



MEETING ABSTRACTS

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A1

The dilemma of the generalist: expert views on role boundary changes in the NHS and private sector podiatry

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Journal of Foot and Ankle Research 2015, **8(Suppl 1)**:A1

Aims/Objectives: In a climate of workforce transition, enhanced specialisation and role transfer, it is timely to address the impact of workforce flexibility on practitioners in non-specialist roles. This study aimed to use podiatry as a case exemplar (as one of the Allied Health Professions) to explore the possible impact of workforce redesign policies on role boundaries on generalist podiatrists and examine the current position of generalist podiatrists in the workforce.

Content of presentation: The study explored views and experiences of key actors from The Society of Chiropodists and Podiatrists through a qualitative research methodology, incorporating focus groups and in-depth, semi-structured interviews supported by explanatory sociological theory, drawn from the sociology of the professions, workforce literature, and Government policies, noting their impact upon the podiatry profession. Data collected was analysed via a thematic analysis.

Relevance/Impact: This research is relevant to professionals involved in the SCP, academic departments across the UK and individuals that have influence over policy changes. The findings of this project may also be of interest to those who organise and deliver undergraduate and postgraduate training. This project has added to the evidence base for generalist podiatrists, for which there was no previous research considering the impact of workforce redesign policies on their role. This study has provided an example of how role boundaries can be affected and the perceived impact on the podiatry profession.

Outcomes: Three themes emerged: the impact of change, concerns about future provision, and meeting the challenge of considering future service provision. The key message was to encourage podiatrists to embrace change by working together, learn from other professions and develop new leaders or 'champions' to lead people towards change.

Discussion: The role of the generalist podiatrist in the NHS may be under threat due to the profession's focus on the pursuit of specialist 'virtuoso' roles, in an attempt to further professionalise. Generalist NHS podiatry is viewed as less of a professional priority, and difficult to sustain and justify in a climate of fiscal restraint. This in turn suggests, therefore, that generalist podiatry may in future become a role entirely associated with private practice.

A2

CODIFI (Concordance in Diabetic Foot Infection): Agreement in reported presence of likely pathogens in swabs and tissue samples from infected diabetic foot ulcers

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Aim: Wound infection is common in diabetic foot ulcers with potentially life changing sequelae. Targeted treatment of infective organisms requires accurate identification of pathogens to enable refinement of antibiotic protocols to improve outcomes and reduce antibiotic resistance. Wound sampling is routinely conducted using swabs although some guidelines recommend use of tissue samples. To date there is a lack of robust evidence to inform clinical practice regarding sampling technique.

This study aimed to evaluate the extent to which results from wound swab and tissue samples taken from the same patient agree with each other; one might report pathogens more than the other, they might both report the same pathogens consistently, or they might disagree with a more complex pattern of disagreement. Here we report agreement and disagreement between the techniques based upon reported presence of likely pathogens.

Methods: In this multi-centre, cross-sectional study, 401 patients with a suspected infected diabetic foot ulcer were recruited from 25 sites across England. All patients had both a swab and tissue sample taken from same ulcer for plating and culture. Agreement between techniques in the reported presence of likely pathogens was assessed by overall prevalence and bias adjusted Kappa (PABAK). McNemar's test was used to investigate patterns of disagreement.

Results: 401 patients were recruited between 2011 and 2013 with a median age of 63 years; 79% were male; 85.5% had type 2 diabetes; 27.5% presented with a recurrent ulcer; and 45.5% had a neuro-ischaemic ulcer, 50.5% neuropathic, and 3.5% ischaemic.

Both swab and tissue reports were available for 395 patients, and at least one pathogen was reported in 70.1% of swab samples and 86.1% of tissue samples. In 58% of patients the two samples resulted in a difference in the reported pathogens, with: 13.2% both reporting

different pathogens; 36.7% reporting additional pathogens in the tissue sample; and 8.1% reporting additional pathogens in the swab sample.

In the most prevalent pathogens (those present in >8%), there were significantly higher rates of reporting of the following pathogens from tissue samples than swabs (McNemar's p-value <0.05): Gram Positive Cocci, Gram Negative Bacilli, Enterobacteriaceae, Anaerobes, Streptococcus, Enterococcus, Coagulase-Negative Staphylococcus, Gram Positive Bacilli, Corynebacterium; with differences ranging between 3.3% (Streptococcus) and 13.7% (Gram Positive Cocci). There was no evidence of a difference in reporting for Methicillin-resistant *S. Aureus* (MRSA) (p=0.22); *Staphylococcus Aureus* and *Pseudomonas* (the latter two both had p=1.00). In terms of agreement, the PABAK ranged from 0.58 (Gram Positive Cocci) to 0.97 (MRSA).

Investigation of the influence of baseline factors on agreement of the number of reported pathogens found, despite large centre variation, significant evidence (p=0.02) of an association with ulcer duration, such that older ulcers (≥ 56 days old) had a reduced odds (0.64 95% CI (0.45, 0.95)) of the tissue sample reporting more pathogens than the swab.

Conclusions: Overall, there were significant differences in the pathogens reported from swab and tissue samples in patients with suspected infected diabetic foot ulcers. This has potential implications for choice of sampling technique in clinical practice.

A3

Taking titles and naming names - who do we really think we are?

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Journal of Foot and Ankle Research 2015, **8(Suppl 1):A3**

Aims: Derived from a larger exploration in podiatric specialisation, the research aims relevant to this presentation were to trace the evolution, change over time and impact of specialist titles.

Content: Findings from extensive qualitative research employing a range of methodologies are presented. Content analysis elicited the range of podiatric specialist areas, when titles associated with specialisation entered the professional language of podiatry, how titles have been applied and changes to titles over time. Using diabetes as a clinical exemplar, findings from focus group and key actor interviews illustrate the impact of specialist titles. Via a criterion based, purposive sampling strategy informed respondents were accessed; in order to explore and build upon this baseline data, further informants were identified using snowball sampling. Respondents included podiatrists specialising in diabetes, diabetologists, NHS service managers and representatives from government and professional bodies. In addition to the research findings, social theories pertinent to the area of professional titles are briefly presented.

Relevance: Research encompassing the origins and effects of professional titles in podiatry has not previously been presented and, as an area, remains under debated within the literature. Whether working in the NHS where titles were greatly influenced by the implementation of Agenda for Change, or in private practice, clinicians experience the effects of their titles and while some have strongly held views on their appropriateness, many remain ambivalent. The demonstrable impact of titles leads to consideration of their potential for the informed user, be they podiatrist or manager.

Outcomes: Drawing on content analysis covering some sixty five years of job advertising in all of the main chiropody and podiatry journals, the presentation illustrates the emergence, changes over time and current uses of specialist titles in a range of areas. Against this background, titles assigned to podiatrists specialising in diabetes are explored. Findings from in depth key actor and focus group interviews elicit the impact of specialist titles, including changes to: accountability under the law, patients' access to services, clinicians' roles, how clinicians are perceived and services are designed.

Discussion: The assignment of professional titles and how they are interpreted is moulded by historical, temporal, cultural and ideological influences. Within podiatry titles have evolved into more than simple descriptors; they have been used to convey concepts of differentiation, status and role. Titles have been employed both to mark new professional boundaries and to maintain existing demarcation. Their

impact shapes the way in which practitioners, services and the profession are perceived, clinicians' accountability under the law; and crucially they influence patients' access to healthcare services. In the field of diabetes, podiatrists have been assigned numerous and varying titles, in particular use of the word "specialist" remains the subject of ongoing reflection and debate. Consideration of the wide reaching effects of professional titles, illuminated by social theory, remains an important area for podiatrists to address.

A4

Effect of reduced foot and ankle sensation on postural response to hip abductor/foot everter vibration

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Journal of Foot and Ankle Research 2015, **8(Suppl 1):A4**

Aims: The aim of this study was to assess whether postural responses induced by vibratory perturbations of the hip abductors and foot everters were modified when foot/ankle sensation was experimentally reduced.

Background: Successful integration of vestibular, visual and somatosensory information results in motor responses to maintain upright stance. When one or more of these senses have reduced efficacy, balance can be affected.

When proprioception is reduced, people show greater postural sway amplitudes, resulting in increased centre of pressure excursions as seen in diabetic peripheral neuropathy. This is the primary cause of postural instability in the diabetic population. To compensate for this, re-weighting between sensory modalities can occur. Reduced peripheral sensation, for example, can result in an increased gain of the postural response to galvanic vestibular stimulation. Particularly in people with distal sensory loss, balance may depend on the ability to effectively reweight remaining information from within the somatosensory system.

Methods: Sixteen healthy subjects were investigated (9 female, 7 male age 40 \pm 15yrs) pre and post foot/ankle cooling. Cooling provided a method of reducing foot and ankle sensation whereby replicating to a degree, peripheral neuropathy. Subjects stood with their eyes closed whilst a 2 s vibratory stimulus was applied to the left or right hip abductor or foot evertor to perturb balance. The postural responses to these perturbations were measured at the knee, pelvis, trunk and head using a 3D motion analysis system (Codamotion, Leicestershire). Medio-lateral ground reaction forces and centre of pressure motion were simultaneously recorded via a force plate (Kistler, UK).

Results: Postural responses to hip and ankle vibration, pre and post cooling were analysed using repeated measures ANOVA.

In response to ankle vibration the pelvis translated and tilted toward the side of stimulation. In response to hip vibration the pelvis translated and tilted away from the side of stimulus. Post cooling the direction of the response to ankle vibration remained unchanged however there was a reduction in the amplitude of pelvic tilt (F(6,2)=P<0.05). Post cooling the direction of the response to hip vibration also remained unchanged however there was an increase in the amplitude of pelvic tilt (F(5,2)=P<0.05).

Discussion: By experimentally reducing foot/ankle sensation through cooling there was a reduction in the amplitude of pelvic tilt in response to ankle vibration and increased amplitude of pelvic tilt in response to hip vibration. This study suggests that in the presence of distal sensory loss the body continues to maintain postural stability by reweighting more proximal sensory inputs- a possible advantage for those with peripheral neuropathies. However in the presence of peripheral neuropathy the ability to use these more proximal senses may be dependent on flexibility/strength in these proximal segments. Range of motion on other joints may also play an important role in providing additional sensory positional feedback to facilitate the increased gain of hip proprioceptive and vestibular postural responses.

Developing our knowledge in frontal plane movement and medio-lateral stability informs future research aimed at developing a targeted program for balance enhancement in those with diabetic peripheral neuropathy.

A5

Clinicians' perceptions of prescribing antibiotics for infections in the diabetic foot

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Journal of Foot and Ankle Research 2015, **8(Suppl 1):A5**

Introduction: Responsible use of antibiotics is high on the public health agenda. The management of infection within the diabetic foot is variable, partly due to a lack of consensus and evidence to guide management choices. Study aims: To explore and describe experiences and views regarding the clinical management of diabetic foot infections among specialist secondary care clinicians involved in the management of diabetic foot infections; to explore perceptions and awareness of antibiotic resistance; to explore whether there are any unknown factors that may contribute to the 'non-pharmacological' prescribing of antibiotics. Study design and methods: A phenomenological approach was used, with data collected in face to face interviews with specialist hospital clinicians including Consultant Physicians, Specialist Registrars, Consultant Microbiologist, Specialist Podiatrists and Consultant Vascular Surgeons within two acute hospital foundation trusts in the south of England.

Results: A total of 152 themes were identified and clustered into ten different groups including: resistance issues, appropriate use of antibiotics, when to prescribe/stop antibiotics, influences on prescribing, complications/areas of concern, microbiology, duration of treatment, the multi-disciplinary team (MDT), training/experience and other factors. There was generally a strong consensus of opinion among clinicians, despite the lack of availability of strong evidence to guide practice.

Conclusion: Responsible use of antibiotics is high on the public health agenda. This study presents a new way to understand how specialist clinicians perceive antibiotic prescribing in the management of diabetic foot infection. Clinicians report the value of the multi-disciplinary foot care team and the importance of shared decision making. There is acknowledgement that antibiotics may be prescribed for longer durations than may be absolutely indicated, but a belief that current practices do not lead to excessive harm in terms of antibiotic resistance and significant adverse effects.

Antibiotics do not appear to be used indiscriminately, and careful consideration is given to their use. There is consensus regarding the limited value of superficial wound swabs, and a desire for improved diagnostic measures to guide treatment choices. Experience and clinical judgement are seen as the major tools available in terms of managing diabetic infection.

A6

The effect of vision impairment on dynamic balance

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Journal of Foot and Ankle Research 2015, **8(Suppl 1):A6**

Aim: The aim of this study was to present the effect of visual acuity impairment on dynamic balance using an in-shoe pressure measurement system.

Relevance/Impact: The control of human gait and the maintenance of balance depend upon the complex integration of visual, vestibular and somatosensory information. Dysfunction of any of these components can result in deficits in the body's ability to maintain equilibrium of the centre of mass by counteracting the constant destabilising forces that challenge it. The role of vision in the control of balance is well documented. Vision can improve bipedal upright stability during standing and locomotion as part of the integrated sensory feedback system. Alternatively vision impairment has been demonstrated as reducing postural stability. Postural stability is traditionally evaluated by the motion associated with changes in Centre-of-Pressure (CoP) during quiet standing. CoP measures have been shown to high reliability and clinical relevance when assessing postural stability. However there are few studies that have assessed the effectiveness of these measures for dynamic stability.

Methods: An in-shoe pressure system (FScan, Tekscan, UK) was used to measure CoP values during walking gait for 15 asymptomatic subjects

along a 5 metre walkway. Walking was assessed under normal and altered visual conditions using vision impairment goggles (BAC 0.08-0.15, DAI Impairment goggles, UK).

Outcome measures used to assess dynamic stability.

1) Rate of medial-lateral progression of CoP (mm/s) in 50-100% stance phase of.

2) Extent of medial-lateral excursion of CoP (mm) in 50-100% stance phase of gait.

3) CoP position (mm) in 50-100% stance phase of gait.

Results: A two-tailed paired t-test analysis of the means demonstrated that impaired vision resulted in an increase in the variability of the CoP position ($t=-3.6$ $P<0.005$) and that there was an increase in the rate of medial-lateral CoP motion with impaired vision $t(14)=2.63$ $p<0.019$. Further, the CoP was 0.4 mm (± 0.61 mm) more medial during reduced vision conditions ($t=2.5$ $P<0.05$).

Discussion: In the present study there were significant changes in gait variability, as measured by the CoP indicators in the medial-lateral plane when vision was impaired. Other studies report similar findings that show impaired/perturbed vision increased sway and reduced balance in quiet standing. This may suggest that our proxy measures are suitable for assessing dynamic stability for this particular population. Our findings indicate that an in-shoe-pressure measurement system may be useful in the clinical assessment dynamic postural instability for those with visual impairment. Measuring changes in COP parameters during quiet standing may not fully reflect changes in CoP parameters during gait. The ability to capture CoP variability as a measure of balance during gait could have greater clinical relevance than more traditional static methods. Further work on testing the reliability of these measures and results in elderly populations would be advantageous to the development of strategies to reduce the impact of visual impairment on dynamic balance to reduce falls risk.

A7

Finding your feet: The development of a podiatry intervention to reduce falls in care home residents

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Introduction: People who live in care homes often fall. Foot and ankle muscle weakness, sub-optimal footwear, and common foot problems such as corns and hallux valgus are known and potentially modifiable contributory factors to falls in older people. Conducting a randomised controlled trial in a care home setting to address these issues is challenging and presents a number of uncertainties that need to be addressed prior to undertaking a phase III trial. Therefore, this study used a qualitative approach to assess the feasibility and acceptability of a podiatry falls intervention to care home residents and staff. The data acquired during this qualitative preparatory phase will inform the conduct of a subsequent exploratory randomised controlled trial of a podiatry intervention to reduce falls in care homes.

Methods: Participants: Permanent care home residents with a history of falls, mini mental state examination (MMSE) >9, ability to provide informed consent (n=8); staff (n=5).

Intervention: Residents, supported by care home staff, participated in a 3-month feasibility-testing phase of an intervention (footwear and orthoses provision, toe and ankle muscle strengthening programme).

Evaluation: Exercise frequency was recorded in logbooks by staff. To assess acceptability and perceptions of feasibility at the conclusion of the 3-month testing period, face to face semi-structured interviews were conducted.

Data analysis: Descriptive data of exercise frequency were calculated. Analysis of the qualitative data employed a constant-comparative process

embedded within the wider framework method to identify emerging themes and concepts to inform the intervention remodelling and development.

Results: Fidelity: 30/57(52.6%) logbooks returned; 11(19.3%) completed in full. Adherence ranged between exercises not having been completed at all in some weeks, to three times per week (optimal) in others.

Facilitators: Participation in the programme was well received and fitted into care home routines. The exercise component of the intervention was easily carried out and took no longer than 10 minutes to complete. Participants reported that explanation of the aims of the programme at each exercise session was beneficial to adherence. Some residents saw peer support as important; however other residents preferred one-to-one sessions. Footwear and orthoses were well received by the participants.

Barriers: Discomfort during exercises, cognitive impairment and illness were barriers reported by residents and staff. A major barrier to adherence was limited access for all staff to training resulting in exercises not being performed when trained staff were not available.

Conclusions: A podiatry intervention to reduce falls in care homes is feasible and acceptable. Delivery to residents should be tailored to individual preferences (taking into account goals, targets, and information). Accessing training via DVD or an online resource may improve the reach of the training, facilitating adherence and fidelity. These findings have informed intervention development and modes of delivery for an exploratory randomised controlled trial that is currently underway.

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A8

Diabetic foot ulcer wound fluid: the effects of pH on DFU bacteria and infection

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Journal of Foot and Ankle Research 2015, **8(Suppl 1):A8**

Background: Foot ulceration is one of the most significant complications of diabetes, and will affect 15-20% of people with diabetes at some point in their lives. Such ulcers frequently become infected with very serious sequelae which can often lead to amputation making diabetes the most common cause of lower extremity amputations. Infections cause increased morbidity (and/or mortality) which means that they represent significant clinical events, requiring immediate attention in relation to local and systemic complications thus requiring well-coordinated management. Unfortunately diabetic foot infections (DFI) frequently fail to display overt signs and symptoms of infection including purulence, erythema, pain, tenderness, warmth and induration. This makes it difficult for clinicians to detect infection, and to make timely interventions to limit the highly undesirable consequences of DFIs. Alternative means of rapidly diagnosing infection are urgently required.

Aim: To determine if the presence/absence of microorganisms, and ultimately the presence of infection, are affected by diabetic foot ulcer (DFU) wound fluid pH.

Methods: DFUs of patients (n=55) were assessed in terms of presence/absence of clinical signs of infection as part of their routine clinical appointment at a High-Risk Foot Clinic. Wound fluid samples were also collected from the DFUs by filter paper absorption and/or pipette aspiration. The pH of samples was determined using a micro-electrode pH meter. Bacteria in the wound fluid were recovered by 24hr incubation in Tryptone Soya Broth, and plating on selective agars which included; MacConkey Agar (*Staphylococcus* spp, *Enterobacter* spp), *Pseudomonas* Agar Base (*Pseudomonas* spp), Chromocult Agar (*E. Coli*, Coliforms), Baird Parker Agar (*Staphylococcus* spp) and Columbia Blood Agar (*Streptococcus* spp). Organisms identified as *Staphylococcus Aureus* cultured on Muller Hinton Agar and and MRSA present detected using Oxacillin and Cefoxitin antibiotic disks.

Results: Sample pH values ranged from 6.2 to 8.5. Recovered bacteria included *Pseudomonas*, *Enterobacter*, *Staphylococcus* and *Streptococcus* spp. Correlations were observed between DFU fluid pH values, the presence/absence of these species and the presence/absence of clinical

signs of infection. This presentation will discuss the potential clinical implications of these findings.

Conclusions: pH conditions within DFUs influence bacterial presence/absence in these wounds. pH conditions also influence the presence/absence of clinical signs of infection. Timely monitoring of DFU fluid pH could enhance clinicians' abilities to rapidly detect and more effectively manage DFU infections. An improved understanding of the interactions between DFU pH and bacterial metabolism may identify ways to limit the duration and wider impact of DFU infections.

Governance compliance statement - Ethical approval and research governance has been granted for the clinical study to take place and all research governance procedures are being adhered to during the completion of the study.

A9

Population survey of the prevalence, impact and care of foot problems in people with rheumatoid arthritis

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Aims: Identify the prevalence and impact of foot problems, assess the access to foot care services and describe the care received, in a sample of patients with RA.

Background: Foot problems in rheumatoid arthritis (RA) derive from a combination of the disease process and altered foot mechanics. Guidelines recommend regular review of patients' feet but the extent to which the general population of RA patients report foot problems and access foot care has not been established.

Methods: All RA patients under hospital care in a defined geographical area (Bristol Community Health) were identified. A random sample was sent a postal survey (reminder after 3 weeks) about presence of foot problems, disability (Health Assessment Questionnaire (HAQ)), patient characteristics (age, disease duration, arthritis medication and comorbidities), and foot care received (if any), including podiatry, orthotics and orthopaedics. Measures of impact (Foot Impact Scale (FIS)) with additional questions (numerical rating scales) related to importance, severity, coping and ability to work derived from a previous study. Socio-economic status was established by IMD scores from postcodes.

Results: Of 739 patients sent the survey, 413 (56%) replied. Responders and non responders were similar for age (63.5 vs.62.6 years), gender (74% F vs. 75%F) and socio-economic status (IMD highest deprivation quintiles 13% vs.15%). Responders' median (inter-quartile range) disease duration was 10 (5-20) years and HAQ score 1.5 (0.75-2.0). Most responders (394, 95 %) were taking arthritis medication and 273 (66%) reported additional medical conditions (including 28 (7%) with diabetes). Almost all reported current or previous foot problems (n=370, 90%; n=399, 97%, respectively). Current problems included: articular features 74%; extra articular features 43%; cutaneous lesions 66%; structural deformity 58%; infection 7.5%. Median (IQR) FISIF score 10/21 (6-14); and FISAP score 16/30 (7-23). Median (IQR): importance 6 (3-8); severity 6 (3-8); and coping 5 (3-7). Overall, 38% reported foot problems that affected their ability to work.

Self-care strategies adopted by responders were: aids 188 (46%), cutaneous treatments 268 (65%); CAMs 96 (23%); and devices 275 (67%). A total of 278 (67%) had accessed foot care: podiatry 204 (73%) [Private sector n=149 (54%)]; orthotics 192 (69%); and orthopaedics 92 (32%). Care received included: insoles 190 (66%); prescribed footwear 73 (25%); treatment cutaneous lesions 99 (49%); and foot surgery 72 (35%). Podiatry was the most frequently requested additional service (n=122, 58%).

Relevance/impact: Foot problems are common in patients with RA and impact on many aspects of patients' lives.

Outcomes: Unlike previous studies this was representative of all hospital patients with RA and almost all reported foot symptoms. Although FIS scores were slightly lower than in previous studies, substantial impact was reported including affecting ability to work. In spite of this, 30% had never accessed foot care.

Discussion: Many patients reported current foot problems. Further research is required to compare self-report of foot problems with clinical observations and explore the reasons why patients do and do not access foot care. Also as many patients who had accessed care still reported foot problems, the quality of foot care requires further exploration.

A10

Reflecting on the methodological challenge of recruiting older care home residents to podiatry research

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Introduction: Successful randomised controlled trials (RCTs) require successful participant recruitment; poor recruitment leads to poor, under-powered studies, and may waste grant funds. Recruitment of older care home residents to RCTs is challenging. This is problematic for podiatry, because older people within care home settings are high users of podiatry services; therefore it is essential that strategies are employed to maximise recruitment to RCTs.

We describe the experience of recruiting to a feasibility study of a podiatry intervention to reduce falls in care home residents in the East of Scotland. This was the first phase of a two phase project consisting of the feasibility study to acquire data (recruitment strategy, selection of suitable outcome measures) to inform the conduct of the second phase, an exploratory RCT. Recruitment difficulties became apparent early in the study. Difficulties arose when it came to assessing whether or not potential participants fulfilled certain inclusion criteria:

(1) Presence of foot pain (defined as foot pain lasting for at least a day in the last month and a positive response of "some days" or "most/every days" to at least one item on the Manchester Foot Pain and Disability Index (MFPDI)).

(2) Ability to provide informed consent.

The reasons for these difficulties are that (1) we discovered that in the area in which our study was conducted, the majority of care home residents receive basic NHS podiatry care to treat any superficial lesions (i.e. pathological nails and skin callus) thus the prevalence of foot pain resulting from these lesions was lower than we had originally anticipated, and (2) the care homes that we engaged for this phase of the study had residents who were far more dependent and with much higher levels cognitive impairment than we anticipated, making obtaining informed consent difficult. Based on the existing inclusion criteria, it was deemed unlikely that we would meet our recruitment target for the subsequent exploratory randomised controlled trial (n=40).

Methods: Following discussion with co-applicants we proposed to make two changes in order to improve recruitment, whilst maintaining the scientific integrity of the protocol:

(1) We engaged with care homes that cater for less dependent residents in order to improve the likelihood of obtaining informed consent.

(2) Since evidence shows that there are several foot and ankle characteristics (toe muscle weakness, hallux valgus, decreased ankle flexibility and strength) that are associated with falls but which do not necessarily cause pain, we widened the inclusion criteria by removing foot pain as a criterion. The recruitment difficulties required a 3 month prolongation of the study duration.

Results: As a result of tailoring the recruitment strategy early in the feasibility study, we recruited rapidly to the exploratory RCT. We have exceeded our target (n=48).

Conclusions: Care home residents represent a convenient population for data collection, but frailty and multiple co-morbidities may make successful recruitment to intervention studies challenging. Whilst the

adaptations used in this study may have implications for external validity, this work underlines the importance of testing recruitment strategies at an early stage.

A11

Do ankle brachial index and pulse volume waveforms compare with the Ultrasound Duplex Scan for identifying Peripheral Arterial Disease?

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Aims/Objectives: To compare the sensitivity, specificity and overall accuracy of an automated ankle-brachial index (ABI) and pulse volume waveform (PVR) with the Ultrasound Duplex Scan (UDS) for identifying Peripheral Arterial Disease (PAD).

Content of presentation: 200 patients referred for UDS of lower limb arteries at two Medical Physics departments in the UK underwent an automated ABI and PVR measurement using a device utilising volume plethysmography followed by a UD Scan. PAD was recorded for automated ABI if <0.9 (and noted if >1.30), PVR's if graded mild/moderate/severe and with a haemodynamically significant stenosis or occlusive disease with the UDS. A result of PAD or NO PAD was recorded for each patient and each method. The outcome measure for this study was the agreement and overall accuracy between the automated ABI and UDS results and the PVR and UDS results.

Relevance/Impact: Of the 200 patients recruited 65% were male, 35% female with an overall mean age of 67 years (range 25-90 (SD 12.38)). 26.7% had DM, 36.7% had CHD, and 28.9% were smokers. 38% were found to have PAD using the gold standard UDS. Those with DM and PAD = 7%, CHD and PAD = 15% and smokers with PAD = 16.4%. The overall results indicated good agreement between ABI and UDS (sensitivity 85%, specificity 89% with overall accuracy 88%) and between PVR and UDS (sensitivity 97%, specificity of 89%, with overall accuracy 95%).

Discussions: The combined use of the ABI and PVR within one device could enhance vascular assessment especially those with potentially calcified vessels and for treatment planning of leg and foot wounds. With its rapid assessment time, it also has the potential to be introduced into a primary care screening environment as a reliable tool for confirming symptomatic PAD and early identification of asymptomatic PAD.

A12

Podiatrists' perceptions of diabetic foot care services in a Scottish NHS health board area

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Aims/Objectives: People with diabetes are at a significantly increased risk of foot ulceration, infection, and lower extremity amputation. The Scottish Intercollegiate Guidelines Network1 (SIGN) published guidelines on the care and management of foot complications in patients with diabetes in 2010. Little data is available on the extent to which these guidelines have been implemented, or on the perceptions of podiatrists working to the guidelines in this sector. The aims of this study were to 1) elicit podiatrists' perceptions of the diabetic foot care service provided in the health board area, 2) identify whether or not podiatrists perceived that national diabetic foot care guidelines are being met, and 3) identify any perceived barriers to optimal diabetic foot care.

Content: A mixed (quantitative and qualitative) methods approach was adopted. An anonymous cross-sectional survey of diabetic foot care service provision was administered to podiatrists attending a professional development event. Survey questions were formulated to address key areas of importance outlined in national diabetic foot care guidelines. Deeper exploration of podiatrists' perceptions of the provision of diabetic foot care services was conducted through a focus group using an interpretative phenomenological approach with thematic analysis. Survey data was summarised using descriptive statistics to identify areas of adherence to, or deviation from recommended clinical practice.

Outcomes: Fifty-nine participants who currently manage diabetic patients as part of their caseload took part in the survey (response rate 40%), and nine participated in the focus group.

Relevance: This research highlights several areas for improvement in the delivery of diabetic foot care services across the NHS health board under study, as well as some examples of good, effective practice. It is likely that the findings will be of interest to service managers across Scotland and the wider podiatric community as they seek to deliver optimal patient care with limited resources.

Discussion: The survey suggested that clinical practice adhered to certain guideline recommendations in the recording of patient risk electronically, appropriate referrals to multi-disciplinary teams and offloading of ulcers. It indicated that time constraints were the most commonly identified barrier to complying with the official care guidelines. Less than half of respondents (42%) believed that all SIGN guidelines were being met, and less than half (44%) stated they believed screening and assessment targets were being met. Analysis of the qualitative data revealed inadequacies in current risk stratification procedures, barriers to accessing certain services and challenges achieving effective patient education.

Conclusions: NHS publications indicate screening targets are being met, however the research indicates that podiatrists do not perceive this to be the case. It is unclear whether this perception is justified. A cross-section of podiatrists in the focus group indicated that screening may not be the most appropriate use of resources.

Further research is needed to identify the most effective solutions to the issues raised.

References

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A13

Type 2 diabetes education programmes – focusing on patients' perceptions

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Objective: The prevalence of Type 2 Diabetes in the UK during 2013 was 0.6%, equating to 3.2 million people. Forecasts indicate that three people will be diagnosed every ten minutes by 2025. Ineffective methods or delays in thorough patient education leaves the patient at risk of developing foot complications among wider issues of morbidity. This research aimed to test the efficacy of patient education for Type 2 Diabetes by analysing patients' views following their educational programme. The project aimed to highlight the value of such education programmes and to encourage wider holistic awareness of education in patient management.

Method: With School of Health ethical committee approval, a focus group was formed using a random sample of seven consenting Podiatry patients from a UK School of Podiatry. All patients had a diagnosis of Type 2 Diabetes and had attended an educational programme at some point over the last 12 years. The researcher initiated discussion with questions to the group and a one hour discussion was transcribed. This was defined using Nvivo 10 software and thematic analysis was employed to look at quality, recurrent themes and their significance in relation to the existing evidence base. The primary outcome measure was comprehension. Positive and negative perceptions were defined into subthemes to measure specific outcomes.

Outcome: This qualitative research study considered the efficacy of educational programmes for patients with a diagnosis of Type 2 Diabetes, using patients' perceptions. Contexts around stabilisation of glucose levels, quality of life, patient adherence and relationships were analysed. Although diet was quantifiably discussed, reference to comprehension and consistency of patient education were defined in order to answer the research question. Compared to current evidence, measures of group versus individual education, biomedical outcomes in the disease process and perceptions via questionnaires, this study found structure of education programmes to be the underlying key to successful outcomes.

Discussion: Effectual education is reliant upon collaborative interventions of all Health Care Professionals, so that consistent information is delivered and patients get the practical skills required to self-manage their Diabetes. Furthermore, patients' knowledge of their condition plays a valuable adjunct to basic awareness of Diabetic foot disease. Though there are many programmes available, it is evident that some patients newly diagnosed and some with long standing Type 2 Diabetes have limited knowledge of their condition. They feel anxious and confused, however; the majority of patients embrace the chance to share their story and knowledge, feeling empowered upon doing this.

This study has served as a useful pilot study and compared existing literature with the presenting qualitative evidence, however; for future research in this area a wider study is recommended to further investigate patient trends in a larger population. Moreover recommended are all practitioners involved ensure patient education forms part of a treatment plan and that we ensure, as professionals, we constantly question our practice. How do we educate best, and are the messages consistent in our delivery of patient education?

A14

A case-controlled study of minimally invasive vs open hallux valgus surgery

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Background: Previous attempts at small incision hallux valgus surgery have compromised the principles of bunion correction in order to minimise the incision. The Minimally Invasive Chevron/ Akin (MICA) is a technique that enables an open modified Chevron/ Akin to be done through a 3mm incision, facilitated by a 2mm Shannon burr.

Methodology: This is a consecutive case series performed between 2009 and 2012. This includes the learning curve for minimally invasive surgery. All cases were performed by a single surgeon at two different sites, one centre where minimally invasive surgery is available and the other where it is not. The standard procedure in both centres is a modified Chevron osteotomy. Regardless of whether the osteotomy was performed open or minimally invasive two-screw fixation was performed.

Retrospective analysis includes the intermetatarsal angle (IMA), hallux valgus angle (HVA), metatarsal 1 (M1) length, forefoot width and forefoot: hindfoot ratio. Clinical outcomes include the Manchester Oxford Foot Questionnaire (MOXFQ), American Orthopaedic Foot and Ankle Surgeons (AOFAS) questionnaire, and assessment of complications.

Results: There were 70 cases in each arm. Follow-up was 4 years to 6 months. The radiological outcomes were similar in both groups. There was an increased rate of screw removal in the MICA group. There were also cases of hallux varus, these occurred in the cases with severe pre-operative IMA angles that also had a lateral release and an Akin. There was high satisfaction in both groups.

Conclusion: This is the only comparison of minimally invasive and open techniques that has been performed, providing a direct comparison of the utility of a burr compared to a saw. These early results demonstrate the efficacy of a Minimally Invasive Chevron/ Akin in terms of achieving radiological correction. The clinical outcomes are excellent but there is a learning curve and this needs to be managed.

A15

Does bunion surgery actually narrow the foot? Assessment of outcomes of surgery using traditional angles and a new radiographic measure of severity- the forefoot: hindfoot ratio. Correlation with clinical outcomes

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Background: Various angles have been used to grade the severity of hallux valgus deformity. They are useful in surgical planning but do not correlate with symptom severity or improvement. We feel that there is a fundamental mismatch between the width of the forefoot and the width of the hindfoot and that this is more clinically relevant, we describe two techniques for measuring this. We aim to measure the degree of foot narrowing after surgery and moreover how this correlates to the severity of pre- and post operative outcomes.

Methods: 200 consecutive bunion operations were assessed with weight bearing radiographs. The HVA and IMA were measured according to standard practice. We also assessed forefoot width using two methods we have described. The first is the 'Forefoot Width' measured as a perpendicular to the midfoot (a technique we have previously validated). The 'Foot Ratio' is calculated as a function of the calcaneal width. Clinical outcomes were assessed using the Manchester Oxford Foot Questionnaire (MOXFQ), American Orthopaedic Foot and Ankle Surgeons (AOFAS) questionnaire.

Results: Bunion surgery narrows the osseous width of the forefoot. This narrowing can be by as much as 23mm in cases with severe deformity. We found that the Forefoot: Hindfoot ratio correlated with symptom severity and that normalisation of the ratio to below 2.5 was associated with better outcomes. This is important as small absolute corrections were associated with good outcomes.

Conclusion: Our measure of Forefoot Width is reproducible and allows for variations such as forefoot adductus. We feel that the Forefoot: Hindfoot ratio is more important as this determines the ability to fit into off-the-shelf footwear rather than requiring bespoke or modified footwear. This is the first study to look at the ability to narrow the forefoot and has important implications in determining patient selection and post-operative outcomes.

A16

The effect of body mass on performance of the Star Excursion Balance Test (SEBT)

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Background: Obesity is a global health epidemic and considered a pre-requisite to falls due to the effect of increased mass on balance

capability. There is limited research on the effect of increased mass on dynamic balance. The narrow scope of research that does exist assesses balance with sophisticated instruments which lack transferability to the clinical setting. The SEBT is a common clinical tool which has proven to be reliable and sensitive in detecting chronic ankle instability and risk of lower limb injury in athletes. To date, no studies have implemented the SEBT in analysing the effect of obesity or increased mass on balance. Therefore, the aim of this study is to investigate the effects of increased body mass on performance of the SEBT.

Method: Twenty-eight healthy participants were included in the study: 9 Male, 19 Female; mean (SD): age = 25.5 (5.1) years; height = 1.68m (0.09); mass = 67.8kg (13.6); leg length = 89.0cm (5.6). After four practice trials, participant's performance was evaluated for three complete trials of the SEBT and a further three with an empathy suit applied. The gender-specific empathy suits were used to increase the participant's mass, represent the distribution of adipose tissue and the associated limitations experienced in obesity. Reach distances were standardised by the participant's leg length and the deficit calculated by deducting the Standardised Maximum Reach while wearing the empathy suit from the Standardised Maximum Reach while not wearing the empathy suit. Paired T-Tests were used to analyse the reach deficits.

Results: All participants demonstrated a reduction in reach distance whilst wearing the empathy suits compared to when the empathy suits were not applied. The reach deficits were significant in seven of the eight reach distances. The anterior reach deficit was found to be the most statistically significant when participants mass was increased ($p=0.00002$).

Conclusions: The SEBT has found to be effective in detecting reach deficits related to increased body mass; as applied by gender-specific empathy suits. This indicates its potential use as a clinical tool to quantify dynamic balance ability.

Cite abstracts in this supplement using the relevant abstract number, e.g.: Waddington *et al.*: The effect of body mass on performance of the Star Excursion Balance Test (SEBT). *Journal of Foot and Ankle Research* 2015, **8(Suppl 1):A16**