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BSR Guideline

British Society for Rheumatology RHEUMATOLOGY OXFORD

BSR Guideline

The British Society for Rheumatology guideline for the management of foot health in inflammatory arthritis

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The guideline was developed in line with the British Society for Rheumatology Guidelines Protocol (version 5.4, November 2023). A lay summary of this guideline can be found in Supplementary File S1, available at *Rheumatology* online.

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The Primary Care Rheumatology and Musculoskeletal Medicine Society

Keywords: foot, inflammatory arthritis, guideline, management.

Background

Foot problems are highly prevalent in adults, children and young people with inflammatory arthritis (IA), an umbrella term encompassing a range of chronic, autoimmune conditions characterized by joint inflammation [1–3]. These include rheumatoid arthritis (RA), spondyloarthropathy (SpA)—comprising psoriatic arthritis (PsA), axial spondylitis (ankylosing spondylitis), reactive arthritis, enteropathic arthritis and undifferentiated SpA—and juvenile idiopathic arthritis (JIA).

Clinical manifestations of RA in the foot include synovitis, deformity, tendon dysfunction, peripheral arthritis, and subluxation and dislocation of the metatarsophalangeal (MTP)

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joints. SpA also causes dactylitis and enthesitis, with the Achilles tendon, plantar fascia and tibialis posterior tendon insertions commonly affected. Synovitis, deformity and enthesitis are prevalent in JIA. Extra-articular features of IA, including peripheral neuropathy and entrapment neuropathies, can also manifest in the foot, and the risk of peripheral arterial disease (PAD) is increased [4]. Long-term steroid use can contribute to poor tissue viability in the foot; when combined with joint deformity and poor vascular supply, the risk of tissue breakdown is significantly increased. Foot ulcers are an important consideration in IA and immunosuppression increases risk of potentially serious infection [5, 6]. Foot involvement often persists despite significant advances in the pharmacological management of IA, resulting in pain, functional impairments, reduced health-related quality of life and increased healthcare costs.

Need for guideline

Existing guidance in this area includes the Arthritis and Musculoskeletal Alliance (ARMA) Standards of Care for people with musculoskeletal foot health problems, published in 2008, the British Society of Paediatric and Adolescent Rheumatology (BSPAR) Standards of Care for children and young people with JIA (2010) [7], and the North West Podiatry Services Clinical Effectiveness Group Guidelines for the management of foot health for people with RA (2014) [8]. Considering the advances in the management of IA over the past decade, these guidelines are now outdated. The National Institute for Health and Care Excellence (NICE) guideline for managing RA in adults (2018) highlights the need to identify foot problems but does not make recommendations about specific aspects of clinical management [9].

Objective

This guideline aims to provide patient-focused, evidence-based, expert recommendations for the management of foot health in IA in the UK.

Target audience

This guideline was developed to assist health professionals who treat and manage people with foot problems and IA. The target audience includes rheumatologists, general practitioners, orthopaedic surgeons, allied health professionals (such as podiatrists, orthotists, physiotherapists and occupational therapists) and specialist rheumatology nurses involved in the management of people with foot problems in IA in primary care and community settings, and secondary and tertiary care. This guideline will also provide a helpful resource for people living with foot problems in IA and their carers and be relevant for those responsible for commissioning care for people with IA and foot involvement in the National Health Service (NHS).

Areas the guideline does not cover

This guideline does not cover:

- surgical management
- treatment of injuries
- systemic drug therapies.

Stakeholder involvement

This guideline was produced by a multidisciplinary guideline working group (GWG) of rheumatologists (E.R., P.S.H.), a paediatric rheumatologist (G.C.), orthopaedic foot and ankle surgeons (R.Re., A.L.), a specialist rheumatology nurse (S.R.), podiatrists (M.R.B., L.S.C., L.C., H.J.S., H.M., L.S., J. W.), a paediatric podiatrist (R.F.), a physiotherapist (L.B.), an orthotist (R.Ro), a general practitioner (L.W.) and people with experience of living with or caring for someone with IA (A.R., S.V., J.D.). An additional lay member withdrew from the guideline development process due to personal circumstances. Guideline development was led by E.R., who chaired the GWG. M.R.B. was the deputy chair. L.S.C. led the preparation of the written guideline. The systematic literature review was conducted by two researchers with evidence synthesis expertise (N.C., D.vd.W.).

Rigour of development

This guideline was developed in line with the British Society for Rheumatology (BSR) Guidelines Protocol (version 5.4, November 2023) using Grading of Recommendations, Assessment, Development and Evaluation (GRADE) to determine certainty in the evidence for each guideline question.

Scope of the guideline

The guideline covers foot problems (including pain, deformity, nail and skin pathologies, ulceration, PAD and neuropathy) in people with RA, SpA and JIA. The full guideline scope was published previously [10]. Nineteen key clinical questions (Table 1) were developed through consensus among GWG members to guide a systematic literature review. Throughout the guideline, the terms 'foot health' and 'foot problems' refer to the entire foot and ankle complex.

Systematic literature review

The systematic review underpinning the guideline was registered in PROSPERO (ID CRD42023423109) and reported in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) [11] (Supplementary Table S1, available at *Rheumatology* online).

Searches

An information specialist (N.C.) designed and conducted systematic searches across nine bibliographic databases (MEDLINE, EMBASE, HMIC, AMED, EMCARE [all OVID]; CINHALPlus [EBSCO]; Cochrane Library; Epistemonikos and Pedro) from database inception to 21 September 2022. A broad search was completed using both subject headings and text word searching, combining terms for IA and foot/ankle (see Supplementary Table S2, available at *Rheumatology* online, for all database searches). This enabled a single search to be carried out in each database to cover all guideline research questions. No date or language restrictions were applied.

In addition, the reference lists of relevant systematic reviews identified during screening were checked, and conference abstracts from the BSR, European Alliance of Associations for Rheumatology (EULAR), American College of Rheumatology and the Royal College of Podiatry were hand searched for 2021 and 2022 to identify relevant emerging evidence.

The results of each search were downloaded into Endnote™ 20 (reference management software; Clarivate Analytics, available at www.endnote.com) to facilitate deduplication, and the resulting unique records imported into Rayyan [12], available at www.rayyan.ai for title screening, and then Covidence systematic review software (Veritas Health Innovation, available at www.covidence.org) for abstract and full text screening.

Table 1. Key clinical questions

Question	
Q1	In adults or children and young people with suspected or confirmed IA, what clinical assessments should be undertaken when assessing foot health and disease activity, and how often?
Q2	In adults or children and young people with suspected or confirmed IA, what imaging should be requested when assessing foot health, and when should imaging be requested?
Q3	When should adults or children and young people with suspected or confirmed IA be referred to specialist foot services, e.g. podiatry?
Q4	In adults or children and young people with foot problems in IA, what personalized care (e.g. support for self-management, activation, shared decision-making and culturally sensitive education) relating to foot health, and considering a person's wider biopsychosocial health determinants, should be provided and when?
Q5	In adults or children and young people with foot problems in IA, are orthotic devices effective, when are they indicated, and which types of orthotic devices are effective?
Q6	In adults or children and young people with foot problems in IA, what types of footwear are effective?
Q7	In adults or children and young people with foot problems in IA, what frequency, intensity, type and time (duration) of exercises, gait rehabilitation and electrophysical therapies is effective?
Q8	In adults or children and young people with common toenail pathologies in IA, what conservative treatments are effective, and when should abnormal nails be surgically removed?
Q9	In adults or children and young people with common skin pathologies (e.g. callus) in IA, what treatments are effective?
Q10	In adults or children and young people with foot ulceration in IA, including infected foot ulcers, what treatments are effective?
Q11	In adults or children and young people with foot problems in IA, are local corticosteroid injections safe and effective, and if so, when should these be offered?
Q12	When should local foot symptoms prompt a review of systemic disease control in adults or children and young people with IA?
Q13	In adults or children and young people with foot problems in IA, when should a surgical referral be considered?
Q14	In patients requiring foot and ankle surgical procedures, including nail surgery, should biologics/DMARDs be stopped, when should they be stopped, and for how long?
Q15	How often should foot health be reassessed in adults or children and young people with IA?
Q16	In young people with IA who are transitioning from paediatric to adult care, how should foot health be incorporated?
Q17	In adults or children and young people with foot problems in IA, what is the clinical effectiveness of physical activity?
Q18	In adults or children and young people with foot problems in IA who smoke, what is the clinical effectiveness of giving up smoking?
Q19	In adults or children and young people with foot problems in IA who are overweight or obese, what is the clinical effectiveness of weight loss?

Selection criteria

Studies were included if they concerned adults, children or young people with suspected or confirmed IA. Recent secondary evidence (2018 onwards), i.e. meta-analyses, systematic reviews, and umbrella reviews were included, as well as primary research: randomized controlled trials (RCTs) of any design; secondary, post-hoc, and sub-group analyses of individual RCTs, and RCT extension studies. Where RCTs were sparse for interventions or were not relevant, i.e. for questions related to assessment, diagnosis, referral, or monitoring, non-randomized controlled studies, before-after studies, cohort studies and case series, were included. In addition, published conference abstracts of primary or secondary research from 2021 onwards only, along with service evaluations and clinical audits, were included. Other study types including case studies, editorials, commentaries, trial protocols, letters, trials registry records and study protocols were excluded, as well as full papers in any language other than English without an English translation. A detailed description of inclusion and exclusion criteria is provided in Supplementary Table S3, available at *Rheumatology* online.

Screening

One reviewer screened titles, excluding studies that were clearly irrelevant. Abstracts, and then full texts, were screened against eligibility criteria by one reviewer, with 10% double screened by a second reviewer to ensure accuracy. Any disagreements were resolved by a third reviewer.

Data extraction

A standardized data extraction form was developed, piloted and used to collect data for analysis. Data were collected on the country, healthcare setting and characteristics of the study population. For intervention studies, data on characteristics of the intervention, type of control, within-group changes and effect estimates were collected. For diagnostic studies, data were extracted regarding the index test, reference standard, target condition and measures of reliability or diagnostic test accuracy. Data extraction was undertaken by one reviewer and independently checked by a second for correctness and consistency. Disagreements were resolved by consulting a third reviewer if necessary.

Risk of bias

Cochrane Risk of Bias v1 [13] was used to assess risk of bias for RCTs and controlled clinical trials. For cohorts and other study designs, relevant bias domains were used from the Quality In Prognosis Studies (QUIPS) tool [14].

Synthesis

Evidence tables were prepared for each guideline question, presented in Supplementary Tables S4–S20, available at *Rheumatology* online. Where quantitative evidence was lacking or irrelevant, summaries were provided of studies reporting relevant qualitative data. GRADE [15] was used to summarize evidence across studies for each guideline question, and separately for each type of assessment test or intervention; for adults or children; and for each outcome. Evidence was downgraded based on concerns related to study design, risk of bias, inconsistency, indirectness (applicability) or imprecision. Separate guidance for downgrading evidence was generated for evidence focusing on effectiveness of interventions and for reliability or accuracy of assessment and

diagnostic tests (see Supplementary Table S6, available at *Rheumatology* online).

Strength of recommendation

Members of the GWG convened online on five occasions to review evidence, resolve disagreements and determine recommendations. The amount of evidence (number of studies) and certainty in the evidence (GRADE) formed the basis of the recommendation, but other aspects, including balance between benefit and harm, access to treatment or resources required and patient/stakeholder preferences, informed the discussion. A strength of recommendation (SOR) grading was made for each recommendation by working group members in attendance at the online meeting where the specific question was discussed. The SOR for each recommendation was graded as strong (1) or weak (2). A strong recommendation in favour of an intervention was made when the benefits clearly outweighed the risks, or vice versa (recommendation against), for nearly all patients, or weak (2) when risks and benefits are more closely balanced or where they are more uncertain.

Strength of agreement score

Following the online meetings, the list of draft recommendations was circulated to the full GWG for review. Each suggested recommendation in the final document was evaluated by all members and subjected to a vote relating to strength of agreement (SOA) on a scale of 1 (no agreement) to 100 (complete agreement) using the Qualtrics online survey platform (Qualtrics, Provo, UT, USA). GWG members then scored each recommendation on the same scale, and the average was calculated to generate an SOA score. The wording of each recommendation was revised until all members gave a score of at least 80/100. Three members expressed concern that they did not have sufficient clinical knowledge to score specific recommendations (recommendations 8, 12, 15, 16, 19, 20 or 21); so, while they fully agreed with each recommendation, they did not wish to score each one, and did not contribute to the final SOA score for that recommendation.

Guideline update

The guideline is expected to be updated after 5 years.

Introduction to the recommendations and supporting evidence

For each question addressed by the literature review, we provide the recommendations followed by the SOR (1 or 2), level of evidence (LOE) (A, B or C) and the SOA score across the GWG (percentage). The rationale consists of a summary of the evidence supporting the recommendation.

Recommendations

Recommendations for assessment and diagnosis

Assessment

(1) In adults, children and young people with suspected or confirmed IA, questions relating to foot symptoms should be asked at each visit and, if appropriate, clinical examination of the foot should be undertaken, including disease activity, deformities, foot posture, musculoskeletal function, gait assessment, footwear, range of motion, vascular and neurological status, and skin and nail pathologies. SOR: 1; LOE: B/C; SOA: 92.

Rationale

The SOR is based on evidence from cross-sectional studies and expert consensus. Clinical assessment should be patient-centred and guided by symptoms and concerns. Foot symptoms should prompt a detailed clinical examination involving an assessment of disease activity, including palpation of the foot joints for localized swelling and tenderness. There is weak evidence from cross-sectional studies for the specificity of the MTP joint squeeze test to identify synovitis in patients with suspected IA, but the test has been shown to lack sensitivity [16–18]. Foot posture, deformities and gait should be visually assessed, while footwear and any existing insoles should be physically examined for wear. Footwear should also be assessed for motion, width and depth, fastening mechanism and arch support. The overall condition of soft tissues and range of motion in the ankle, subtalar, midfoot and MTP joints should be assessed, in addition to the quality of this motion. Skin and toenails should be assessed for pathologies, including skin disease (e.g. psoriasis), callus, wounds and anhidrosis. An assessment of vascular status, primarily to assess for PAD, and neurological status should be performed given the increased risk of vascular disease [19] and peripheral neuropathy [20] in IA. Assessment findings can be augmented with imaging if appropriate (see recommendation 2). The recommendation that questions relating to foot symptoms should be asked at each visit was made in response to qualitative evidence indicating that people with IA are rarely asked about their feet [21, 22].

In children and young people with IA specifically, age and developmental stage should be taken into consideration when assessing foot health. The foot joints should be assessed as part of the Juvenile Arthritis Disease Activity Score-71 (JADAS-71) [23] and the paediatric Gait Arms Legs and Spine (pGALS) screening [14]. The pGALS is proposed when there are indicators of potential MSK disease and includes an assessment of gait and foot posture [24].

Imaging

(2) Health professionals managing adults, children and young people with suspected or confirmed IA should have access to appropriate imaging (including X-ray, ultrasound (US), computed tomography (CT) and magnetic resonance imaging (MRI)) to assess foot health, to inform clinical management. SOR: 1; LOE: B/C; SOA: 99.

Rationale

This recommendation is based on evidence from cross-sectional, cohort and case-control studies and augmented by expert opinion. Imaging can aid diagnosis and monitoring of foot health in IA in the context of clinical history and a full assessment. When assessing foot health in adults, children and young people with IA, consideration should be given to whether imaging would provide additional information compared with clinical assessment alone. The type of imaging most appropriate for foot health in IA is dependent upon what is being assessed: X-ray, CT, US or MRI may be most appropriate depending on the clinical scenario. In the metacarpophalangeal and wrist joints in IA, US and MRI are more

sensitive for erosions than conventional radiographs, particularly in early disease [25]. MRI is considered the reference standard modality for imaging synovitis and tenosynovitis in IA and is more sensitive than conventional radiographs for the detection of inflammation [26]. To assess foot health specifically, there is weak evidence for the use of MRI and US. In adults with RA, MRI and US can be used to evaluate bursitis, active inflammation and structural damage [27–29]. In a cross-sectional study involving children with clinically active JIA ($n = 50$), US was shown to potentially increase the precision of clinical evaluation of the subtalar joint, compared with clinical evaluation alone [30].

Consideration must be given to the comparable costs of different imaging modalities, access to imaging locally, ionizing radiation exposure and training needs. For example, US is operator-dependent, and it is recommended that anyone who performs US should undertake a recognized formal training programme [31]. Recommendations relating to imaging in other IA guidelines should be considered, including NICE guidelines for the diagnosis and management of RA [9], EULAR, and EULAR-Paediatric Rheumatology European Society (PReS) points to consider for the use of imaging in the diagnosis and management of JIA in clinical practice [32]. In adults with suspected RA and persistent synovitis, NICE recommend X-rays of the feet, regardless of foot symptoms. In adults with confirmed RA, X-ray of the hands and feet is recommended to establish whether erosions are present, unless these were already performed prior to diagnosis [9]. The NICE guideline for the diagnosis and management of spondyloarthritis in over 16 s states that X-ray of symptomatic feet should be offered for suspected SpA, and US of the hands and feet and suspected enthesitis sites should be considered if a diagnosis cannot be made from X-ray [33]. Additionally, EULAR guidelines for SpA state that when peripheral SpA is suspected, US or MRI may be used to detect peripheral enthesitis, peripheral arthritis, tenosynovitis and bursitis, and to monitor disease activity (particularly synovitis and enthesitis) in peripheral SpA, aiding clinical and biochemical assessments [34]. In peripheral SpA, if the clinical scenario requires monitoring of structural damage, then conventional radiography is recommended, but MRI and/or US might provide additional information. In JIA, US and MRI are highlighted as being useful in monitoring disease activity overall, given their increased sensitivity over clinical examination and good responsiveness [32].

Referral to specialist foot services

(3) In adults, children and young people with foot problems in IA, prompt referral to specialist foot services, e.g. podiatry, should be considered at any stage of the disease course where they impact on activities of daily living, participation and quality of life. Foot problems include but are not limited to pain, joint damage, deformity, risk of ulceration and/or footwear difficulties. SOR: 1; LOE: C; SOA: 98.

Rationale

There is no direct evidence relating to referral to specialist services for adults, children and young people with foot problems in IA; this recommendation is based on expert opinion and indirect evidence from qualitative studies. In this context, specialist foot services refer to foot services with experience of managing foot problems in people with IA such as podiatry, orthotics or orthopaedic surgery. Such specialist services should ensure that people with IA are seen by health professionals with appropriate skills and training. Adults with IA consider that a referral to podiatry immediately after diagnosis should be made in an attempt to prevent future foot problems [21, 22]. Adults with foot problems in IA have reported difficulty in obtaining foot care, with delays in being referred to a podiatrist, and have highlighted the need for easy access to podiatry services [22, 35].

Recommendations for treatment strategy

Personalized care

(4) Individually tailored, culturally sensitive foot health education and support for self-management should be offered to adults, children and young people with IA, and their family members and carers, at diagnosis and on an ongoing basis. SOR: 1; LOE: C; SOA: 97.

(5) Education and self-management support could be offered by any member of the rheumatology multidisciplinary team (MDT). SOR: 1; LOE: C; SOA: 95.

(6) Information could include how IA and medications affect the feet, advice about skin and wounds, nail care, footwear and/or physical activity, exercise and pacing, self-management advice, signposting to additional sources of support, who to contact about foot problems, and the role of podiatrists and orthotists. SOR: 1; LOE: C; SOA: 99.

Rationale

These recommendations are informed by qualitative studies, expert opinion and evidence underpinning other recommendations in this guideline. Patient education and support for self-management are key components of care in chronic conditions [36] and are widely recommended in the routine management of adults, children and young people with IA. The effectiveness of foot health education and self-management support in IA has not been formally assessed. One RCT comparing a self-management programme for foot health against usual care in participants without any systemic conditions demonstrated better foot disability scores in the self-management group, with similar cost-effectiveness [37]. In qualitative studies and surveys [38–40], adults with RA indicated a preference for delivery of foot health education shortly after the point of diagnosis. Many qualitative studies have highlighted insufficient provision of foot health education for people with IA [21, 22, 38, 40, 41]. Foot health advice and self-management support should be discussed at diagnosis and reinforced at follow-up appointment by any member of the rheumatology MDT. The NICE guideline for shared decision-making [42] should be taken into consideration during any discussions. For example, adults, children and young people with foot problems in IA should be offered access to resources in their preferred format and encouraged to express their needs and preferences, while health professionals should be sensitive to a person's cultural identity or heritage and the beliefs and conventions that might be determined by this [43].

Orthotic devices and footwear

(7) Adults, children and young people with foot problems in IA should have access to customized orthoses to

reduce pain and improve function, recommended or prescribed by a health professional. A customized orthosis can comprise a fully bespoke device or a modified prefabricated orthosis tailored to meet the needs of the patient. SOR: 1; LOE: B/C; SOA: 99.

Rationale

Definitions of types of foot orthoses vary extensively in the literature. The GWG considered a prefabricated orthosis to be a device that has been mass-produced to a generic foot shape; this is in contrast to a custom-made or fully bespoke orthosis which is specifically manufactured to the shape of an individual's foot. The customized orthosis referred to here is any device that has been tailored, adapted, or modified to meet individual needs (including a prefabricated device that has been selected following assessment by a health professional with expertise).

The SOR is based on individual RCTs, systematic reviews and meta-analyses, indicating that customized foot orthoses may be beneficial in reducing foot pain, improving function and decreasing plantar pressure in adults with RA [44–47]. NICE also recommended that functional orthoses should be available for adults with RA if indicated [9]. There is weak evidence for the effectiveness of foot orthoses for children with IA; a systematic review of two small RCTs found inconclusive evidence of the benefits of customized foot orthoses on pain and quality of life in children with JIA [48], but a more recent RCT ($n = 66$) found that customized foot orthoses may be beneficial in reducing pain and tender foot joints over 6 months post-intervention in children with JIA [49]. Given the nature of the intervention, it is difficult to conduct a gold standard, clinician-blinded RCT for orthoses.

Provision of orthoses should be considered with regard to accessibility and cost. Prefabricated orthoses, with or without modifications, are readily available in clinics and can usually be provided instantly, compared with bespoke orthoses which often require multiple patient visits. While direct evidence on the cost effectiveness of different types of orthoses is limited, available data suggest that prefabricated orthoses are more cost effective [50].

(8) Therapeutic footwear may be effective at reducing pain and improving function in adults, children and young people with foot problems in IA. SOR: 2; LOE: C; SOA: 97.

(9) The acceptability of therapeutic footwear for adults, children and young people with foot problems in IA should be taken into account. SOR: 1; LOE: C; SOA: 92.

(10) A shared decision-making approach should be adopted to inform acceptability and may include factors such as comfort and fit, style, fastening mechanism, weight of the footwear, seasonality and cultural sensitivity. SOR: 1; LOE: C; SOA: 98.

Rationale

Two systematic reviews have evaluated the clinical effectiveness of footwear interventions for adults with RA [51, 52]. There is limited evidence that therapeutic footwear, such as extra-depth and extra-width off-the-shelf shoes, or custom-made footwear, improves foot pain, function, impairment and disability, and reduces plantar pressure. NICE guidance recommends that therapeutic footwear should be available for adults with RA [9]. Expert opinion from the GWG was that adults, children and young people with IA without significant foot deformity should be supported to self-manage foot symptoms with appropriate commercially available footwear (e.g. footwear with adequate width and depth, arch support, a firm heel counter and a fastening mechanism). Issues around the acceptability of custom-made footwear for adults with significant foot deformity in RA are well established in existing qualitative literature, with widespread dissatisfaction in terms of poor fit, aesthetics, weight of the shoe and perception of comfort. This dissatisfaction often results in poor adherence [22, 53, 54]. Wearing therapeutic footwear can impact on body image, particularly among women. Patient involvement during the design process of bespoke footwear can improve acceptability [55]. The NICE guideline for shared decision-making should be considered in the context of footwear provision and advice; adults, children and young people with IA should be involved in decisions about therapeutic footwear, and the choice of footwear should take into consideration their individual preferences, beliefs and values, including cultural sensitivities [42].

Targeted exercises, gait rehabilitation and electrophysical therapies

(11) Individually tailored exercises should be offered to adults, children and young people with foot problems in IA, if indicated after a comprehensive holistic assessment (see recommendation 1). SOR: 1; LOE: C; SOA: 96.

The role of targeted exercises for foot problems in IA has rarely been formally evaluated in clinical studies. One small ($n = 30$) study considered at high risk of bias was identified, which suggested foot-specific exercises reduced pain and improved balance and mobility in adults with IA, but the GWG thought this of insufficient quality to inform their discussion; hence, the recommendation is based on expert consensus only [56]. A small ($n = 11$), low-quality study investigating the effects of aquatic therapeutic exercise on ankle range of motion, gait, balance and functional mobility in children with JIA found no statistically significant benefits. There is currently no evidence for gait rehabilitation for adults, children and young people with foot symptoms in IA. Rehabilitation programmes that have included repetitive walking tasks have demonstrated benefits in walking capacity in adults without symptoms in RA [57, 58]. There is insufficient evidence to recommend the use of electrophysical therapies (e.g. extracorporeal shockwave therapy, low level laser therapy) and gait rehabilitation for adults, children and young people with foot problems in IA [59–61].

Nail and skin care

(12) In patients without diabetes or suspected ulceration, callus debridement should not be routinely offered in isolation; additional treatments (e.g. education and self-management advice, foot orthoses, footwear, emollients) should be used. SOR: 1 (against); LOE: C; SOA: 98.

Rationale

The effectiveness of sharp scalpel debridement of plantar callus in adults with RA has been investigated in two RCTs [62, 63] and a prospective cohort study [64]. In the RCTs, sharp scalpel

debridement had no benefits over sham debridement for pain relief, localized pressure reduction or functional improvement [62], and no benefits over a therapeutic approach alone [63]. In the prospective cohort study, all patients ($n = 8$) reported symptomatic relief with an average change in pain score of 48% ($P = 0.01$), but the treatment effect was lost by 7 days, and sharp debridement did not have a statistically significant effect on pressure distribution [64]. The rationale for adjunct treatments (education and self-management advice, foot orthoses, footwear, emollients) are discussed in other recommendations (4–10 and 13) throughout this guideline. Sharp debridement, when required, should only be undertaken by competent practitioners with specialist training [65]. No studies have been undertaken to assess sharp scalpel debridement of plantar callus in adults with other types of IA or children and young people with IA. Members of the GWG with podiatric expertise agreed that inflammatory callus margins in PsA should not be debrided. GWG members with experience relating to children and young people with IA reported they rarely present with callus.

In the case of suspected ulceration, sharp scalpel debridement of overlying callus should be performed to reveal the size and nature of the ulcer, assess for infection and promote healing [66]. Additionally, callus is a risk factor for foot ulceration in people with diabetes, and sharp scalpel debridement should be performed [67].

(13) Emollients are safe and effective and can be offered for the relief of dry skin affecting the foot in IA. SOR: 1; LOE: C; SOA: 96.

Rationale

The effectiveness of emollients for foot health in IA has not been formally evaluated in clinical trials. Emollients are widely recommended for dry skin conditions generally and for dry skin on the feet (with the exception of interdigital areas), and for plantar callus for people with foot problems in diabetes [68]. Emollients are also recommended for people with psoriasis to improve dryness, scaling and cracking, particularly for the soles of the feet. The SOR is based on expert opinion, widespread use of emollients in routine practice and low risk of harm. Consideration should be given to other physical problems experienced by some people with IA, such as hand problems, which could make the application of emollients difficult.

(14) All adults or children and young people with IA should be offered personalized nail care advice, including footwear advice, to help prevent and/or treat common toenail pathologies. People should be advised when to access foot healthcare, for example, for ingrowing toenails, wounds and infections, and how to do this. SOR: 2; LOE: C; SOA: 99.

(15) Systemic control of disease activity is the aim of treatment, including joint disease and extra-articular manifestations, e.g. skin and nail disease in PsA. Foot skin and nail health should be assessed and managed in the context of systemic disease. SOR: 1; LOE: C; SOA: 98.

(16) In the presence of recurrent pain or infection, surgical removal of nails can be considered. SOR: 2; LOE: C; SOA: 96.

Rationale

Toenail pathologies are common in the general population and include onychocryptosis, onychauxis and onychomycosis. These can cause infection and wounds, which have additional implications in people with IA who are immunosuppressed. Consideration should be given to the appropriateness of self-management, and when and how to access a specialist foot services (see recommendation 3).

In PsA, where multiple nails are pathological, systemic rather than local treatment should be considered, and dermatology input should be sought. Systemic drugs for the treatment of nail disease in people with PsA have been shown to be effective; current GRAPPA guidelines strongly recommend biological DMARDs (bDMARDs) for psoriatic nail disease [69]. Topical therapies (e.g. calcipotriol and glucocorticoid preparations, topical tacrolimus, topical ciclosporin, intralesional glucocorticoids and pulsed dye laser) and systemic medications (ciclosporin, methotrexate, acitretin, JAK inhibitors and PDE4 inhibitors) can also be considered. For foot skin disease in PsA, current GRAPPA guidelines strongly recommend topical agents (e.g. emollients, keratolytics, topical corticosteroids) when there is limited body surface area involved. More widespread psoriasis, or foot psoriasis that is unresponsive to topical treatment, should prompt a review of systemic disease management, with methotrexate, ciclosporin, PDE4 inhibitors and JAK inhibitors, and bDMARDs strongly recommended [69].

Nail surgery should be considered for toenail pathologies that do not or are thought unlikely to resolve with conservative care. When infection is present, antibiotics should be considered and conventional synthetic DMARD (csDMARD) and bDMARD therapy should be suspended [70, 71], with input from the rheumatology MDT. There is no evidence for one type of nail avulsion surgery procedure over another in IA or generally [72, 73]; matrixectomy should therefore be considered on a case-by-case basis.

Wound management

(17) Adults, children and young people with IA and foot ulceration should be able to access an appropriate health professional(s) promptly. SOR: 2; LOE: C; SOA: 99.

(18) Assessment of adults, children and young people with IA and foot ulceration should include causation, infection, wound severity and disease activity, in the context of their IA, comorbidities and their treatment. SOR: 2; LOE: C; SOA: 99.

(19) Wound management could include wound cleansing, removal of devitalized tissue, application of topical medicinal products or dressings, or offloading, as appropriate. Systemic treatment for infection and/or IA disease activity should be considered. SOR: 2; LOE: C; SOA: 98.

Rationale

For the purpose of the guideline, the GWG defines a wound as any area of skin that is torn, cut, punctured or ulcerated, and ulceration as a non-healing wound. Contemporaneous prevalence estimates for foot ulceration in IA are lacking; however, a 2008 survey found a point prevalence of 3.39% and an overall prevalence of 9.73% [5].

There is no direct evidence for the management of foot ulceration in IA; recommendations are based on evidence for managing foot ulceration generally and on expert opinion. Qualitative research has indicated that people with RA foot ulceration may lack knowledge regarding whom to see, and

how and when to seek help, ultimately leading to delays in accessing treatments [74]. Patients with or at high risk of foot ulceration should be advised how and when to access a health professional. Additionally, timely communication between the health professional who first identifies a wound and the rheumatology MDT, with regards to wound management, is important to ensure ulceration is not being managed in isolation.

Foot ulceration in RA usually occurs on the pressure-vulnerable bony sites in the forefoot. Common causes of foot ulceration in IA include mechanical trauma/pressure, PAD, neuropathy, comorbidities (e.g. diabetes) and vasculitis [75]. The principles of foot ulcer management therefore include offloading, particularly accommodation and offloading of the bony sites often involved to aid healing, restoration of tissue perfusion, treatment of infection, treatment of comorbidities, local ulcer care, patient education and ulcer prevention [76].

The management of foot infection in people with IA who are immunocompromised due to systemic drug treatment can be complicated as signs of infection may be masked. Collection of a wound sample can be considered where infection is clinically suspected. Stopping csDMARDs and bDMARDs in the presence of infection should be discussed with the rheumatology MDT, with further guidance available in the BSR guidelines for biologic DMARD safety [70] and prescribing and monitoring of non-biologic DMARDs [67]. Suspension of systemic drugs can increase disease activity and delay wound healing, therefore liaising with the rheumatology MDT around disease management is important.

Targeted injection therapy

(20) Local corticosteroid injections are safe and effective and can be offered as an adjunct for the relief of inflammation and pain in the foot in IA. Image guidance using radiology or US should be considered and available if needed. SOR: 1; LOE: C; SOA: 98.

(21) Children and young people undergoing local corticosteroid injection should be offered access to general anaesthesia or conscious sedation in a suitable paediatric environment. SOR: 1; LOE: C; SOA: 99.

Rationale

Local corticosteroid injections are widely performed in routine clinical practice to address inflammation and pain in the foot in IA, e.g. to induce remission or as a rescue treatment. The SOR is largely based on expert opinion. Weak evidence for the effectiveness of US-guided local corticosteroid injections on pain reduction for adults with heel enthesitis, tendinitis and retrocalcaneal bursitis in IA has been demonstrated in a systematic review of four uncontrolled trials and one comparative trial [59]. US-guidance ensured selection of lesions appropriate for injection, allowing precise needle tip placement.

The GWG accepted the effectiveness of unguided (blind or palpation-guided injections) and US-guided injections to reduce pain and inflammation. While evidence that US-guided injections are more effective than palpation-guided injections in the foot is lacking, the GWG recognized the theoretical advantages of US-guided injections, including more accurate needle placement, increased feasibility of injecting structures that are difficult to access (e.g. midfoot and subtalar joints), and to avoid other structures. However, RCTs involving other areas of the body indicate that it is not certain that the accuracy established by US-guided corticosteroid injections improves outcomes compared with systemic [77] or clinical examination-guided steroid injections [78, 79], or sham lavage plus steroid [80]. There is also weak evidence from observational studies for reduction in synovitis and a sustained clinical response in the ankle and subtalar joints following local intra-articular corticosteroid injections in children and young people with JIA [81].

Concern has been expressed about possible deleterious effects on articular cartilage volume of repeated joint injections with corticosteroid in people with knee osteoarthritis [82], but there is little evidence in people with IA. EULAR recommendations for intra-articular therapies advise avoiding >3–4 corticosteroid injections in the same joint per year while acknowledging the lack of evidence to underpin this [83].

Conscious sedation, such as nitrous oxide, provides safe and effective short-term relief of pain and anxiety during intra-articular injections and can therefore be considered when administering local corticosteroid injections in children and young people with IA [84]. General anaesthesia may be more suitable in certain cases (e.g. younger children or those requiring multiple injections) [7].

Local corticosteroid injections are well tolerated, and serious side effects are rare. Recognized complications include infection, lipoatrophy, hypopigmentation and temporary worsening of diabetes control. No serious adverse effects took place during the injection procedure or follow-up for all patients included in the systematic review of the five studies mentioned above ($n = 120$) [59]. A minority of patients ($n = 7$) reported a mild cold feeling during the injection and one patient developed mild local atrophoderma at the point of entry after the treatment. Administration of local corticosteroid injections is also standard practice in other joints in IA (e.g. knees, shoulders), with evidence from RCTs for reduction in joint swelling [85], improved disease activity scores and DAS28 remission [86]. There is no evidence to support any specific corticosteroid agent over another in the foot [59].

Reviewing systemic disease control

(22) In adults, children and young people with IA, the presence of inflammatory foot pain, new or increasing early morning stiffness, and/or suspected joint/tendon swelling should raise the possibility of active systemic disease and prompt a review of systemic disease control. SOR: 1; LOE: C; SOA: 100.

Rationale

The ankle and foot joints are particularly susceptible to damage in IA. In the absence of direct evidence for reviewing systemic disease control based on symptoms in the foot, this recommendation is based on expert opinion and evidence for systemic disease control reviews in IA generally [7, 9, 69]. The presence of inflammatory foot pain, new or increasing early morning stiffness and/or suspected joint/tendon swelling are indicators of poor disease control. Features of pain which raise the possibility of active inflammation are being worse after rest (especially overnight) and eased by activity. Adults, children and young people with IA should be advised on who to contact if they have concerns about worsening symptoms, and how to go about this (e.g. provision of contact details for a rheumatology advice line or email address). In cases where

foot symptoms improve, the potential to reduce or withdraw treatment should be reviewed in the context of the overall disease.

Surgical referral

(23) In adults or children and young people with foot problems in IA, prompt surgical referral should be considered where there is pain, risk of ulceration, joint damage and/or deformity at the forefoot, midfoot or hindfoot, and usually when multidisciplinary non-operative care has failed or is considered unlikely to be successful. SOR: 2; LOE: C; SOA: 99.

Rationale

There is no direct evidence concerning when to consider surgical referral; this recommendation is based on expert opinion. First-line conservative management is appropriate for most people with IA. However, earlier referral for surgical opinion should be considered in certain cases, e.g. where there is significant pain or deformity and the patient is keen to have a permanent resolution while taking into account that commissioning and pathways vary nationally. Inability to wear off-the-shelf footwear may also be considered an indication for surgery. In children and young people with foot problems in IA, the indication for surgical referral is less common, and the range of surgical options is more limited.

When considering a surgical referral, and prior to making it, the patient should be at the centre of the decision and an informed discussion that includes surgical options and the risks and benefits of each should be made. The discussion could cover what an operation involves, the possible complications, how much time off work might be needed, information on the post-operative recovery period, and whether and for how long systemic IA therapies should be withheld (see below) and should factor in that some patients may not want surgery at all. In specialist MDT foot clinics that include a surgeon, this discussion can involve surgical opinion at an earlier stage.

Stopping biologics/DMARDs prior to foot and ankle surgical procedures

No specific recommendations were made regarding stopping biologics/DMARDs in patients requiring foot and ankle surgery, including nail surgery. Existing BSR guidelines for biologic DMARDs safety [70] and prescribing and monitoring of non-biologic DMARDs [71] should be followed and advice from the rheumatology MDT can be sought.

The BSR biologic DMARD safety guideline indicates the need to weigh up the benefit of preventing post-operative infections by stopping the biologic *vs* the risk of a perioperative flare, to consider planning surgery when at least one dosing interval has elapsed (depending on the specific drug), and to recommence the biologic after surgery when there is good wound healing, all sutures and staples are out, and there is no evidence of infection. The non-biologic DMARDs guideline states that DMARD therapy should not be routinely stopped in the perioperative period, although individualized decisions should be made for high-risk procedures. Both guidelines are applicable to adults. There are no specific biologic/DMARD safety guidelines for children and young people with IA; stopping biologics for foot and ankle surgical procedures in children and young people with IA should therefore be considered on a case-by-case basis. In the context of nail surgery, consideration should be given to the presence of existing infection. Existing BSR guidelines state that biologics and DMARDs should be discontinued in the presence of serious infection but can be recommenced once the infection has resolved [70, 71].

Follow-up and monitoring

(24) In adults, children and young people with confirmed IA, questions relating to foot symptoms should be asked at each visit and, if appropriate, clinical examination of the foot should be undertaken, including disease activity, deformities, foot posture, musculoskeletal function, footwear, gait, range of motion, vascular and neurological status, and skin and nail pathologies. SOR: 1; LOE: B/C; SOA: 92.

Rationale

The rationale for this recommendation is similar to recommendation 1. Patients should be asked about foot symptoms at every appointment, by any member of the MDT, and assessed as indicated.

(25) In young people with IA who transfer from paediatric to adult care, a multidisciplinary approach to foot health should be considered a core element of the transition process. SOR: 2; LOE: C; SOA: 98.

Rationale

There is no direct evidence for the inclusion of foot health in transitional care; the SOR is based on expert opinion. Transitional care is defined as the purposeful, planned process of transferring a young person's healthcare from a child-centred to an adult-orientated care setting that comprehensively addresses the medical, psychosocial, educational and vocational needs of that young person [87]. To enhance the process, young people with IA should be appropriately signposted to information and educational resources relating to foot health and made aware of how to access foot health services, at each visit. EULAR/PReS standards and recommendations for the transitional care of young people with juvenile-onset rheumatic diseases [88] and recent National Confidential Enquiry into Patient Outcome and Death (NCEPOD) recommendations [89] should be considered.

Recommendations for secondary prevention

Physical activity

(26) Adults or children and young people with foot problems in IA should be encouraged and supported to meet physical activity guidelines for people with IA. This may include regular assessment and management of foot health needs, including appropriate footwear. SOR: 1; LOE: C; SOA: 98.

Smoking and weight loss

(27) Adults or children and young people with foot problems in IA should be encouraged and supported to stop smoking where appropriate. SOR: 1; LOE: C; SOA: 99.

(28) Adults or children and young people with foot problems in IA should be encouraged and supported to

maintain/reduce weight where appropriate. SOR: 1; LOE: C; SOA: 99.

Rationale

There is no evidence for physical activity, smoking or weight loss specifically in relation to foot health in IA. Evidence from existing literature for IA in general demonstrates that physical activity is safe and beneficial, and improves pain, function, fatigue and quality of life, and potentially modifies disease [90, 91]. Current EULAR recommendations for physical activity in people with IA [92] and for lifestyle behaviours and work participation to prevent progression of rheumatic and musculoskeletal diseases [93], and NICE guidelines for weight management [94] and RA management [9] should be considered.

EULAR recommend aerobic and strengthening exercises as part of physical activity while highlighting the need for shared decision-making regarding the type of activity that is appropriate for a person's ability and condition [92]. Shared decision-making is particularly pertinent in relation to adults, children and young people with foot symptoms in IA, where there may be uncertainty around reducing weightbearing activities during a systemic flare. The management of foot pain among people who are trying to become more active should be considered using a personalized approach, e.g. non-weightbearing physical activity or the use of customized orthoses/therapeutic footwear. Regular assessment and management of foot health needs will therefore help people to meet their activity needs.

The negative effects of smoking on inflammation and disease activity in IA are well established [95–97]. Smoking is a strong risk factor for PAD [98], the risk of which is higher in people with IA [99]. The NICE guideline relating to tobacco (preventing uptake, promoting quitting and treating dependence) is applicable for people with foot symptoms in IA [100]. The recommendation relating to smoking cessation advice should also consider e-cigarettes/vaping, which is particularly common among children and young people [101] and negatively affects circulation [102, 103].

High BMI is strongly associated with non-specific foot pain in the general population [104]. The negative impact of high BMI on inflammation and disease activity, and on the effect of anti-TNF agents, is well established in IA [105, 106]. Additionally, weight loss can improve outcomes in IA [107]. EULAR recommend that people with IA should aim for a healthy weight and that those who are overweight or obese should work with health professionals to achieve controlled and intentional weight loss through healthy diet and increased physical activity [93].

Applicability and utility

This guideline represents a framework to support clinical practice. As with any guideline, individual patient circumstances can influence clinical decision-making; health professionals should continue to work with patients to make shared decisions about care. Failure to adhere to this guideline should not necessarily be considered negligent, nor should adherence to these recommendations constitute a defence against a claim of negligence.

Potential organizational barriers to implementation of the guideline in the UK are acknowledged. For example, the GWG recognizes inequitable access to services, including widespread variation in access to the imaging modalities suggested. Additionally, while prompt referral to specialist foot services is recommended, that the podiatry workforce is facing severe challenges and capacity to assess patients promptly within these specialist services will vary nationally. Practitioner skillsets (e.g. rheumatology expertise in specialist foot services, and complex foot and ankle expertise in surgical services) and clinical commissioning policies will also differ. Finally, national variation in referral pathways may also create barriers to guideline implementation, regarding the ability to refer directly to rheumatology, surgeons or extended scope practitioners, and care pathways need to be designed to meet the needs of local populations. Use of the foot health in IA audit tool (Supplementary File S21, available at *Rheumatology* online) with a consecutive sample of patients presenting to a clinic or service is encouraged to assess compliance with the guideline.

Research recommendations

Recommendations made in this guideline are predominantly based on expert consensus and low-quality observational studies, highlighting the lack of high-quality evidence. Definitive RCTs, with adequate sample sizes and long-term follow-up, are critical to determine the clinical- and cost-effectiveness of treatments for adults, children and young people with foot problems in IA. The top five recommendations for future research, proposed by the GWG, are presented in Table 2. Further research recommendations are provided in Supplementary Table S22, available at *Rheumatology* online.

Table 2. Recommendations for future research

	Research recommendations[a]
1.	In adults or children and young people with suspected or confirmed IA, what is the additional value of imaging modalities in the foot compared with clinical examination?
2.	In adults or children and young people with foot problems in IA, what is the clinical and cost-effectiveness of customized foot orthoses[b] compared with unmodified off-the-shelf orthoses?
3.	In adults or children and young people with foot problems in IA, what additional help is required to enable people to meet physical activity guidelines?
4.	In adults or children and young people with foot problems in IA, what is the best way to measure foot health?
5.	In adults or children and young people with foot problems in IA, what is the best way to identify those most likely to benefit from foot health interventions?

[a] Recommendations are not in prioritized order.
[b] A custom-made or fully bespoke orthosis that is specifically manufactured to the shape of an individual's foot.

Supplementary material

Supplementary material is available at *Rheumatology* online.

Data availability

Data are available in the guideline and its supplementary material.

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