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Musculoskeletal toolkit for evidencing podiatry effectiveness

For further information:
Royal College of Podiatry, Quartz House, 207 Providence Sq, Mill Street, London SE1 2EW
Email: contact@rcpod.org.uk

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Purpose

The main purpose of this report is to define and guide service provision for Musculoskeletal (MSK) podiatry. The primary audience is NHS departments where clarity, unity and provision of care vary throughout the four nations. The content of this project and report is also applicable to private practice, particularly larger groups, where service provision bids from Primary Care Networks (PCN) and Integrated care services (ICS) may be made. There is also suitable data reported here to support the independent practitioner to define and model their MSK service provision.

Introduction

MSK conditions are the most common form of physical disability worldwide with one in five GP consultations being related to MSK chronic pain [1]. The exact incidence of foot pathology associated with MSK conditions is unknown, yet there is a suggested range of 3-26% of the population experiencing foot-related MSK pathologies [2,3]. Presenting MSK pathologies that can be managed within the scope of podiatry range from generalised foot osteoarthritis, inflammatory disease, paediatric growth and development, sports injuries, fragility and falls risk and neurological conditions. The basis of podiatry intervention is developed through an accurate diagnosis of the pathology accompanied by analysis of gait and human movement biomechanics related to the presenting complaint. From this diagnostic information a suitable treatment plan is agreed upon and may include exercise therapy, functional foot orthoses or insoles, footwear, acupuncture, steroid injections, shockwave therapy, self-care and social prescribing. Provision of assessment and care can vary depending on the development of MSK podiatry services within a trust. A recent review of 32 NHS podiatry MSK services [4] highlighted that on average there were 5.2 podiatrists working specifically in MSK with an average of 3.42 designated clinics a week that focus on a speciality. However, there are large discrepancies in available services with just 60% of services

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being able to request diagnostic imaging and only 35% having access to plantar pressure measurement systems. Similarly, from the same review, 60% of services provide palpation guided steroid injections, 25% acupuncture and 13% shockwave therapy indicating a wide variation in care across the country.

Aims

The purpose of this project is to collate current evidence that exists on MSK outputs and efficacy whilst scoping further data sets, highlighting clinical outcomes from MSK services and identifying clinical champions. The long-term aim of the project is to develop an MSK tool kit, from this information, to demonstrate to commissioners, Trusts and Health Boards the cost-effectiveness and clinical effectiveness of podiatric MSK services, whilst unifying service provision and solidifying scope of practice for the MSK podiatrist.

Objectives

1) To tabulate specific outcomes from data collected from NHS trusts and Health Boards on MSK interventions
2) Lead analysis on the data collected
3) Work with a health economist/data analyst to develop narrative around cost-effectiveness of podiatric MSK interventions, with commissioners as the key audience.

Themes

To deliver the aims and objectives of this project, the following six themes have been identified as the relevant information required to go on to develop an MSK toolkit.

1) Point of referral and patient journey
2) Treatment Outcomes
3) Case Studies
4) Costing

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5) Treatment Protocols
6) Specialities

By collating this data and building collaboration between trusts on treatment protocols and care pathways, an effective knowledge transfer route will be formed to create a two-way flow of communication between the College and activity within NHS MSK provision.

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1. Point of referral and patient journey

MSK podiatry services exist in many forms throughout the NHS and regional provisions vary. This appears to be based on relationships with community and acute trusts, primary care networks and historical contracts that are repeatably renewed. Often, change is limited to how proactive individual management and commissioners are in altering the MSK service provision. Having a suitable mandate with guidance to improve and amend care gives MSK podiatry team leaders leverage to alter existing systems to enable faster and more efficient care.

When evaluating the patient's journey to gain access to the appropriate level of podiatry MSK care, either within the community or acute trust, on average one or two other practitioners are consulted. Although, when a First Contact Practitioner (FCP) is working in primary care in a GP's surgery, this journey is reduced as immediate contact with the podiatrist is made first time. From the referral source to podiatry, the average time for a patient to be seen by MSK podiatry is between 3-8 weeks. Then, after initial contact and assessment are made, the average patient receives two appointments (an assessment with initial treatment followed by a review with discharge). In some cases, depending on pathology, this can be longer and with paediatric cases where care can be ongoing until the patients are 18 or deemed suitable to discharge. Once a patient is assessed and treated, there is an average period of between 8-14 weeks for the patient to be discharged completing their care. Again, this is not the case observed for paediatric cases and when treating complex complaints, it is acknowledged that patients can continue their pathway of care indefinitely.

Patient journeys do vary within geographical localities, however once a patient has been seen by MSK podiatry, a common theme of treatment includes assessment and initial intervention at first

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appointment with a review and possible discharge at second appointment. In some cases, the patient is referred into another service (physiotherapy/orthotics and surgical intervention (podiatric or orthopaedic)). Other pathways of care lead patients to diagnostic testing/phlebotomy/casting for bespoke device and other healthcare services including mental health, chronic pain and dietetics.

Referrals into an MSK podiatry service can be via the GP, self-referral or by another medical/ healthcare professional. Within the tiers of care, there may also be a referral route from a FCP into community and multidisciplinary team (MDT) services as appropriate as well as referral between the podiatrists working in community and MDT hospital settings (Figure 1).

It is acknowledged in this report that completing the correct initial referral into services can be the main hurdle to access care; therefore, there is a case to provide a national programme to raise awareness of MSK podiatry skills and engage with national workstreams like GIFRT and BestMSKhealth initiative [5,6]. The knowledge and understanding about the scope of MSK podiatry practice is frequently reliant on historical experiences, active management of services as well as relationships between departments. If these connections are weak, or relationships poor, then often appropriate referrals are mismanaged into other services which can lead to a long route for patients into MSK podiatry.

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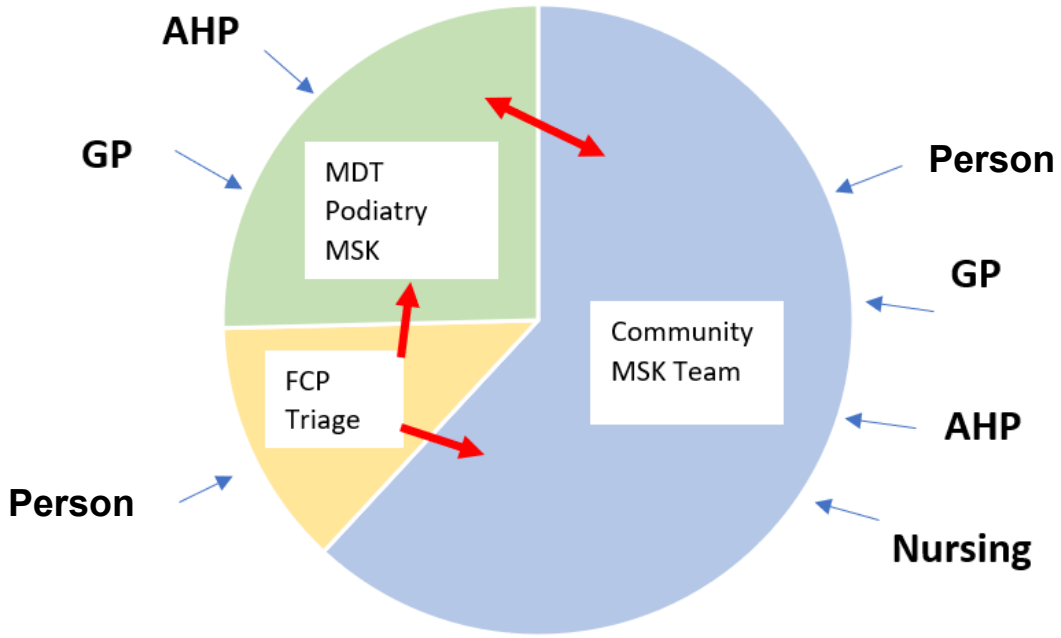
Figure 1 *Referral pathways between MSK podiatry services as well as access routes into services.* ***Where*** *AHP= Allied Health Professionals, GP= General Practitioner. Nursing includes health visitor and district nursing. Body icon is a self-referral.*



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2. Treatment Outcomes

Providing an evidence base to MSK podiatry treatment offers credibility, effectiveness and value to practice and the profession. Patient outcome measures (PROMS) are valuable as the main aim of any intervention is to get the patient better. In MSK podiatric practice, presenting symptoms are mostly represented as pain from injury, reduced function or systemic disease; the podiatrist will work with the patient to reduce or manage the amount of pain experienced and help to maintain function and manage disease. Pain perception from the patient is often measured with a numerical visual analogue scale to record a value of 0-10 which represents how much pain the patient associates with their problem. More recently this measure has been accompanied with the MOXFQ (Manchester -Oxford Foot Questionnaire) which has been shown to be the most reliable and repeatable clinical tool of the available PROMS [7]. This measure evaluates the amount of pain, ability to walk or stand and has an assessment parameter linked to social interaction and quality of life.

PASCOM-10 the podiatry audit tool **https://www.pascom-10.com/** allows for the practitioner to collate audit information about the pathology, treatment and PROMS from a contact with an MSK patient. Recently a modification to the original data collection proforma has been formulated to allow for faster and more relevant data set to be collected around MSK activity. Promoting utilisation of this tool will build on the supportive evidence available to promote efficacy of MSK podiatry intervention whilst boosting reliable outcomes to support further research.

From analysis of existing data, 208 complete inputs from nine centres in PASCOM demonstrated that plantar heel pain is the most prevalent condition seen by MSK podiatry (Table 1) with a vast array of other pathologies being diagnosed and recorded. Overall, the percentage improvement after intervention was 19%. However, it is critical to observe that in the most prevalent foot conditions there was on average a 30- 25% improvement across all MOXFQ parameters and in others improvement in the MOXFQ measure rose above 30%. Equally, the observed incidence and

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improvement in PROMS were also observed in an audit of 86 contacts where plantar heel pain was diagnosed most frequently and the MOXFQ significantly improved with podiatry intervention [8].

Table 1 – *Observed frequency of pathology. MOXFQ results, average % change in scores after review for each domain with an overall % average improvement. Totals indicate 210 incidences of care and overall % improvement for all pathologies.*

Pathology	Frequency Observed	MOXFQ			MOXFQ overall
		Pain	Walk/Stand	Social	
Plantar Heel Pain	49	26.8	28.1	20.9	25.3
Pes Planus	36	33.9	33.7	23.4	30.3
PTTD	19	28.1	26	25.2	26.4
Rheumatoid foot	18	15.5	7.7	7	10.1
Midfoot OA	14	6.2	12.1	7.8	8.7
Hallux Rigidus	12	4	10.8	1.1	5,3
Sinus tarsi	9	38.4	40	27.6	35.3
Achilles tendon	9	27.8	27.7	21.5	25.7
Ankle OA	7	17.4	25	10	17.4
Neuroma	6	6.5	9.1	8.3	8
Hammer toe	5	8	8.7	6.2	7.6
Metatarsalgia	5	-0.4	2	-0.1	0.2
Severs	4	30.2	27.5	27.7	28.5
HAV	3	17.6	10	2.6	10.1
Peroneal Tendon	3	1.3	16.6	2	6.6
Lateral Foot	3	33	20	12.3	21.7
Fat Pad	2	39.5	15	44	32.8
Sesamoid	2	21.5	10	3	11.5
Ankle instability	2	12.5	10.1	1.1	8.1
TOTAL	**208**	**21.6**	**20.5**	**15.7**	**19.2**

Where *OA= Osteoarthritis, PTTD= Posterior Tibial Tendon Dysfunction, HAV= Hallux adductor valgus, IM= Intermetatarsal*

For the purpose of this report, it should be noted that the presented MSK data collected has been extracted from PASCOM in its purpose as an audit tool for podiatric surgery and not the new MSK

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short-form. This tool has been identified as a suitable audit tool for MSK data and hence has been modified and changes made to create the MSK short-form. This MSK short-form in PASCOM purely focuses on the MSK podiatrist and allows for a larger range of podiatric diagnoses to be reported on. The design of the new form has been modified to allow for quick use by the podiatrist working solo with evaluation and modification from a pilot review with East Sussex Healthcare Trust, as well as with expert users of the original PASCOM system (Hadlow, Serrano, Welsh). From this feedback, several amendments have been made to the form (Table 2) and the MSK short-form tool launched to all members in Autumn 2021 to encourage a wider group of MSK podiatrists to register and use it.

Table 2 – Changes to the PASCOM forms based on focus groups, evaluation and feedback.

Identified Problem	Changes made
Difficult to fill in with too many processes	Amalgamation of all data required to complete the form into two episodes of care 1) Assessment 2) Review
Diagnoses are not relevant	Updated ICD-10 codes with a broader MSK focused set of pathologies to allow for representation of caseloads.
MOXFQ is not patient-friendly to use and is time-consuming	Altered the format of MOXFQ form to allow users to email the form to patients prior to appointments. The format was also changed to include an electronic response so that the patient could email the form back to the podiatrist.
Treatments are not relevant	Survey conducted through MSK:UK to collate information about a broad spectrum of treatments utilised by the MSK podiatrist. This gives a comprehensive choice for reporting.

A wider pilot study to assess the usability of the MSK short-form has been conducted in Northern Ireland with the additional feature of reporting medical device regulations. This has given a further opportunity to gather data from the patients assessed using the form, particularly diagnosis of pathology and treatments used. Giving a vision of what future data on MSK incidence and outcomes would look like (Table 3). From five practices registered, 200 contacts were reported during May

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and June 2021. Table 3 highlights the type of data possible to extract from the MSK short-form including the pathologies diagnosed and the treatments provided.

Table 3 *Representative data available to extract from the MSK short-form.* ***Where*** *WS= walking speed, P=pain and SI= social interaction for MOXFQ (score out of 100, larger being more problematic).*

Gender	Age	Podiatric Diagnosis	VAS	MOXFQ			Intervention
				WS	P	SI	
M	59	Posterior tibial Tendon Dysfunction	8	64	65	50	Orthoses
F	60	Foot Drop	3	10	30	25	Richie brace
F	12	Anterior Tibial Syndrome	5	50	50	43	Orthoses
M	52	Plantar Heel pain	4	75	45	50	Strength/orthoses
M	11	Osgood Schlatter	5	46	20	18	Orthoses
F	68	Posterior tibial Tendon Dysfunction	8	71	50	68	Orthoses
M	13	Patella Femoral Pain	5	42	50	50	Orthoses

Data moving forward in the future will be from a wider group of patients with a greater MSK focus, giving a clearer picture as to the impact this service has on patient outcomes.

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3. Case Studies

Service provision for MSK podiatry varies across the country but generally fits into three formats. The most common set-up is in a community service, where there are several roles at different competency levels within the team and set pathways for referrals and conditions treated. Separate to this model is an advanced level of practice that sits within an MDT/MCATS service within a hospital discipline. Podiatry services here provide care for complex cases, pre and post-operative care as well as supporting rehabilitation services. Then, more recently, a third level of service provision is emerging as FCP in PCNs where podiatry MSK sits in a triage role for patients in GP surgeries.

The following case studies highlight examples of service provision. Summary of care levels is presented in Table 4.

"First Contact Practitioner, Northants Rural PCN"

Based on the MSK FCP physiotherapy model (9) this role has been set up within Northants Rural PCN and provides a triage service of MSK patients at five GP surgeries. Graded at Band 8, the podiatrist is employed by the GP and objectives are set by the PCN with salary controlled and negotiated by the group. The service provides appointments for any patient with a lower limb MSK complaint and is supported by GP mentorship as well as team support from practice nursing staff and physiotherapists. Within the PCN, guidance on mapping patients to the service was created to fit with the HEE guidance on FCP and AP in MSK (9). The pathway is set up and designed to appoint urgent red flag conditions the same day with support of the GP team and routine care at the next available appointment.

The podiatrist can provide a range of treatments at first contact, including Nail Surgery, exercise prescription, preform orthoses provision, general diagnosis and advice. If required, patients can

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then be referred into secondary and tertiary care including surgical provision, imaging, community physiotherapy and community podiatry. Follow up care appointments are provided by telehealth with face-to-face review given if further treatment is required.

"Community MSK podiatry, Bradford District"

From a team of 53 podiatrists, there are 15 roles that are providing care for MSK patients. Referral into the service is primarily from the GP after an initial 6-week period of self-care directed by the GP with footwear advice and simple exercises. On review, if there is limited progress, the only route of referral is to MSK podiatry. The podiatry team consists of one advanced practitioner (band 8), three practitioners at band 7 and 11 band 6 podiatrists.

The average journey for patients starts with an assessment (6 weeks after seeing the GP), which includes a diagnosis and treatment plan, and treatment is provided. This is then followed up between 4-8 weeks and if successful at review, then the patient is discharged. If a persisting problem is identified then this is rectified or the patient is referred into another service for further diagnostic services, surgery or supportive physiotherapy. Assessment includes gait analysis, including plantar pressure scanning, biomechanical and pathology diagnosis. Treatments include pre-form orthoses, prescribed bespoke orthoses, extracorporeal shockwave therapy, steroid soft tissue injections, acupuncture, specialist footwear and specialist clinics in rheumatology.

"Royal Orthopaedic Hospital Case MSK podiatry"

The Royal Orthopaedic Hospital (ROH) is a tertiary centre in Birmingham where patients are referred primarily by GPs but also by other hospitals. There are currently four advanced podiatric practitioners (B8a), and further development of the team is planned with a trainee Advanced Podiatric Practitioner (APP) (B7) new to post next month with workload planned around the HEE four pillars of practice. ROH is a teaching hospital and the APPs are actively involved in the undergraduate medical student placements, delivering lectures and also have them shadowing in clinic.

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The podiatry service is delivered as part of the MSK medicine service (including advanced physiotherapist practitioners and pain management). The APPs work closely with the orthopaedic foot and ankle consultants in an out patient setting. APPs workload includes triage, assessment of complex patients, requesting diagnostic imaging (including x-ray, US, MRI, CT, NCS and bloods), injection therapy, listing patients for surgery with the agreement of the consultant, post-op reviews and care.

"Shetland Isle MSK triage"

As there are no orthopaedic services on the island an MDT triage service has been set up with podiatry and physiotherapy at the forefront. This allows for assessment, diagnosis and surgical triage to be completed with suitable input into orthopaedic consultants at Glasgow Royal Infirmary. This is facilitated by video conferencing with case discussions and pathways produced within a team environment. By creating this service, the patient is able to receive the most appropriate care, within a suitable time frame whilst also minimising travel and cost.

Clinical Stories and carer progression

Developing a special interest and career in MSK podiatry does not have a standard route as there are many sub-specialities to be trained in. This leads to a varied career choice with several postgraduate courses and qualifications to be gained [Appendix 2]. These routes to leadership and advanced clinical practice include academic achievements, a desire for research and enquiry and a desire to learn more about the care provided.

Patient experiences from receiving care from an MSK podiatrist are often life-changing with reports of people never looking back once their diagnosis and plan have been established and outcomes achieved. Patients often report that seeing a podiatrist first would have helped them most with their complaint.

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Table 4 Summary of the levels of service provision from first contact, community team and tertiary advanced care.

First Contact Practitioner Triage	Community MSK Team	MDT / Hospital MSK Team
• Frontline service • Extended Scope • Band 7-8 • Immediate care • Aligned referral • Right person first time • Limited follow-up care • Urgent care	• Self-referral, GP referral / consultant referral • Team approach and varied capabilities bands 3, 4, 5, 6, 7 and 8 • Package of care following care pathways for common MSK foot and ankle conditions. • All packages include: Self-management, health promotion, orthoses provision, exercise prescription. • Some trusts also offer shockwave, acupuncture, MSK injections. • Scope for advanced care e.g. imaging and contact ultrasound; Specialist clinics can include gait analysis with scope for plantar pressure assessment. • Direct referral pathways into tertiary care	• GP referral / consultant referral • Band 7 or 8 • Complex cases • Pain management • Advanced practitioner • Pre and post-op care • Guided injection • Non-medical prescribing • Referral for non-medical imaging and blood tests • Work closely with orthopaedics rheumatology orthotist physiotherapy pain Clinics

To provide a fully established provision of MSK podiatry care, all 3 service models can work together responding to patients needs and referring between each level of care, (Figure 1). Depending on the demographic of patient, population size and MSK need the variability of service may be tailored to localised requirements.

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4. Costing

Establishing a secure model for the cost of MSK podiatry services is a difficult task to create for a nationwide template. This challenge is driven by historical and geographical negotiated contracts and is limited by previous agreements in service provision. Additionally, the management of funds often falls under the umbrella of podiatry as a whole service, making it harder to define MSK cost. Adding to this model of provision, the newer role of an FCP podiatrist working in MSK is funded the PCN that they are employed by. This budget and cost can vary depending on the requirements of the group, but is often set at an NHS pay scale band 7 with scope to negotiate this pay grade with the employee.

Community trusts adopted different models of funding and can be managed on a block contract to provide care for all patients, with which the podiatry service manager decides how to allocate the funds for the whole service. This leads to discrepancies in what is included for MSK podiatry, with MSK team leads competing against diabetes, nail surgery and general care to obtain funds to support staff development, equipment and core services. Other models include negotiated fees for assessment and follow-up appointments. On average this is a flat rate fee, with no consideration of skill level and expertise. An initial appointment can be charged at £42.11 - £55 and a follow-up appointment £29.90. MSK podiatrists working in the community can be on an NHS Agenda for Change (AfC) contract bands 5,6 or 7 depending on skill level and expertise.

Applying this costing to a model of patient contact enables context to be put to the figures. Exploring data collected from Torbay and South Devon NHS trust between April 2020 and February 2021. Over this time 2676 New Patients were seen, using a cost figure of £42.11 this would generate £112, 686. At the same time, 885 reviews would equate to £26, 261. The total income for the service over this time frame could have been £139, 147. It is not clear from managing a service how

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this money is then allocated. Wages for podiatrists to run the service would need to be factored in along with running costs of materials, equipment, training and access to other facilities.

MSK podiatry delivered in an MDT as an outpatient does not have a treatment function code and is often included in the physiotherapy budget for the orthopaedic service it serves. Podiatrists can be employed under a physiotherapy contract and are often listed as band 8 advanced practitioners. Fees for a consultant-led service can range from £163-£180 for an initial assessment with a review appointment priced at £65-£75 per contact.

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5. Treatment Protocols

A vast array of conditions are observed in adult MSK podiatry with a variety of frequencies in presentation (Table 1). Plantar heel pain presents with the highest incidence, followed by a mixture of tibialis posterior dysfunction, pes planus and osteoarthritis. [Presenting Complaints, Appendix 1]. A recent review of treatments that are most effective in managing these conditions has been completed to create evidence-based treatment protocols. These protocols guide practitioners to the most relevant and suitable treatments for frequently diagnosed conditions. The protocols developed include [10]:

- Heel/Plantar fascial Pain
- Achilles tendinopathy (insertional and mid portion)
- Neuroma
- Patella tendon dysfunction
- Posterior tibial tendon dysfunction.

The pathways developed guide the user on diagnosis, assessment, intervention and prognosis. They have been developed with research-based information and can be utilised at different levels of practice. Additional to the developed guidance there are also intervention guides on:

- MSK guidance on steroid injections [11].

As research continues to develop around a deeper understanding of pathology and the effectiveness of interventions, these pathways will need to be updated and kept current. Similarly, several conditions are treated in MSK podiatry that have not got a developed care pathway. Table 1 represents conditions that are commonly diagnosed and treated. It is acknowledged that there is a paucity of research work to support strong diagnostic and intervention evidence to create set

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pathways of care for all pathologies encountered. The role of the advanced podiatrist is to mentor and guide less experienced practitioners in the management of less frequently observed conditions. Additionally, the application of underlying biomechanical principles allows an MSK podiatrist to provide appropriate intervention to a larger scope of mechanical and inflammatory conditions.

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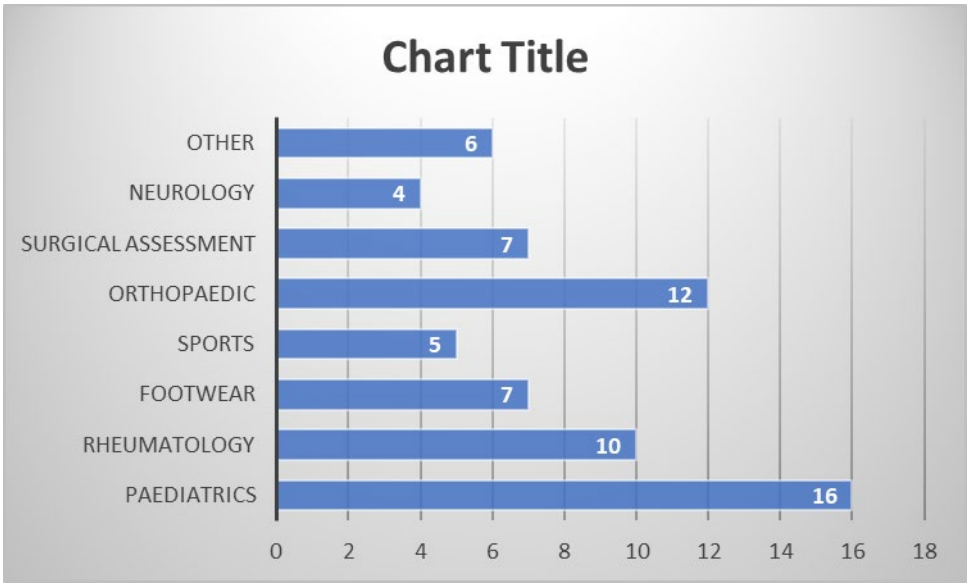
6. Specialities

The podiatry career framework (Appendix 2) provides descriptors to identify at what stage a podiatrist is at within their career. Within the management of MSK complaints lie several specialities where podiatrists can practice at an advanced and consultant level when their learning, practice, leadership and research go beyond the general care of core patient groups to focus primarily on a subset of pathology. The specialities generally cover paediatric care, rheumatology, sports medicine, neurology and surgical interventions. From a snapshot question sent out to 18 NHS MSK services around the UK, team leaders identified the following distribution of specialist services on offer from within their trust (Figure 1). The most frequently available specialist service is a paediatric MSK service which exists in 16 out of 18 areas, the least being neurology. Surgical assessment refers to advanced podiatry services supporting secondary care orthopaedic surgery with pre and post-operation assessment and intervention as well as rehabilitation and conservative management. Other services include specialist skills including joint injections and diagnostic ultrasound which are applicable to many groups of people.

Figure 1 *Survey responses to specialist service availability within NHS trusts.*



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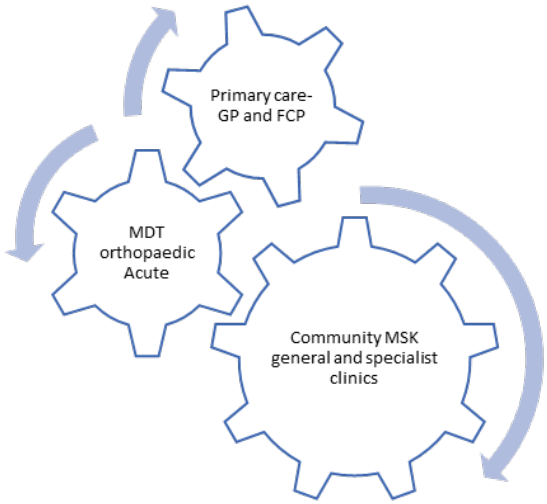
What needs to be established and defined to create speciality practitioners are suitable pathways of training to equip and support this higher level of practice. The *MSK Capabilities Framework* provides overarching guidance of capabilities for each level of practice with a focus on the key skills required to provide care within the broad speciality of MSK (Appendix 2). Guidance on development and leading practice in paediatric podiatry can be sought from the *Paediatric Podiatry framework* (Appendix 2) with applicable guidelines for managing the rheumatoid foot from the Northwest Podiatry Clinical Effectiveness Group (Appendix 2). These guides could be extended and applied to clinical practice enabling lead podiatrists to develop suitable specialities with appropriate service training. Suggestions for postgraduate CPD and qualifications have been created to support practitioners (Appendix 2).

Conclusion and Summary

MSK podiatry services can make a significant difference in patient care and outcomes when the foot and lower limb are affected. The services can be accessed at every level of NHS delivery and vary in their provision of care. The following model is recommended for service provision, with each region having a model where the patient can be assessed at initial contact and given suitable advice or referral to the correct podiatry service, either community or MDT. This can be with an FCP in place, or a triage service provided by the GP as seen in the Bradford case study.

Provision of care	
Primary – GP or FCP	First contact providing initial assessment/diagnosis and referral where required
Community service	MSK team with levels of care delivered across MSK capabilities [12] Provision of routine and specialised clinics
MDT acute	Advanced practice sitting with a hospital setting with extended roles in management of complex conditions.



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Within the podiatry MSK provision, there should be an advanced practitioner for each of the three specialities, paediatrics, orthopaedic medicine (general MSK) and rheumatology. Each one of these leads a team of practitioners who provide care for that patient group. Each specialism should have access to the relevant diagnostic equipment and have appropriate skills for the group they serve. A range of relevant interventions should be available for the team to work with, and these can be audited with appropriate tools including PASCOM. At all levels, referral pathways to more advanced clinicians and other services should be available for the patient.

Specialties	Diagnostic	Intervention	Audit outcomes	Referrals
	(Relevant to each patient group being treated)			
Paediatric Band 7 with PG training in paediatric **Orthopaedic** Band 7 with PG training in relevant orthopaedic biomechanics **Rheumatology** Band 7 with PG training in rheumatology	Imaging Clinical testing Gait analysis Biomechanical assessment	Orthoses Shockwave Injection Exercise prescription Mobilisation Taping Acupuncture Footwear advice Gait retraining Social prescribing Orthodigital splinting Advice	Appropriate outcome measure PASCOM	Physiotherapy Orthotist Prescription Footwear Surgery (orthopaedics or podiatric) Interventional radiology Phlebotomy Rheumatology

*PG=postgraduate

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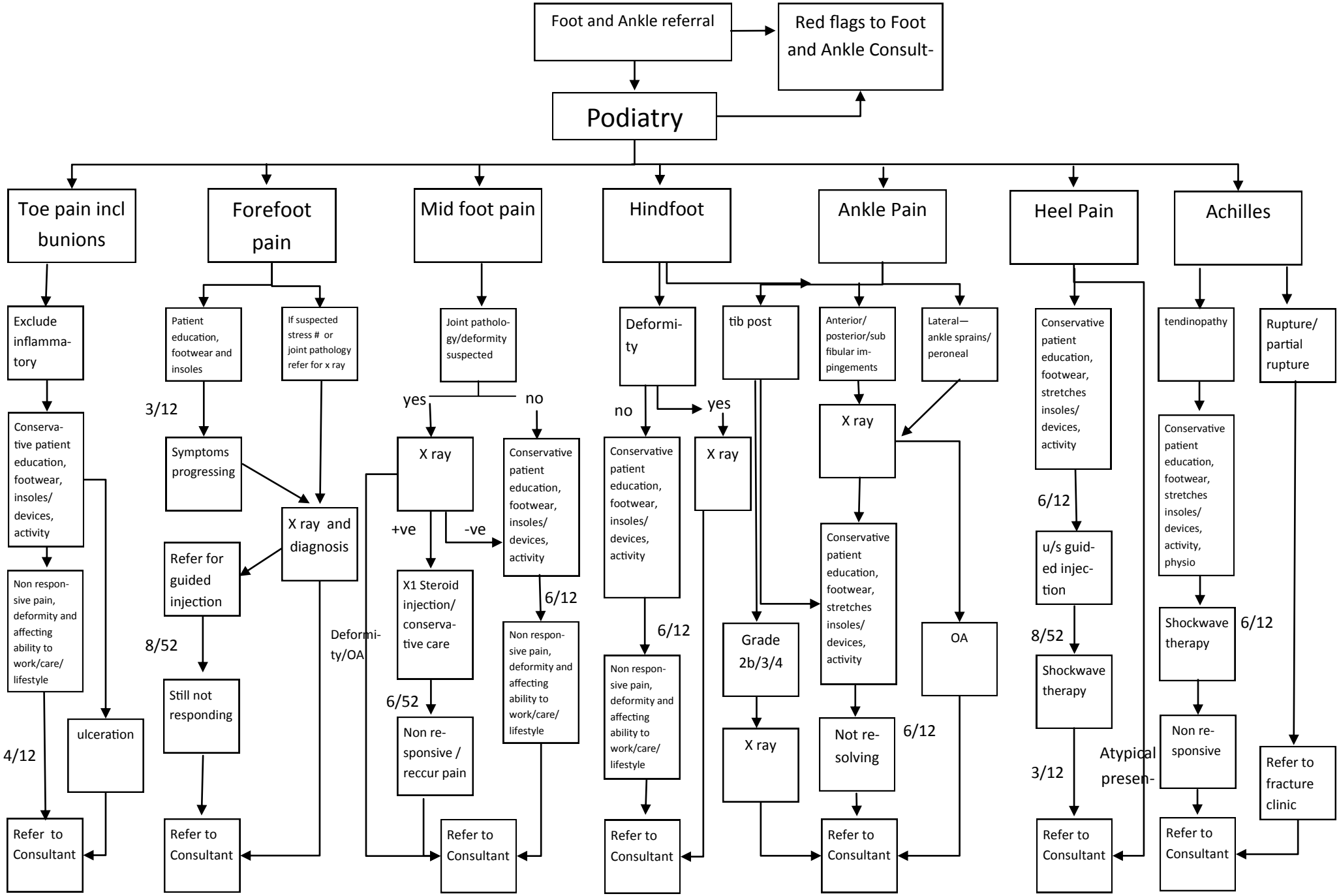
ROYAL COLLEGE of PODIATRY

Appendices

ROYAL COLLEGE of PODIATRY

Appendix 1


Foot and Ankle referral
Red flags to Foot and Ankle Consult-
Podiatry
Toe pain incl bunions
Forefoot pain
Mid foot pain
Hindfoot
Ankle Pain
Heel Pain
Achilles
Exclude inflamma-tory
Conserva-tive patient education, footwear, insoles/ devices, activity
Non respon-sive pain, deformity and affecting ability to work/care/ lifestyle
4/12
ulceration
Refer to Consultant
Patient education, footwear and insoles
If suspected stress # or joint pathology refer for x ray
3/12
Symptoms progressing
X ray and diagnosis
Refer for guided injection
8/52
Still not responding
Refer to Consultant
Joint patholo-gy/deformity suspected
yes
no
X ray
+ve
-ve
X1 Steroid injection/ conserva-tive care
6/52
Non re-sponsive / reccur pain
Refer to Consultant
Conservative patient education, footwear, insoles/ devices, activity
6/12
Non respon-sive pain, deformity and affecting ability to work/care/ lifestyle
Deformi-ty/OA
Deformi-ty
no
yes
Conservative patient education, footwear, insoles/ devices, activity
6/12
Non respon-sive pain, deformity and affecting ability to work/care/ lifestyle
Refer to Consultant
X ray
Refer to Consultant
tib post
Grade 2b/3/4
X ray
Refer to Consultant
Anterior/ posterior/sub fibular im-pingements
Lateral— ankle sprains/ peroneal
X ray
Conservative patient education, footwear, stretches insoles/ devices, activity
Not re-solving
6/12
Refer to Consultant
OA
Conservative patient education, footwear, stretches insoles/ devices, activity
6/12
u/s guid-ed injec-tion
8/52
Shockwave therapy
3/12
Refer to Consultant
Atypical presen-
tendinopathy
Conservative patient education, footwear, stretches insoles/ devices, activity, physio
Shockwave therapy
6/12
Non re-sponsive
Refer to Consultant
Rupture/ partial rupture
Refer to fracture clinic

East London NHS
NHS Foundation Trust

Plantar heel pain

Significant history/ findings

- Isolated heel pain with initial weight –bearing
- Pain described as sharp or aching
- Hx of sudden increase in exercise or prolonged standing in occupation
- Pain with palpation of inferior heel either at calcaneal tubercle or along plantar fascia
- Weak/tight calf muscles (lunge test, ankle dorsiflexion, heel raises)
- High body mass index - ↑ strain at plantar fascia

****Bilateral heel pain – may suggest underlying spondylarthropathy. Ask re: back pain, morning stiffness, joint pains ****

Consider other diagnoses e.g.

- nerve entrapment
- spondylarthropathy
- fascial tear
- tendinopathy/tenosynovitis
- neoplasm
- ischaemia

1st line treatment options

- Strengthening and stretching exercises (see exercise protocol)
- Deep tissue massage
- Footwear advice (if required)
- Gel cushioning/off the shelf insoles
- Advice re: weight loss (if required)

Improved

Discharge to self-care

No improvement

Has patient followed advice?

No

Yes

- Continue initial therapy (see exercise protocol) with a view to progressing exercise.
- Consider proximal musculature e.g. hamstring flexibility, gluteal strength.
- ***Discuss with MSK lead*** if recalcitrant PF which has not resolved in spite of above advice, complex case or suspected mechanical aetiology.

Improved

No improvement

2nd line treatment options

- Corticosteroid injections
- Orthoses
- Night splints
- Shockwave therapy

Diagnosis confirmed

3rd line treatment options

- Surgery e.g. fasciotomy

No improvement

Refer for diagnostic imaging

Diagnosis changed

Review treatment plan

Podiatric management of

Insertional Achilles tendinopathy [10]

Evidence base Pathway

Initial assessment

Significant History [1, 6]

- Posterior heel pain
- Intermittent first step pain
- Aggravated by activity
- Tendon stiffness

Findings suggestive of alternative diagnosis [1, 6]

- Radiating Pain
- Hyperaesthesia
- Anaesthesia
- History of trauma
- History of inflammatory arthritis
- Plantar heel pain

Significant Findings [1, 6]

- Tendon swelling/deformity posterior calcareous
- Localised thickening/nodularity
- Inflammation
- Difficulties single leg heel raise
- Rapid pronation during gait
- High BMI
- Hyperlipidaemia [9]
- Reduced ankle dorsiflexion [8]

Imaging [6,10]

Clinical diagnosis, imaging may be used to rule out differential Dx

Investigation to Consider [6]

- Lipid profile
- HbA1c
- ESR-CRP

Differential Diagnosis? [1]

- Midportion Achilles tendinopathy
- Partial/complete rupture
- Retrocalcaneal bursitis
- Superficial calcaneal bursitis
- Plantaris tendinopathy
- O/A ankle complex
- Tendon xanthoma

1st Line treatment [1, 6]

- ICED[6]
- Modified activity
- Eccentric loading (not into dorsiflexion) 3, 11

Not improved (consider Diff Dx)

Improved

2nd Line treatment

- Modify insole control (if appropriate)
- Assess patient compliance
- ESWT (in non-calcified tendon) [1, 7, 11]
- Heel raise [1]
- Functional foot orthotic if Biomechanics abnormality [1]
- footwear advice

Not improved

Improved

Referral to Orthopaedic surgery

Continue treatment until symptoms resolved

Treatment not currently recommended based on evidence [6]

- Acupuncture
- Ultrasound therapy
- Corticosteroid therapy
- Eccentric loading into dorsiflexion [5]
- Rest[1]
- PRP[1]

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Podiatric management of

Mid-portion Achilles tendinopathy [5]

Evidence base Pathway

Initial assessment

Significant History [2, 3]

- Posterior heel pain
- Intermittent first step pain
- Aggravated by activity
- Tendon stiffness

Findings suggestive of alternative diagnosis [2]

- Radiating Pain
- Hyperaesthesia
- Anaesthesia
- History of trauma
- History of inflammatory arthritis
- Plantar heel pain
- Positive Thompson test

Significant Findings [2, 3]

- Tendon swelling/deformity
- Localised thickening/nodularity
- Inflammation
- Difficulties single leg heel raise
- Rapid pronation during gait
- High BMI
- Hyperlipidaemia [4]
- Reduced ankle dorsiflexion [1]
- Excess rearfoot eversion at propulsive phase of gait [1]

Imaging [2]

- ultrasound or MRI indicated if clinical assessment is not clear

Investigation to Consider [2]

- Lipid profile [5]
- HbA1c
- ESR-CRP

Differential Diagnosis? [5]

- Acute Achilles rupture
- Partial tear of the Achilles
- Retrocalcaneal bursitis
- Posterior ankle impingement
- Irritation or neuroma of the sural nerve
- Os trigonum syndrome
- Accessory soleus muscle
- Achilles tendon ossification
- Systemic inflammatory disease
- Plantaris tendon involvement
- Insertional Achilles tendinopathy
- Calcaneal fracture
- Systemic inflammatory disease

Treatment not currently recommended based on evidence [2]

- Acupuncture
- Ultrasound therapy
- Corticosteroid therapy
- Splinting
- Custom Foot Orthotics
- Rest
- PRP
- Functional Orthotics

1st Line treatment [2, 3]

- Eccentric loading or slow heavy resistance training [2, 3]
- Weight loss advice

Not improved (consider Diff Dx)

Improved

2nd Line treatment

- Heel Raise [8]
- Assess patient compliance
- ESWT [2, 4]
- Imaging if Diff Dx suspected
- PRP [1,5]

Not improved

Improved

Referral to Orthopaedic surgery

- Dry needling[2]
- Iontophoresis[2]

Continue treatment until symptoms resolved

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Management of patients with musculoskeletal and rheumatic conditions who:

- are on corticosteroids
- require initiation of oral/IV corticosteroids
- require a corticosteroid injection

16 June 2020

This supersedes the specialist guidance “Management of Patients with Musculoskeletal and Rheumatic Conditions on Corticosteroids” published as part of the NHS England and Improvement phase 1 response to the coronavirus pandemic. It relates to musculoskeletal (MSK) service provision across primary, community and secondary care and is applicable to adults and children. The use of steroid medication is one of the management options for a range of musculoskeletal conditions and in particular rheumatic conditions, and this guidance aims to assist decisions on the use of such medication during the pandemic.

It is supported by the British Society for Rheumatology, British Association of Orthopaedics, British Association of Spinal Surgeons, Royal College of General Practitioners, British Society of Interventional Radiology, Faculty of Pain Medicine, British Pain Society and Chartered Society of Physiotherapy

It reflects the new potential problems that may be associated with corticosteroid use in the setting of COVID-19 while recognising the important role that appropriate and considered use of corticosteroids may have to treat patients where alternative treatments are inappropriate or ineffective.

Summary

Steroids – oral and injected – can be an important and effective treatment for some MSK conditions, particularly rheumatic conditions, some types of arthritis and joint pain. Sometimes these can be lifesaving. Stopping steroids suddenly can be dangerous, and patients should only do so under clinical supervision.

There is concern that steroids can increase the risk from the novel coronavirus (COVID-19). Therefore, healthcare professionals should always consider alternatives to steroids where possible. If steroids are needed, the lowest possible dose should be used for the shortest possible time. If people are already taking steroids, consideration should be given on whether the dose can be safely reduced. Only give steroid injections for severe symptoms, and where there are no other options. Corticosteroids (either oral or parenteral) should only be initiated following careful counselling of patients and shared decision making.

Table 1 Summary of key points

Don’t stop current steroids but taper their dose if possible and if it is clinically safe to do so, in line with usual practice.
Think before starting steroids in the current pandemic.
Use the lowest possible dose of oral steroids for the shortest period of time.
Starting oral prednisolone at more than 5mg per day for more than a month could move a patient into the shielding group.
Starting oral prednisolone at more than 20mg per day (or greater than 0.5mg/kg/day for children) for more than a month will move a patient into the shielding group.
Only give a steroid injection if a patient has significant disease activity and/or intrusive and persisting symptoms, and there are no appropriate alternatives.

Background

The current WHO guidance[1] for the management of severe acute respiratory infection in patients with coronavirus is to avoid giving systemic corticosteroids. We therefore need to be cautious when using steroids for other indications during the pandemic.

Steroids have been associated with an increased risk of mortality in patients with influenza and delayed viral clearance in patients with Middle East respiratory syndrome coronavirus (MERS-CoV) infection. Although steroids were widely used in the management of severe acute respiratory syndrome (SARS), there was no good evidence for benefit but there was persuasive evidence of adverse short- and long-term harm.[2] A recent study of patients with coronavirus from China reports that corticosteroids have no effect on mortality but do delay viral clearance.[3]

Long-acting, usually insoluble steroid formulations are frequently used as intra-articular or intramuscular injections in rheumatic diseases. To put this into context, triamcinolone acetonide 40mg is equivalent to 10 times normal daily adult physiological steroid production. The potential impact of any theoretical immunological suppression that may be associated with exogenous corticosteroid treatments in an asymptomatic patient incubating coronavirus at the time or in future is currently unknown. Therefore, in clinical practice processes to ensure an informed shared decision making with the patient should be in place. It is important to discuss the potential risks with patients in whom corticosteroid injection is being considered, and it is sensible to minimize the dose used and to avoid simultaneous injections to multiple sites where possible.

Although children and young adults are thought to be at lower risk from coronavirus, this guidance also applies to them as well as adults.

Steroid route and indications

Oral prednisolone

Patients on long-term steroids should not stop their treatment.

If starting steroids in **adults** during the pandemic, use the lowest possible dose and taper corticosteroid therapy as fast as possible in the clinical context, for example:

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[1] World Health Organization *Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected*, 2020. https://www.who.int/docs/default-source/coronaviruse/clinical-management-of-novel-cov.pdf

[2] Russell CD, Millar JE, Baillie JK. Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. *Lancet* 2020; 395:473.

[3] Huang C, Wang Y, Li X, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet* 2020; 395(10223):497-506.

- maximum 15mg daily or equivalent for new polyarthritis or polymyalgia rheumatica
- maximum 40mg (0.75mg/kg) daily for giant cell arteritis (GCA)
- maximum 60mg (1mg/kg) daily for GCA with ocular involvement, large vessel involvement or vasculitis
- maximum 30mg daily for 1 week for gout or pseudogout flares where oral NSAIDs or colchicine are contraindicated, and intra-articular joint injection is not possible.
- higher doses of oral prednisolone should only be used on specialist advice
- high dose steroids may be required to manage an acute flare of severe autoimmune connective tissue disease or vasculitis and specialist advice should be sought.

Steroid use in **paediatric** disease should only be initiated/dose adjusted by the paediatric specialist service.

Intramuscular injections

Only use to control a significant disease flare that is compromising a patient's ability to function, and consider using lower doses (maximum recommended 120mg methylprednisolone or equivalent).

Intra-articular injections (IAI) for inflammation

Only use for inflammatory joints where there is active synovitis ± effusion, and consider using lowest clinically effective doses.

For children and young people with juvenile idiopathic arthritis, if few or only one joint is affected, IAI may be used, and is likely to be safer than oral steroids. If multiple joints are affected a DMARD or escalation of treatment should be considered.

In young children intra articular injections may need to be administered under a general anaesthetic, which makes these 'aerosol generating procedures' for COVID-19 purposes. In such cases, careful consideration would need to be given as to whether this is the most appropriate treatment option at the current time, taking into account factors including: (1) the additional COVID-19 risks associated with this aerosol generating procedure; (2) any practical issues for the child/family in receiving such injections at this time (e.g. usually a procedure requiring a general anaesthetic will occur in a 'green' or COVID-free pathway and under current guidance this would require 14-days isolation prior to the injection); and (3) whether there are circumstances in the local healthcare setting meaning patients cannot secure suitably rapid access to the procedure. Alternatively, treating clinicians could consider injection with local anaesthetic, or sedation, or a short course of systemic steroids as other options.

Intra-articular, peri-articular and soft tissue injections for musculoskeletal pain

For example, osteoarthritis, shoulder pain, lateral hip pain, carpal tunnel syndrome, trigger digit and de Quervain's.

Recommend simple analgesia, activity modification, splinting where appropriate and exercise as first line and in most patients.

Only consider a steroid injection if a patient has high levels of pain and disability, has failed first-line measures and continuation of those symptoms will have a significant negative effect on their health and wellbeing and after obtaining informed consent.

Consider carefully the dose of steroid used, choosing the minimum appropriate dose. Where possible avoid simultaneous multiple site injections.

Patients should be given guidance about activity modification and exercise therapy following an injection.

Injections for spinal radiculopathy

All appropriate and available non-invasive treatments should be explored and discussed with the patients, before injection treatments are considered

Injections can be offered for severe radiculopathy and as an alternative to surgery, they should be assessed on an individual basis and a collaborative approach taken with other clinicians to guide prioritisation. Patients must be engaged with the process, fully aware of the risks and be able to give informed consent.

In such cases an epidural or targeted nerve root block can be performed with local anaesthetic only or with the lowest possible dose of steroid to be effective.

Patients should be given guidance about activity modification and exercise therapy following an injection.

Intravenous methyl prednisolone

IV methyl prednisolone should be reserved for those with clinically active disease and given on specialist advice only.

Shielding and steroids: implications

Starting a course of oral prednisolone to last more than a month **may** put someone into the shielding group and the implications of this should be discussed with the patient.

Starting oral prednisolone at more than 20mg per day in an adult or greater than 0.5mg/kg in a child for more than a month **will** move a patient into the shielding group.

A one-off steroid injection for local action will **not** put someone into the shielding group.

A one- off intramuscular steroid injection will **not** put someone into the shielding group.

Should injected corticosteroids still be used during the current coronavirus pandemic?

As per usual practice, individuals with active infections must not be injected with steroids.

Steroid injections are commonly used in MSK management to control inflammatory joint disease, ease pain, increase mobility and improve quality of life. Their duration of effect is variable but they can provide benefit for several months and in certain conditions (such as trigger digit) may provide long-term symptom resolution. In some patients, the use of an injection can avoid the need for surgery or delay it for a substantial period, thereby reducing the risks of patients undergoing procedures at this time. However, during the coronavirus pandemic clinicians need to give extra consideration as to whether the benefits outweigh the risks. The incubation period for coronavirus can be long (up to 14 days) with an estimated median time of 5.1 days. This means that giving a steroid injection to an asymptomatic patient who is carrying the virus could potentially put them at increased risk of an adverse outcome from the virus. This potential risk therefore needs particular consideration in more clinically vulnerable patient groups, for example patients over the age of 70, those with diabetes mellitus, ischaemic heart disease, chronic respiratory disease and hypertension.[4] Patients in the 'clinically extremely vulnerable' group for COVID-19 will be shielding, and similarly great care will need to be given to assessing and discussing the risks both of any immunosuppression resulting from the injection and also attending a clinical setting where higher levels of COVID-19 ma be present; the risks for these patients may outweigh the benefits so clinicians need to exercise great caution and explain the risks to the patients.[5]

To summarise:

An individual risk analysis should take place on a case-by-case basis.

Delivery of care should follow relevant national guidance[6] and local delivery plans.

If you are a non-prescribing clinician injecting under a patient group directive, then you must follow local guidelines.

[4] NHS defined groups at 'moderate' and 'high' risk: https://www.nhs.uk/conditions/coronavirus-covid-19/people-at-higher-risk/whos-at-higher-risk-from-coronavirus/

[5] Shielding guidance: https://www.gov.uk/government/publications/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19/guidance-on-shielding-and-protecting-extremely-vulnerable-persons-from-covid-19

If you are a non-prescribing clinician injecting under a patient group directive, then you must follow local guidelines.

If you do decide to undertake injection therapy, you **must**:

1. Adhere strictly to your local infection control policies, including cleaning and use of personal protective equipment (PPE) as required.
2. Adhere to local policies on screening, testing etc. for patients to reduce the risk of COVID infection at the time of the injection.
3. Review if the procedure is still clinically indicated if patient has been on a waiting list for some time, ensure the benefit outweighs the risk.
4. Consider if you can reduce the maximum dose of the steroid or choose an alternative medicine to minimize the systemic effects of corticosteroid (e.g. injecting bilateral joints at separate times)
5. Ensure patients are fully aware of the potential increased risk and the lack of clear evidence related to risk during the coronavirus pandemic. They must be engaged in decision-making.
6. Advise all patients to adhere to regular public health advice, e.g. regarding hand hygiene and social distancing, to reduce risk of COVID infection.
7. Obtain and document informed consent to proceed with injection therapy.

[6] https://www.england.nhs.uk/coronavirus/publication/operating-framework-for-urgent-and-planned-services-within-hospitals/.

Podiatric management of

Intermetatarsal Neuroma

Evidence base Pathway

Initial assessment

Significant History [2]

- Pain in the forefoot commonly in the third inter-metatarsal space.
- Pain in tight fitting shoes and relieved on removing footwear and massaging toes.
- Reported sensation of a pebble or stone under the metatarsal area
- Sharp stabbing, tingling or burning pain in the nerve distribution.

Findings suggestive of alternative diagnosis

- Presence of plantar hyperkeratosis
- Tenderness located on palpation of plantar met head
- Hx of trauma

Significant Findings [3, 4, 8, 9]

- **Pain on squeezing met space**
- **Mulder's click**
- **Pain on lateral foot squeeze**
- Digital nerve stretch test
- Tinnels sign/plantar or dorsal percussion
- Apical sensation deficit for 10g/light touch.

Those in bold show a higher correlation in research. Two or more positive tests is a strong indication [7]

Imaging

Not indicated at time of diagnosis, but to rule out differential diagnosis

Differential Diagnosis? [1, 2]

- Heloma Durum
- Verruca Pedis
- Fat pad atrophy
- rheumatoid nodules
- Stress fracture
- Frieberg's disease
- Osteoarthritis
- Tarsal tunnel syndrome
- Systemic sensory neuropathy
- Systemic disease
- Capsulitis

1st Line treatment

- Foot wear advice (avoid hard soled or high heeled shoes) [1, 2]
- NSAIDS [2]
- Insoles/orthoses to reduced pressure on nerve (use a metatarsal pad or dome placed proximal to the metatarsal heads to spread metatarsals) [1, 2]

Not improved (consider Diff Dx)

Improved

2nd Line treatment

- Consider imaging (ultrasound as first choice, M.R.I. if multiple neuromas or X-ray to rule out bony pathology) [1, 2, 10]
- Modify or trial alternative insole
- Corticosteroid injection [2, 6]

Not improved

Improved

Referral to Podiatric surgery

- Neurectomy or cryoablation [2,6]

Continue treatment until symptoms resolved

Treatment not currently recommended based on evidence [6]

- Supinatory insoles alone are not effective [2, 12]
- ESWT[11]

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Note for the future/current ideas under trial

NICE guidance contains current recommendations around use of radiofrequency ablation. It states that due to evidence being limited in terms of quality and quantity, the procedure should only be used with special arrangements for clinical governance, consent and audit or research[6]

There are studies taking place around the use of extracorporeal shock wave therapy in the reduction of symptoms of Morton's neuroma but evidence is not yet sufficient and this is not commonly used as part of a common treatment pathway[11]

Hirschberg (2000) relates in a small journal article to an idea he has tried with his patients around using a 1/8 inch or 3mm elevation area under the 4th and 5th metatarsals to allow the 3rd metatarsal to drop to separate the metatarsal heads vertically leaving space to "free" the neuroma [5]

Podiatric management of

Patellofemoral Pain

Evidence base Pathway

Initial assessment

Significant History

- Anterior knee pain
- Worsens with activity
- Ascending/descending stairs
- Subluxation
- Gender = Women>Men[5]

Findings suggestive of alternative diagnosis

- Pain proximal or distal to patella
- "Deep" pain
- Altered sensation

Significant Findings [5]

- Anterior knee pain
- Positive patella fem compression test
- Decreased hip abduction strength
- Decreased quadriceps strength
- Decreased ankle ROM
- Pronated foot posture (High FPI score)

Imaging

Not indicated at time of diagnosis, but to rule out differential diagnosis

Differential Diagnosis? [1, 2]

- Referred hip pain
- Quad/patella tendon tear
- Retinacular insufficiency
- Bipartate patella
- Fracture
- Bursa
- OA

1st Line treatment [1]

- Gluteal strengthening
- Quad strengthening/stretching
- Hamstring stretching
- Calf stretching
- Orthotics dependant on biomechanics
- RICED
- Medially directed Patellar taping

Not improved (consider Diff Dx)

Improved

Treatment not currently recommended based on evidence

- Joint Mobilisation in isolation of other treatment modalities
- Ultrasound[1]
- Knee brace[5]

2nd Line treatment

- Modify orthotic control
- Check Patient Compliance – Re-educate
- Imaging

Not improved

Improved

Referral to Orthopaedics

Continue treatment until symptoms resolved

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Note for the future/current ideas under trial

Gait and movement pattern retraining - a lack of consensus among experts on the level of difficulty in implementing these strategies exists, primarily owing to the fact that the majority of research reporting favourable findings utilised gait laboratories to facilitate running retraining. Recent promising case series findings for gait retraining in runners with PFP, movement pattern retraining may be a valuable addition to the clinical management of PFP. Clearly further research to establish clinical approaches to facilitate movement pattern retraining, and evaluate their effectiveness is needed.

Exercise prescription — there is a lack of guidance regarding various exercise prescription principles, including the value of OKC and CKC; duration and frequency of exercise sessions; and level of supervision required at various stages of rehabilitation.

Podiatric management of

Plantar Heel Pain[8]

Evidence base Pathway

Initial assessment

Significant History

- Isolated Plantar Heel Pain [5,9]
- Pain on initial weight bearing [5,9]
- Recent history of increased weight bearing activity [5,9]

Findings suggestive of alternative diagnosis [5]

- Radiating Pain
- Hyperaesthesia
- Anaesthesia
- History of trauma
- History of inflammatory arthritis
- Posterior heel pain

Significant Findings

- Pain on palpation of medial tuberosity of the calcaneus or plantar fascia [5]
- Obesity/High BMI [11]
- abnormal Foot posture index score [5,12]
- Decreased hamstring flexibility [12]
- Ankle Equinus [12]
- Decreased functional ROM of 1st MTPJ during gait [12]
- Poor/flat footwear [5,12]
- Weight bearing job [12]

Imaging [8,9]

Not indicated at initial assessment and diagnosis of plantar heel pain but for differential diagnosis.

Differential Diagnosis? [5]

- Imaging?
- Achilles Tendinopathy
- Stress Fracture of calcaneus
- Trauma
- Juvenile Arthritis
- Sever's disease
- Skin pathology .e.g. Corn
- Nerve entrapment pathology
- Plantar fibroma

1st Line treatment

- Plantar Fascia specific stretching [2,4]
- Achilles tendon stretching [5,6]
- Foot orthoses [5,13]
- Oral/topical NSAIDs
- Footwear advice[5]
- Weight loss [5,11]
- Strapping/taping [5]

Not improved (consider Diff Dx)

Improved

2nd Line treatment

- Plantar fascia loading regime [7]
- Night splints[9]
- Steroid Injection [2,3]
- ESWT [1,2]

Not improved (consider Diff Dx)

Improved

3rd Line treatment

- Plantar fasiotomy—after 6 months conservative treatment failure.[11]

Continue treatment until symptoms resolved (discharge as appropriate)

Treatment not currently recommended based on evidence

- Trigger point dry needling
- Acupuncture[10]
- Ultrasound
- PRP injections
- Low level laser

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Podiatric management of

Tibialis Posteior Tendon Dysfunction

Evidence base Pathway

Initial assessment

Significant History

- Over use injury [4, 9]
- Woman > Men [3, 4]
- > 45yrs [3, 4]
- High BMI [4]
- Pes Plano valgus foot deformity [9]

Associated Factors

- Age related degeneration[4]
- Inflammatory arthritis [4, 12]
- Hypertension [4]
- Diabetes mellitus[4]

Findings suggestive of alternative diagnosis

- Inflammatory arthritis[4,12]
- Recent traumatic injury[6]
- Radiating pain[6]
- Neurological symptoms[10]
- Complete loss of active ankle inversion against resistance[10]

Significant Findings

- Stages I-IV[5, 6, 9]
- Pain around medial malleolus[9]
- Flattening of medial longitudinal arch[9]
- Tibialis posterior muscle weakness[10]
- Lateral impingement[10]

Imaging

- Not indicated at initial assessment [10, 11]
- US [11]
- MRI [6, 9,11]

Differential Diagnosis [5, 6, 8, 10]

- Navicular fracture
- Tarsal tunnel syndrome
- Tarsal coalition
- FHL tendinopathy
- FDL injury
- Medial ligament sprain/ insufficiency
- Neuromuscular conditions
- Hypermobility
- Os navicular
- Charcot arthropaty

Treatment not currently recommended based on evidence

- Corticosteroid injection [8]

1st Line treatment

Stages I-II

- Orthoses [4]
- Eccentric strengthening exercises [1, 4]
- Oral/topical NSAIDs [11]
- Footwear advice [8]
- Strapping/taping [5]
- Weight loss [4]

Stages III-IV

- AFO [5, 7, 8]
- Cast immobilization [5]

Not improved (consider Diff Dx)

Improved

2nd Line treatment

Stages I-II

- Modify orthotic control
- Check patient compliance – Re-educate
- AFO [5, 7, 8]
- Cast immobilization [5]

Not improved

Improved

Referral to Orthopaedics

Stages II-IV

- Corticosteroid injection [2 (Tenosynovitis)]
- Surgery [5, 8 (Synovectomy, Tendon transfer, Arthrodesis)]

Continue treatment until symptoms resolved

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ROYAL COLLEGE of PODIATRY

Appendix 2

Review of MSK post grad provision.

A current survey of specialist MSK podiatrists concluded that a defined pathway for postgrad MSK training, CPD and education was required to be aligned with a career pathway and framework. This was also supported by a working NHS MSK managers group who felt one of the biggest concerns for the development of services within the NHS was the lack of a defined postgrad pathway to support the development of lower band gradings moving into specialist posts. Post graduated training has been shown as an essential requirement for a AHP to deliver an extended specialist post within the NHS (HEE 2019). The critical skills and training that are delivered from completing a postgraduate award improve confidence in decision making as well as the ability to enquire in detail about clinical presentations. Postgraduate study can encompass academic awards as well as modules but should also extend to recognised courses and conferences. The choice and focus on which award to study should be relative to MSK as a whole and not solely Podiatry driven. This enriches the learning experiences of the student by exposing them to a multi-professional cohort, allowing for a synthesis of new ideas and collaborations.

The following review was conducted to help support and guide those wishing to develop their MSK skills at a number of levels.

Doctorate

A traditional PhD is usually fixed to a defined research project that is often completed full time over a 3-5 year period. This would mean leaving a clinical post and becoming a student for that period of time. A useful resource to search for possible projects is www.findaphd.com

There are also alternative ways of completing this level of study with a professional doctorate or a research post/grant within an organisation.

Award	**Institute**	**Content**
Integrated Clinical Academic Programme • Clinical Doctoral Fellowship	National Institute for Health Research https://www.nihr.ac.uk/explore-nihr/academy-programmes/hee-nihr-integrated-clinical-academic-programme.htm	A 3- 6 year programme that allows for clinical work to be completed alongside a research project
Professional Doctorate in Healthcare Sciences	Staffordshire University https://www.staffs.ac.uk/course/healthcare-science-professional-doctorate	Part or full time the programme allows for independent study in your chosen field with modular study and final original research project. You are able to study and keep in your clinical role
Podiatry PhD	University of Brighton	Full time student you will be focusing on a

	https://www.brighton.ac.uk/research-and-enterprise/postgraduate-research-degrees/programme-areas/podiatry.aspx	podiatry specific research programme with modules in paediatrics, inflam arthritis and woundcare
Musculoskeletal PhD or MPhil	University of Manchester https://www.manchester.ac.uk/study/postgraduate-research/programmes/list/11028/phd-mphil-musculoskeletal/	Research is undertaken by researchers investigating genetic and epidemiological aspects of musculoskeletal conditions.

Masters /Postgraduate Diploma /Certificate Level 7

Level 7 study is a formalised postgraduate university based level of study. Modular construction of the awards are based on a credit value system with 60 credits being associated with a Postgraduate Certificate, 120 a Postgraduate Diploma and 180 equal to a Masters. Programmes are often staged in this way with subject specific content being delivered in the first two years of study, up to 120 credits, with the final year being a research thesis that creates the masters degree.

Delivery can be part of full time and does include distance learning as well as campus based programmes. Useful resources include www.findamasters.com and www.postgrad.com

Award	Institute	Content
Podiatry MSc	University of Huddersfield https://courses.hud.ac.uk/part-time/postgraduate/podiatry-msc#_ga=2.250913094.1766116232.1581694952-1736417281.1581694952	This course has been designed for practicing and newly qualified podiatrists who wish to further their career to work at a higher level of practice by expanding their knowledge and skills in the specialist areas within the profession. It provides the opportunity for you to focus on podiatric specialisms including musculoskeletal or management of long-term conditions. 2 year
Advanced Podiatry MSc	University of Brighton https://www.brighton.ac.uk/courses/study/advanced-podiatry-msc-pgcert-pgdip.aspx	Core modules on the course focus on the four pillars of clinical practice (clinical practice, leadership and management, education and research) and help you to develop complex decision-making skills, apply evidence-based practice and develop innovative solutions that will enhance patient, family and

		carer experience and improve clinical outcomes. Part time or full
Advanced Practice PgCert PgDip MSc	University of Cardiff https://www.cardiff.ac.uk/study/postgraduate/taught/courses/group/advanced-practice	The MSc in Advanced Practice is designed for health, social care and related professionals in primary, secondary and tertiary settings who wish to advance their knowledge base and their clinical, leadership and management skills. Full or part time
Clinical Biomechanics	Staffordshire University https://www.staffs.ac.uk/course/clinical-biomechanics-msc	The MSc Clinical Biomechanics has been developed for health professionals who wish to extend their understanding of the clinical application of mechanical principles. Considerable flexibility in the way the award is structured will allow you to tailor learning to your specific area of practice. 3 years part time blended learning with some module distance learning and others weekend based on campus study.
Clinical and Sports Biomechanics	Liverpool John Moores University https://www.ljmu.ac.uk/study/courses/postgraduates/sport-and-clinical-biomechanics	Biomechanics is the study of the mechanical functioning of the biological system. This course applies biomechanical knowledge in both a sporting and clinical context. You will study under the guidance of world-leaders in biomechanics, bringing your own knowledge into our state-of-the-art facilities 2years part time or 1 year full time campus based
Sports Injury Management PgCert	Leeds Beckett University https://courses.leedsbeckett.ac.uk/sportinjury/	This course will provide you with the range of skills required to respond to a growing number of challenging developments within sport, such as dealing with an increasingly ageing population wanting to be physically active. Part time taught
Musculoskeletal Management MSc	UCLAN https://www.uclan.ac.uk/courses/msc_musculoskeletal_management.php	The Musculoskeletal Management programme will provide medical and health professionals with the knowledge and skills to assess, triage and care for patients with MSK conditions; to apply the clinical theory, practice and associated research in the prevention, assessment and management of MSK conditions within contemporary healthcare

		Full or part time taught on campus in Preston.
Musculoskeletal Ultrasonography PgCert	University of East London https://www.uel.ac.uk/Postgraduate/Courses/PGCert-Musculoskeletal-Ultrasonography	This fully accredited PG Certificate course allows established healthcare clinicians working in the field of musculoskeletal and sports medicine to combine learning in the workplace with a recognised postgraduate qualification. Full and part time on campus learning
Clinical Rheumatology and MSK medicine MSc	University of Manchester https://www.manchester.ac.uk/study/masters/courses/list/02120/msc-clinical-rheumatology-and-musculoskeletal-medicine/course-details/	Our MSc Clinical Rheumatology and Musculoskeletal Medicine course is designed for doctors/allied health professionals who are pursuing a career in rheumatology or a related subject. Part time on day release
Podiatry MSc/PgDip	Queen Margaret University https://www.qmu.ac.uk/study-here/postgraduate-study/postgraduate-subject-overviews/podiatry/	This flexible MSc course provides an opportunity for podiatrists to develop their own programme of study at master's level when studying from their own home or work base 3-7 years duration Distance learning
Health Research Methods MSc	University of Exeter http://www.exeter.ac.uk/postgraduate/taught/medicine/health-research-msc/	This programme has been designed to give you the skills and knowledge to enact meaningful change and gain a comprehensive grounding in health services research methods as a platform for developing a career as a health researcher Taught programme part or full time.
Sport and Exercise Medicine Podiatry MSc	Queen Mary University of London https://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/sports-and-exercise-medicine---podiatrist-msc/	It is a very practical course with a multidisciplinary approach to patient management, so it should also appeal to those who want to enhance their clinical knowledge and expertise. Full or part time
Podiatric Sports Medicine – Pg Cert	Queen Mary University of London https://www.qmul.ac.uk/postgraduate/taught/coursefinder/courses/podiatric-sports-medicine-pgcert/	The course is designed and suitable for qualified podiatrists with clinical experience and an interest in sports medicine. It is a very practical course with multidisciplinary approach to patient management, so it should also appeal to those who simply want to enhance their clinical knowledge and expertise.
Advanced Medical Imaging MSc/PgDip/PgCert	University of Salford https://beta.salford.ac.uk/courses/postgraduate/advanced-medical-imaging	The novelty of this Advanced Medical Imaging programme is that there is no single standard pathway. Module choices will depend on your

		own practice area and more complex requirements can be discussed with the course team prior to commencement. This programme will allow you to meet the challenge of specialist, advanced and consultant practitioner status in the field of advanced medical imaging within a rapidly evolving health service.
Sports Medicine MSc/Pg Dip/Pg Cert	Manchester Metropolitan University https://www.mmu.ac.uk/study/postgraduate/course/msc-pgdip-pgcert-sport-and-exercise-medicine/	Designed for qualified doctors, physiotherapists and osteopaths with clinical experience, you'll study the prevention, diagnosis and management of sport and exercise related medical conditions and injuries. Based at MIHP in Manchester the award is delivered by healthcare professionals and experts in sports rehab.
Rheumatology MSc	University of South Wales https://www.southwales.ac.uk/courses/msc-rheumatology-online-delivery/	Having specialist knowledge in Rheumatology is an increasingly important role and extra responsibility of medical personnel. Our team of course authors and tutors are recognised experts and opinion leaders in their specialty areas. This MSc is taught fully online and is designed for allied health professionals.
Pain Management Pg Dip	University of South Wales https://www.diploma-msc.com/p/diploma-in-pain-management?utm_source=findamasters&utm_medium=listing&utm_campaign=pgdip_listing	The online Pain Management Postgraduate Diploma covers the wide range of conditions pertinent to pain management and meets the educational needs of primary and secondary healthcare professionals. Having a specialist knowledge in pain management is an increasingly important asset and extra responsibility of medical personnel. Our Pain Management Postgraduate Diploma is designed to help healthcare professionals specialise in their career and aid the need for more pain management professionals.
Advanced Professional Practice MSc/ PgDip/ PgCert	University of Plymouth https://www.plymouth.ac.uk/courses/postgraduate/msc-	Are you a registered health or social care professional looking to develop your clinical career? This clinically-

	advanced-professional-practice-clinical-practitioner	focused specialist pathway has been designed to prepare and support nurses, midwives and allied health professionals to develop understanding of the underpinning principles of clinical assessment and examination to inform safe and effective clinical decision making. You will also gain the knowledge and skills required to work in any sector of the health service.
Advanced Clinical Practice MSc	University of Worcester https://www.worcester.ac.uk/courses/advancing-practice-msc	The MSc Advanced Clinical Practice (ACP) supports registered healthcare practitioners in their continued professional development to Masters Level, focusing on their role, sector and specialist area in line with the NHSE (2017) Multi-professional Advanced Clinical Practice framework. At the beginning of the course, students will identify their own learning needs in collaboration with their Clinical Supervisor, Manager and Personal Academic Tutor to create an individualised route through the programme that builds on their existing knowledge, skills and experience, whilst enabling achievement of competence and capability at the level of an Advanced Clinical Practitioner.
Advanced Clinical Practice MSc	University of Wolverhampton https://www.wlv.ac.uk/courses/msc-advanced-clinical-practice/	The MSc Advanced Clinical Practice has been designed to meet the needs of the health professional whose desire is to develop their clinical career to a higher level as an advanced practitioner. The course philosophy is to acknowledge your prior experience and knowledge as a health professional and subsequently enable you to fulfil your potential as a postgraduate through the development of new understanding, critical insight and advanced level academic and clinical skills.

Short Courses

Specialist skills and advanced practice can be developed from attending a non-academic accredited course that is specifically designed to advance a particular skill. These courses are often delivered by industry experts or from other professionals who specialise in that area. Some of the courses measure competency and are validated against a set of defined outcomes or from the College review panel. Others are mentored and then assessed. All enhance practice and provide a broad spectrum of skills for the MSK podiatrist.

Course	Delivered by	Content
Shockwave	Paul Wimpenny MSc Physio via Phoenix Healtcare https://www.phoenix-healthcare.co.uk/browse/shockwave-therapy/shockwave-therapy-courses/491 http://www.shockwavetherapy.education/index.php	Theory around how shockwave works and the research around the impact of treating patients with shockwave, this is then backed up with practical use of the equipment and review of use on a number of sights around the body and the pathologies that it can be used to treat.
	EMS shockwave with Stuart Metcalf https://www.emsphysio.co.uk/shockwave-therapy-training-course/	This is a one day course with a practical hands on approach supported by e-learning content. You will learn: How shockwave works How to apply shockwave safely Clinical protocols for the conditions you will treat Contra-indications Machine types and which is best for you How to market shockwave in your practice
Diagnostic Ultrasound	Warren Foster https://www.aecc.ac.uk/study/our-courses/short-courses-and-cpd/ultrasound-short-courses/podiatry-ultrasound/	This well established CASE accredited podiatry musculoskeletal ultrasound course brings you a wealth of knowledge and hands-on skills. Tutorials, masterclasses, and hands on sessions brought to you by AECC University College School of Medical Ultrasound. providing a solid foundation in the safe use of ultrasound.
	Stuart Wildman, The Ultrasound site accredited by CoP https://theultrasoundsite.co.uk/ultrasound-training-courses/foot-and-ankle-	This one day course provides an ideal introduction for Podiatrists on the topic of foot and ankle musculoskeletal ultrasound. All participants will complete the day

	musculoskeletal-ultrasound-course-introduction-for-podiatrists/	knowing what ultrasound can visualise, the skills required and how it can impact practice.
Injection Therapy	UCLAN 20 credits injection therapy certificate https://www.uclan.ac.uk/courses/certificate-injection-therapy.php Ian Reilly Corticosteroid Injection course https://podsurgeon.co.uk/courses/corticosteroid-injection/ Steroid of Foot and ankle Dr Colin Thomason Email: colinatthomson@gmail.com	This course is suitable for physiotherapists, GPs, doctors, occupational therapists, podiatrists, nurses and other allied Health professionals working in orthopaedics, rheumatology, neurological and musculoskeletal patient management. It brings together the theory, practice, evidence, safety, ethical and legal aspects of injection therapy that enhances interdisciplinary working, professional development and reflective practice. The course provides an introduction to corticosteroid injection therapy for common musculoskeletal conditions of the foot. The course will run over two days, to be followed by a period of supervised clinical practice (to be arranged by the delegate). To successfully complete the course and receive accreditation for it, the delegate will need to pass an end of course MCQ exam and complete a series of 10 mentored injections Based in Edinburgh this two-day course is accredited by CoP
Imaging	IRMER radiation training https://www.mkupdate.co.uk/courses/physical_examination/irmer_radiation_protection_training Diagnostic Imaging at Salford University Dr Jane McAdam www.salford.ac.uk/onecpd Tel: 0800 298 2460	This half-day theoretical course is for health care professionals requiring education and training on the Ionising Radiation (Medical Exposure) Regulations 2000 (IRMER) for their practice and is suitable for those practitioners who are designated as 'referrer' by their employers. Imaging of the foot and ankle short course.

Manipulation	Ian Linane A range of courses on mobilisation, manipulation and fascial work. https://infigoeducation.co.uk/ Ted Jedynak http://www.footmobilisation.com/ online tutorials for mob and manipulations	Podiatrists to upskill and extend their scope of practice in various manual therapy techniques through our three core* courses, which are suitable for practitioners in both the the NHS and private sector Online suite of tutorials on mobilisation and manipulations as well as soft tissue work.
Acupuncture	Steve Bailey acupuncture course accredited by the CoP https://www.stevebaileyacupuncture.com/ British Medical Acupuncture society https://www.medical-acupuncture.co.uk/Home.aspx	Podiatric Medical Acupuncture course will meet the requirements of podiatrists who are interested in using acupuncture in the treatment of MSK disorders. There are 3 days' workshop and 5 online interactive lessons. The British Medical Acupuncture Society is a registered charity established to stimulate and promote the use and scientific understanding of acupuncture within medicine for the public benefit. We seek to enhance the education and training of suitably qualified practitioners, and to promote high standards of working practices in acupuncture. Members are regulated healthcare professionals who practice acupuncture within the scope of their professional practice.
Taping	Rock Tape Function muscle taping/kineso tape. https://www.rocktape.co.uk/education/ Multidisciplianry taping course directed at sports https://www.proactive-training.co.uk/sports-taping-course	Our courses present a modern, evidence-based, pragmatic way of thinking about how we move. Our education program is based on concepts that can be used with elegant simplicity to create lasting change to complex problems. Improving movement and reducing pain is at the heart of everything we teach. These are essential skills for any therapist looking to play an active role in the management of sports injuries and many musculoskeletal conditions.

		In addition to having the skills to tape sports injuries there are also techniques taught that will help to re-educate poor posture and the problems that are associated with it.
Orthoses	Firefly Orthoses https://www.fireflyorthoses.com/ie/education/ Langer Medical https://lbgmedical.com/education PPL orthoses https://www.pplbiomechanics.com/pages/courses	A range of one day seminars, specific instruction on casting techniques and advances in foot orthoses as well as webinars and conferences.
Low Level Laser	1 day course delivered by CoP, dates throughout the year and in different locations.	Objectives of this course is to provide an initial training course to include measured competence of the safe use of low level laser therapy in the podiatry clinic. Successful completion of this course will ensure that College of Podiatry members will be covered by their membership insurance to practice these techniques.

Organisations delivering CPD

There are a number of charities that run CPD updates and courses that are relevant to continuous development for podiatrists working in MSK. These should be utilised for frequent updates for the advanced practitioner but also can be a valuable resource for the newly qualified podiatrist who is wanting to explore their interests. Similarly, there is access to CoP suite on online modules and CPD that can be purchased for CPD activity. Becoming an active member of the CoP branch meetings will also give access to credible CPD at a lower cost.

Organisation		
Versus Arthritis – Red Whale GP update	gp-update.co.uk	A range of free CPD webinars that are delivered by GP specialists and focused at primary care. Live discussions occur as well a provision of a wealth of resources for patients as well as personal development. Registration for this is free

		There is also a MSK/chronic pain one day course that is delivered around the country for a fee.
BMJ	https://new-learning.bmj.com/	A range of short courses that span all aspects of medicine but have a suite of resources that can be accessed from some institutions or £12 per month.
MSK Knowledge Hub	Arthritis and Musculoskeletal Alliance and NHS England https://mskhub.org.uk/	The aim is to provide a searchable resource library for people working on support for people with musculoskeletal conditions. If you have musculoskeletal-related articles or documents which meet our criteria you'd like to share, please register and then use the add a resource button to let us know. The Hub incorporates an interactive MSK Forum enabling people to discuss and share views.
E-Learning for health	The Musculoskeletal primary care programme https://www.e-lfh.org.uk/programmes/musculoskeletal-primary-care/	The Musculoskeletal (MSK) primary care e-learning programme has been developed to support clinicians working in primary care as first contact practitioners (FCP) in a primary care environment. In a primary care setting it has been reported that a GP will see 25% of their case load as MSK in origin and it has also been highlighted that using the wider workforce, such as physiotherapists, can improve outcomes, give high patient satisfaction, save time and ultimately costs.
CoP Branch meetings	Via membership benefits on the CoP web page https://membersarea.cop.org.uk/membership/membership-benefits/local-branches	A range of meetings organised by CoP branches that cover a broad range of topics on MSK conditions and management.
CPD updates	Online courses https://www.podiatrycpd.com/	Basic and advanced biomechanics, anatomy and

		foot orthoses. Short modules to complete around MSK

Conferences and Networking Groups.

There are a number of specialist interest groups, networking arenas and annual conferences that are available to expand the interest and involvement of MSK podiatrist. Interested podiatrists should be encouraged to join these groups around their specialist interest and interact with others who practise in the field.

Group	Contact	Content
MSK:UK	Facebook Group	A closed MSK group on facebook that creates debate and discussion around issues in MSK.
Paediatric Specialist group	Facebook Group	A closed podiatry network for practitioners working in peadiatrics
Bartold Biomechanics	https://www.bartoldclinical.com/	Online resources for podiatrists interested in current topics in MSK. Focused on overuse and sporting injuries. Emphasis on footwear.
Bootcamp Craig Payne	https://podiatrycpdacademy.com/	Online resources for podiatrists interested in current topics in MSK. Focused on overuse and sporting injuries
Podiatry Arena	https://podiatryarena.com/index.php	Global open forum for discussion and debate
Footwear Biomechanics Group	https://www.footwearbiomechanics.org/	Special interest group supported by International society of Biomechanics. Clinical and sporting research on footwear science.
Staffordshire Biomechanics	www.staffs.ac.uk/sccb	Annual Conference in Stoke on clinical Biomechanics
PRCA	http://www.prcassoc.org.uk/about	Specialist interest group on rheumatology of the foot and ankle
OMERACT	https://omeract.org/	OMERACT (Outcome Measures in Rheumatology) is an independent initiative of international heath professionals and patient

		research partners interested in outcome measures and measurement methodology, especially in rheumatology.
Pod Chat Live	Facebook group	Monthly webinars with specialists in their field on MSK issues.

ROYAL COLLEGE of PODIATRY

Further information:

Royal College of Podiatry
Quartz House
207 Providence Square
Mill Street
London
SE1 2EW
Tel: 020 7234 8620
Email: contact@rcpod.org.uk
Web: www.rcpod.org.uk

@RoyColPod

@RoyColPod

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