i>Health Questionnaire/ Medical declaration form / GP clearance.</i> • <i>Trained First Aid personnel/ Equipment.</i>
<p><i>Equipment</i></p>	<p><i>Exposure to faulty unfamiliar equipment.</i></p> <p>/No</p>	<p>Consider:</p> <ul style="list-style-type: none"> • <i>Equipment is regularly checked and maintained as manufactures instructions.</i> • <i>Operators receive adequate training in use of.</i> • <i>Participants receive induction training prior to use.</i>
<p><i>Sensitive issues i.e. Gender / Cultural e.g. when observing or dealing with undressed members of the opposite sex</i></p>	<p><i>Exposure to vulnerable situations/ sensitive issues that may cause distress to interviewer or interviewee</i></p>	<p>Consider:</p> <ul style="list-style-type: none"> • <i>Use of chaperones/ Translators.</i> • <i>What initial and subsequent support will be made available for participants or interviewees?</i>

	/No	
<i>Children</i>	/No	<ul style="list-style-type: none"> • <i>Adhere to local guidelines and take advice from research supervisor</i>
<i>Manual Handling Activities</i>	<i>Exposure to an activity that could result in injury</i>	<ul style="list-style-type: none"> • <i>Adapt the task to reduce or eliminate risk from manual handling activities. Ensure that participants understand and are capable of the manual handling task beforehand.</i> • <i>Perform health questionnaire to determine participant fitness prior to recruitment</i>

If you have answered yes to any of the hazards in question 3, please list the proposed precautions below:

<ul style="list-style-type: none"> • <i>Location of interviews –will be held in a safe environment, University building near to a manned reception area.</i> • <i>Reception staff will be available to assist if there is a call for help.</i> • <i>Supervisor will know where interview to take place and the approximate times</i> • <i>Colleague will telephone the interviewer when interviews are due to be completed to ensure safety of interviewer and will call podiatry reception campus after 5 minutes if interviewer has not responded.</i>
--

Signature of student Date

Signature of Supervisor Date

Appendix 9

Draft Interview questions

About you

Can you tell me about your current job role please?

- What are the kinds of patients do you treat?

Can you explain what factors influence your practice?

- For example, in your trust what influences service provision?
- Can you identify any barriers? limitations?
- Can you identify any positive influences?

About podiatry practice

In your opinion what are the (broader) professional influences that affect podiatry practice?

- E.g. professional bodies – national level

In your view what other external professional influences affect podiatry practice?

- For example independent bodies NHS or professional groups or policies or guidelines

In your opinion, what are the priorities in podiatry practice?

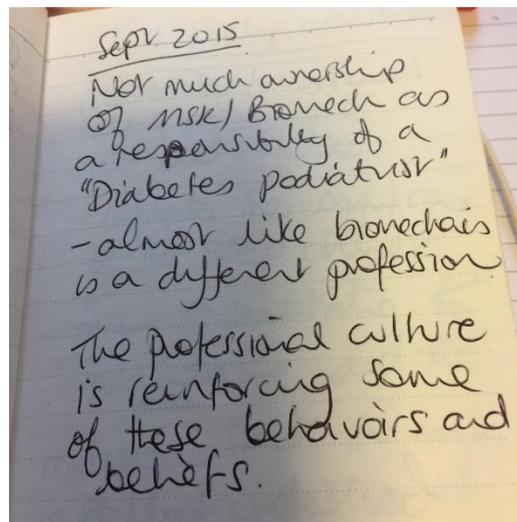
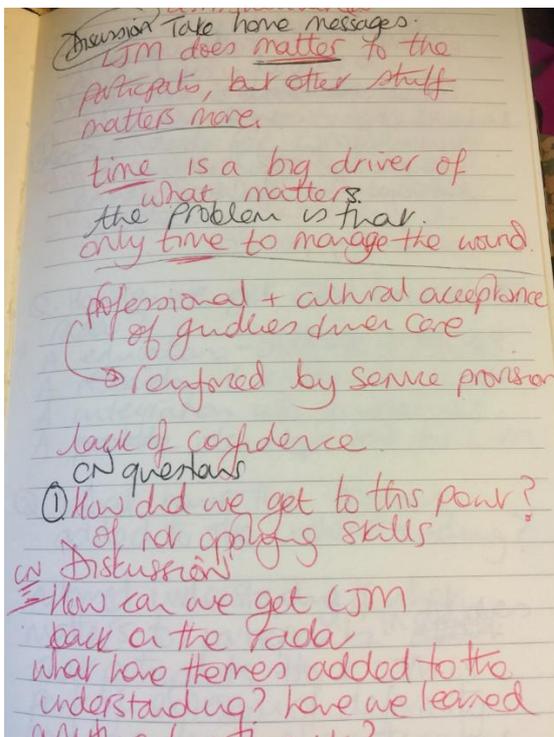
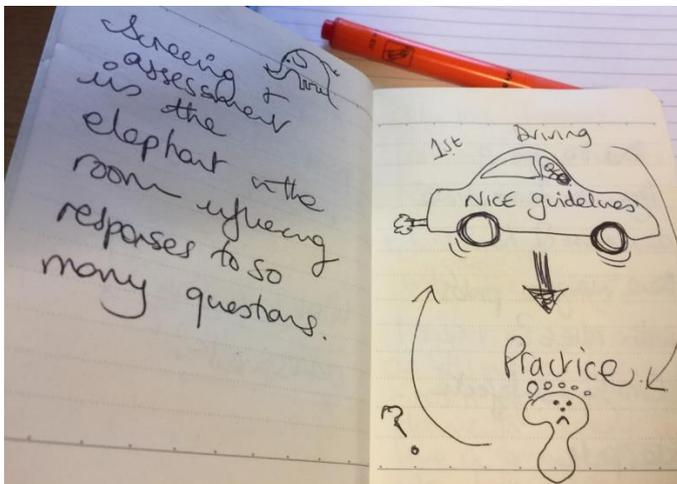
In your view, how does podiatry practice need to develop?

Finally

What do you feel you need to develop your professional practice?

Appendix 10

Reflective diary extract



Appendix 11

Ethics approval process at University of Salford.

Getting ethics approval and complying with what was approved

All activities, involving human beings or animals, – undergraduate/postgraduate research, commercial, knowledge transfer, evaluation, audit and in some instances teaching and learning - need ethical consideration. Applicants seeking ethics approval are responsible for ensuring that all activities fall within the principles set down in the University Academic Ethics Policy. You are also responsible for seeking University of Salford ethical approval, and any subsequent agency approval, prior to conducting research involving humans or animals. (Please note UoS approval must be gained before applying to other ethics approval agencies.)

It is contrary to University policy to undertake field work, experimentation or work with human participants or animals without having first obtained ethics approval. Where ethical approval has not been gained a number of consequences are likely to occur:

- (1) Conducting research without proper ethical approval could be construed as research misconduct which could result in disciplinary action
- (2) The University cannot protect you against any untoward consequences, financial or otherwise, that may or have occurred during your research.
- (3) An aggrieved participant could seek legal redress and you would have a weaker defence if the research did not have ethical approval.

You should have read and familiarised yourself with the University and School's ethics procedures (<https://www.salford.ac.uk/ethics>) and University requirements regarding data protection and data management (<https://www.salford.ac.uk/privacy>).

If you are unsure then your University of Salford supervisor or Ethics Panel Chair should be consulted for advice. In the event of non-compliance with, or deviation from, the ethics protocol that has been approved for your research, a sanction could be applied. For staff members, this will be considered through the Policy and Procedure for Dealing with Allegations of Misconduct in Research (<https://www.salford.ac.uk/ethics/research-governance>), and may result in action under the [staff disciplinary procedure](#). For students, this may involve the instigation of the [Academic Misconduct Procedure](#), [Fitness to Practise Procedure](#) and/or [Student Disciplinary Procedure](#). On taught awards, at a minimum any academic misconduct will result in a sanction of zero for the component of assessment in question, and can lead to much more serious sanctions including expulsion from the University. For students on post graduate research studies (e.g. PhD) any research or academic misconduct would most likely result in expulsion from the University.

For further information on the Policy and Procedure for Dealing with Allegations of Misconduct in Research please contact research-misconduct@salford.ac.uk.

Appendix 12

Ethics approval form for interviews

6 September 2017

Dear Veronica,

RE: ETHICS APPLICATION–HSR1617-161 – ‘Exploring the influences on professional practice in Podiatry.’

Based on the information you provided, I am pleased to inform you that application HSR1617-161 has been approved.

If there are any changes to the project and/or its methodology, then please inform the Panel as soon as possible by contacting Health-ResearchEthics@salford.ac.uk

Yours sincerely,

A Clark

Andrew Clark Deputy Chair of the Research Ethics Panel

Appendix 13

Ethical approval for focus group

University of
Salford
MANCHESTER

Research, Innovation and Academic
Engagement Ethical Approval Panel

College of Health & Social Care
AD 101 Allerton Building
University of Salford
M6 6PU

T +44(0)161 295 2280
HSresearch@salford.ac.uk

www.salford.ac.uk/

20 March 2015

Dear Veronica,

RE: ETHICS APPLICATION HSCR15/12 – Exploring Podiatrists opinions, knowledge and beliefs about limited joint mobility (LJM), in the feet of people with Diabetes

Based on the information you provided, I am pleased to inform you that application HSCR15/12 has been approved.

If there are any changes to the project and/ or its methodology, please inform the Panel as soon as possible.

Yours sincerely,

Sarah Starkey

Sarah Starkey
Engagement & Innovation Assistant

Appendix 14

Published work on Limited joint Mobility in chronological order. 1957-2014

date	author	Theme	journal
1957	Lundabek	Hand stiffness in diabetes	Acta medica Scandinavia

date	author	theme	journal
1971	*Jung	Diabetic hand syndrome	Metabolism
1974	Rosenbloom	Coined the term LJM (abstract)	Clinical research
1975	Grgic (&R)	Joint contracture in diabetes (corresp)	N E J of Medicine
1976	Grgic (&R)	Table top sign method for LJM	J Paed
1976	*Bendetti and Noacco	Cheiro in juvenile diab	Acta Diabetica latina
1978	*Fitzgerald	Syndrome of DIDMOA with Cheiro	Post graduate med journal

date	author	theme	journal
1981	Rosenbloom	LJM =risk for Microvasc Disease	New England J of Medicine
1984	Buckingham	Scleroderma skin changes in diabetes	Diabetes care
1985	*Slama	Quantification of LJM - goniometer	Diabetes care
1986	Starkman	LJM hand and chronic complications Correlate with neuropathy and Retino	Annals of Rheu Dis
1987	*Shinabarger	LJM in adults – active ROM compared – advocated therapy for maintaining ROM	Physical therapy
1988	*Delbridge	LJM in foot related to Neuro ulcers	Diabetic medicine
1989	Rosenbloom *Eadington	Limitation of finger mobility LJM, Dupytrens, retinop & smoking	J of D and its complication Diabetic Medicine

	*Mitchell	LJM – cold test reduced capillary flow and AV shunting – (vasc aetiology)	Br J of Rheum
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date	author	theme	journal
1990			
1991	Fernando	LJM and abnormal foot pressures &DFU	Diabetes Care
1992			
1993	*McCance Danne	10 year study LJM and Micro vasc Effect of high glucose on type IV collagen (cultured) in vitro	Diabet med Diabetes
1994	*Veves	Risk factors are same across europe Athens Manchester rome and antwerp	Diabet med
1995	*Veves	Diff in joint mobility and pressures between black and white patients with diabetes.	Diabet med
1996	*Ismail *Arkillla *Vukovic	Ultrasonographic features of Cheiro LJM associated with Microvasc D but does not predict micro. Risk factors for progression of LJM	B J of rheumatology Diabetes medicine Acta Diabeteologica
1997	Simmons *Fernando Arkillla	LJM ankle in Diabetes with sensory loss (gonio) LJM in Sri lanka – STJ mobility reduced in those with Cheiro. (Gonio) LJM and vasc disease	D res and clinical prac B J of Rheum J Diab compl
1998	Frykberg	Neuro, Pressure, Joint mobility ethnicity and DFU	Diabetes care

	*Silverstein (&R)	Glycaemic control and onset of LJM	J paed
1999	Duffin Boyko *Sauseng (german)	LJM in hands and feet apparent – risk of Microvasc D LJM independent Risk factor for DFU LJM and pl pressure – the smaller the ROM (STJ) the higher the PI pressure.	Diabetic medicine Diabetes care Acta Medica Austriaca

date	author	theme	journal
2000	Salsich	Ankle Stiffness in diabetes using a range of passive and active rom tests.	Physical therapy
2001	1)Abouesha 2)Chuter & Payne 3)Frost 4)*Infante (&R)	1)Reduced Plantar tissue thick, increases pl pressure, (* 1 st mpj exception) 2)LJM at 1 st mpj, plantar fascia function and Charcot 3)LJM and Microangiopathy – sonography of carotid (gender diffs) 4) Freq LJM between 1978 - 1998	Diabe care Diab med Diabetes care J paed
2002	Disj Abbott Duffin	Physical therapy on LJM (mobs) Risk factors for ulceration U/S evaluation of plantar fascia in young people with DM - thicker With male Gender –male & assoc with STJ limitation – but, no plantar pressure changes	JAPMA Diabetic medicine Diabetic medicine
2003	1)Viswanathan 2)*Arkkilla	1)LJM, pl pressure and DFU Asians 2)Biochemical markers of Type I&III collagen in T1D. (not signif)	Acta Diabeteologia

	<p>3)D'Ambrogi</p> <p>*Crispin</p> <p>*Smith</p> <p>Ledoux</p>	<p>Plantar fascia and high forefoot pressure in LJM – thicker plantar fascia and less mobility at 1st mpj and Higher pressure 1stMH</p> <p>Rheumatological manifestations of DM</p> <p>MSK manifestations of DM</p> <p>Ledoux WR, Shofer JB, Ahroni JH, Smith DG, Sangeorzan BJ, Boyko EJ. Biomechanical differences among pes cavus, neutrally aligned, and pes planus feet in subjects with diabetes</p>	<p>Diabetes care</p> <p>Am j of medicine</p> <p>Br J of sports med</p> <p>Foot and Ankle International</p>
2004	<p>Zimny</p> <p>*Hider</p> <p>*Bhansali</p>	<p>LJM and Risk status – pulses,neuro,gonio,fastscan,PTI</p> <p>Ankle 1st mpj ROM reduced</p> <p>Resolution of Cheiro with pancreas transplant</p> <p>Acquired pes cavus manifestation of LJM</p>	<p>Diabetes Care</p> <p>Saudi Medical Journal</p>
2005	<p>Lindsay</p> <p>Amin</p> <p>Abbott</p>	<p>Red Prevalence of LJM over 20 years</p> <p>10 year Oxford study LJM and risk of Microalbuminuria</p> <p>Foot ulcer risk lower in south asains</p>	<p>Diabetes Care</p> <p>Arch dis child</p>

	Ambrogi	Six point deformity score using LJM as a factor D'Ambrogi E, Giacomozzi C, Macellari V, Uccioli L. Abnormal foot function in diabetic patients: the altered onset of windlass mechanism	Diabetic Medicine
2006			
2007	Turner	Passive and active ROM during gait And plantar pressure	Diabetic medicine
2008	Craig Papanas *Viswanathan	Plantar fascia thickness & complication Diabetic hand LJM plantar pressure in T1D in India Goniometer and RS scan	Diabetes care J of diab and complications J of Assoc of Phys of India
2009	Ikem	LJM in the hand for black Africans with and without diabetes	West indian med J
2010	*Abate	Advances in LJM pathogenesis and therapy – pharmacological (AGE breaker compounds)	Int J of immunopathology and pharm.

date	author	theme	journal
2011	Umay Somai Lazaro-Martinez Abate	LJM and metabolic control quality of Life (sf36) funct hand tests. Clinical implications of LJM Obs study - Biomechanics of foot, deformity, LJM Callus and neuro LJM in elderly with Diabetes U/S and goniometer study	Int J Diab Dev countries MSK network JAPMA Archives of Ger and Geriatric
2012	Sartor	Protocol for Training prog to improve mobility (outcome pl pressure)	Musc skeletal disorders

Bevans 1992	Biomechanics and plantar ulcers in diabetes
Fernando 1991	Relationship of LJM and foot pressure and DFU
Viswanathan 2002	Association of LJM and high pressure in DFU Indians
Abouesha 2001	Plantar tissue thickness and peak pressure
Abate 2010	LJM and elderly
Formosa 2012	Importance of clinical biomechanics in T2D
Duffin 1999	LJM in hands and feet of T1D
Zimny 2004	Role of LJM in Diabetes in at risk
Lazaro Martinez 2011	Foot biomechanics deformity neuropathy and LJM
Chuter and Payne 2001	LJM and plantar fascia function
Craig 2008	Plantar fascia thickness /glycation T1D
Boyko 1999	Risk factors for DFU
Garcia-Alvarez 2013	Morphofunctional characteristics of foot In DM
Periyasyamy 2012	LJM,(gonio) neurop, and skin hardness (durometer) risk of DFU Asian Indian
Abbott 2005	Foot ulcer risk lower in south asians
Montineiro-soares	Factors for risk of DFU – mobility, deformity
Sartor	Protocol for Training prog to improve mobility
*Fernando	LJM in SRI LANKA

key

Ethnicity

Biomech / foot characteristics/function

Risk

Tissues / Plantar fascia

Structure / Foot pressure

Appendix 15
Field Notes from Focus group

General Introduction question: Thoughts about LJM in the foot.

General theme from the group in relation to this question was that it was felt to be a common occurrence, but underassessed – lacked inclusion in screening documentation due to influence of National and local guidelines and due to the influence of the QoF system and the restriction of time during assessment. Historically it may have been noted in the hands with the use of the ‘Prayer Sign’ in the hands, but nothing specific in the feet. In addition it was felt that there was no differentiation made between soft tissue and joint limitation when assessing the foot and that if there were any limitations in movement- this would not be treated unless it was symptomatic.

Causes of LJM: overall consensus that it was caused by increased sugar levels (MC), Muscle shortening (AS) and that the presentation of rigid feet would be common esp in ulcer clinics (KS) as this is one of the causative factors of foot ulceration (rigidity).

How does LJM affect the feet: ‘solid’ – was the word used to sum up the affect on the feet by (AW) and expanded upon by (MF) to nods of agreement by the group – about limited ankle jt ROM and its association with foot ulceration.

What does LJM look like in the feet: general group consensus was that its appearance would be variable – though there was some agreement about the traditional ‘high arch’ ‘clawed toes’ shape – overall the feeling was that there would be other influencing factors including the type of population that were now being treated (an ageing population) and that this would lead to restrictions in joint mobility toodifficulty therefore in determining what a foot with diabetes- LJM might look like because of this. MF/PC discussion around – soft tissue structure rupture due to glycation/ potential link with Charcot-type foot architecture – the overall view was that there could be variability in the foot shape presentation.

How would you look for LJM in the foot? General consensus around ankle joint ROM examination and MPJts (goniometer measurement raised by AW, muscle strength testing by KW and weight bearing assessment by SH).

How does LJM effect how the foot works? Overriding theme in response to this question was that the end result would be foot ulceration or that it would influence wound healing due to factors ranging from: dysfunctional biomechanics/gait cycle- shuffling or ataxic gait with shorted steps/cadence / reduced ROM leading to increased pressure and stress and the fact that in neuropaths there would be no painful symptoms to enable compensatory mechanisms to take place or that the neuropathy could be an additional factor which influences gait together with LJM. There was some contention between WHAT is actually being seen in the clinical presentation and the thought that disease duration was an additional influencing factor.

Influence of Ethnic Background on LMJ: general consensus was that those individuals from an ethnic minority tended to have better mobility than the Caucasian population with diabetes. Additional factors here were that this group of patients also had a higher incidence of neuropathy and lower incidence of Charcot (two of the factors that appear to the group to potentially overlap in presentation with LJM) – there was some discussion about the possible cultural influence of ethnic minority populations on the lower incidence of presentation in relation to more effective care of relatives with diabetes within the family??improved support = better outcomes = reduction in certain complications??

If you knew your patient had LJM how would that influence your management? Group consensus was that they would refer to MSK specialist podiatrist – but that it would depend on the context of the patient history (MF) i.e; was it causing problems – if so then offloading strategies/ Footwear/FO / Rocker soles/Exercise. This question also developed dialogue about the timing of presentation (these patients typically present later when there is already LJM present – its not something that is screened for).. strong theme here about the influence of the nature of the referral and assessment on the presentation/diagnosis of LJM.

A secondary discussion also developed here about the nature of interventions for the management of LJM – reducing pressures by reducing mobility and the consideration that this is a ‘double-edged sword’: reducing mobility further compounding the LJM?? What should the primary concern be? – heal the ulcer THEN address the LJM (SH) or can you re-introduce mobility at this late stage (PC)...the ultimate ambition is that the patient become ulcer free then address the LJM. Another theme potentially about TIMELINESS of diagnosis of LJM?? And TIMELINESS of referral for interventions such as surgery to address foot deformity before ulcerations occur.. however there is a lack of guidance as to what the optimal time of referral for surgery is... ???again influence of guidelines (or lack thereof?). Concern here about being able to distinguish arthritis from LJM due to poor recognition by clinicians of LMJ and its absence from the patients assessment/foot screening.

The most important issues were highlighted as being: the need to assess for LJM better and not waiting too late to prevent it and then intervene.

How would you try to identify LJM? Main themes in response to this: improved links to MSK Pod between diabetes and MSK teams – the group consensus was that a SIMPLE method of identification was required to help diagnose LJM and prompt earlier referral esp as it is not always Pods doing the assessment (could be assistant practitioners) – training need identified for improved knowledge and skills within the diabetes team in relation to MSK knowledge/assessment. ‘Gaps’ in knowledge and ‘Gaps’ in referral pathways (to MSK) were highlighted – a lack of research into LJM means that it has a low priority in terms of people looking for a link with it and ulcer occurrence/and restricted ankle mobility.

How do you screen for deformity? Assessment of deformity/Footwear interface – identification of prominent joints, callus formation, skin condition – the feeling here was that this was a very subjective area and again the influence of the NICE guidelines about how and what components of the diabetic foot are assessed upon the outcomes of assessment was raised and this was further linked to the time frame for patient review and the fact that nurses also assess the feet of patients with diabetes.

Main themes the spring immediately to mind are

Influence of Guidelines on the components of assessment and on the subsequent referral pathway

Influence of time (timeliness of presentation and time available during the consultation)

Influence of limited practitioner knowledge about LMJ identification and management

Difficulty in identification due to overlapping variables of age of patient population, other complications of diabetes (neuropathy, charcot) and other co-morbidities such as OA

Need for SIMPLE identification tool to allow ALL levels of AHP's involved in patient assessment/screening to recognise LJM and refer appropriately

Need for AHP education about LMJ to raise awareness and knowledge about LJM.

References

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