Recent advances in the diagnosis and management of hand osteoarthritis

Hand osteoarthritis is a prevalent and heterogeneous condition and is one of the most common musculoskeletal conditions in adults aged 50 years and over. Hand osteoarthritis frequently causes pain and functional limitation with subsequent reduction in health-related quality of life. The diagnosis and treatment of hand osteoarthritis can be challenging and a range of factors, including different clinical phenotypes, the numbers of joints affected and the impact on the individual, require a biopsychosocial approach to assessment and management. There are a number of international recommendations for the diagnosis and management of hand osteoarthritis and this review considers new evidence from July 2012 to December 2012 to report advances in the field. This review identifies new advances that may contribute to evidence-based practice.

KEYWORDS: diagnosis guidelines hand interventions management osteoarthritis

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Learning objectives

Upon completion of this activity, participants should be able to:

- Identify factors associated with the severity and progression of hand pain and hand osteoarthritis
- Review the diagnosis of hand osteoarthritis
- Describe the recommended nonpharmacological and pharmacological treatment of hand osteoarthritis

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Osteoarthritis (OA) is the most common form of arthritis and the source of most of the musculoskeletal pain and disability in adults aged 50 years and over [1]. Although the projected increase in the proportion of older people in the population has propelled OA up the agenda of health planners, the main focus of attention has been on lower limb OA. Less attention has been given to the hand, despite the fact that it is one of the most common sites of pain and osteoarthritic change in this age group [2]. In the UK, it is estimated that at least 4.4 million people have x-ray evidence of moderate-to-severe OA of their hands [101]. In a large cross-sectional survey of older adults with musculoskeletal hand problems in north Staffordshire (UK), participants reported that they considered the diagnosis of 'hand OA' to represent a serious condition [3]. Sufferers reported significant pain and disability, which affected their everyday lives. In-depth interviews with patients with hand OA clearly highlight the personal impact and loss of independence caused by this condition, with disruption of day-to-day activities, such as washing, toileting and dressing, together with psychological and emotional distress [4]. Patients report considerable frustration caused by their hand problems, which is compounded by a perceived lack of appropriate information and advice about their condition [5]. It has been increasingly recognized by healthcare professionals, researchers and the public that hand OA is an important chronic disease, which impacts on the health and wellbeing of adults in their middle years and beyond.

Summary of current evidence

Until the last decade there had been a paucity of research in the field of hand OA, so a number of international recommendations for the diagnosis and management of hand OA have relied on consensus of opinion leaders [6,7].

Diagnosis

European evidence-based guidance for the diagnosis of hand OA has previously proposed key recommendations using a systematic review of the evidence combined with expert consensus [6]. It concluded that diagnosis of hand OA should be based on an assessment of a composite of measures including Heberden's nodes, age (over 40 years), family history of nodes and joint space narrowing in any finger joint on x-ray. Recognized subsets with different risk factors, associations and outcomes were identified; interphalangeal joint OA (with and without nodes), thumb-base OA and erosive hand OA which is considered to have a poorer outcome than nonerosive interphalangeal joint OA **(Box 1)** [6].

Management

International recommendations covering the management of hand OA have been previously reported for example, European League Against Rheumatism (EULAR) evidence-based recommendations [7] and NICE guidance [102]. Evidence-based treatments for hand OA have also been previously reviewed [8,9] and summarized [10,11]. European recommendations offer 11 propositions based on consensus and systematic review of the research evidence [7]. Individualized treatment is based on a combination of nonpharmacological and pharmacological approaches. Advice and education is recommended with particular emphasis on joint protection education and hand exercises. Nonpharmacological approaches include the local application of treatments (e.g., heat), which are preferred over systemic treatments particularly if only selected joints are affected (e.g., splinting for thumb-base OA or to correct finger joint deformity). Pharmacological approaches include topical NSAIDs and capsaicin cream. EULAR recommends that oral medication should be used at the lowest effective dose for the shortest duration with particular attention to efficacy, comorbid conditions and contraindications to use. Intra-articular corticosteroid injections may also be offered for painful thumb-base OA.

Guidance from the UK has been previously established through NICE recommendations for OA of the hip, knee, hand and foot [102]. Here recommendations emphasize core treatment approaches for all people with OA presenting in primary care. Advice, information and education are recommended for all, along with specific advice on exercise and physical activity, and if obese, on healthy eating and healthy weight. Evidence for the NICE guidelines was based predominantly on research in knee OA, and nonpharmacological approaches were considered essential for all individuals with OA.

A review of best evidence for best therapies in hand OA has summarized evidence from systematic reviews of nonpharmacological therapy [10] and this has been updated in an overview by Moe and colleagues [11]. Evidence supporting nonpharmacological therapy, in particular exercise, was conflicting with inconsistent treatment responses.

New evidence for diagnosis & management

The purpose of this review was to take a 6-month period of evidence from July 2012 to December 2012 to report advances in the field, highlight the trends in the literature and identify potential future direction for research and practice.

Method

A literature search was undertaken of the Current Awareness Database at the Arthritis Research UK Primary Care Centre (Keele University, Keele, UK), which uses PubMed [103] and Web of Science [104] to retrieve manuscripts in musculoskeletal conditions. The search terms are outlined in Box 2. Eligible publications were those in the English language published between 1 July 2012 and 31 December 2012. The focus of the review was diagnosis and management of hand OA. Publications evaluating methodological issues, outcome measurement, surgical interventions and basic science studies were therefore excluded. Individual articles were selected for inclusion in this review at the sole discretion of the author.

Results

The literature search identified 28 eligible publications specifically relevant to hand OA and a further 45 articles on OA in general. Those on diagnosis and management of hand OA are detailed below.

Diagnosis

Studies on diagnosis covered prevalence, risk factors, comorbidities, mortality, imaging and phenotypes. Hand OA as a whole joint disease was investigated by Madry *et al.* who demonstrated that even in the early stages of hand OA the entire joint, including the articular cartilage, subchondral bone, synovial membrane and periarticular structures are found to be involved [12]. Another study of the Brazilian population by Blay and colleagues highlights further that the diagnosis and treatment of OA is complex and multidimensional [13].

Box 1. Features of erosive hand osteoarthritis.

Signs
- Targets the interphalangeal joints
- Central erosions present on imaging
- Inflammation
- More severe structural damage than in nonerosive interphalangeal joint osteoarthritis

Symptoms
- Rapid onset
- Marked pain
- Marked functional limitation
- Inflammation

Outcome
- Poorer than for nonerosive interphalangeal joint osteoarthritis

Prevalence

A systematic review of the prevalence of musculoskeletal problems in older adults identified seven studies on hand OA giving eight prevalence estimates for symptomatic, radiographic and combined symptomatic, radiographic hand OA [14]. Different definitions and age ranges were reported, but consistent findings were found for the high prevalence in women and with increasing age. The point prevalence estimates for combined symptomatic radiographic hand OA ranged from 4 to 14%. For radiographic hand OA alone prevalence ranged from 56% in the youngest men to 100% in the oldest women. The review confirms previous summaries of prevalence estimates.

Risk factors

Factors associated with the severity and progression of hand pain and hand OA were addressed in two systematic reviews [15,16]. Kwok and colleagues assessed risk factors for the progression of hand OA. Most factors showed limited or inconclusive evidence for the association with radiographic hand OA progression, although a positive association was found with an abnormal scintigraphy scan [15]. The contribution of

Box 2. Search terms for review of hand osteoarthritis studies.

Web of Science search strategy

- (ts = topic) ts = osteoarthritis

Pubmed strategy for osteoarthritis trials

- [ptyp] - publication type
  - Search: (((“osteoarthritis”[MeSH Terms]) OR osteoarthritis)) AND (Search AND ((Clinical Trial[ptyp] OR Clinical Trial, Phase III[ptyp] OR Clinical Trial, Phase I[ptyp] OR Clinical Trial, Phase IV[ptyp] OR Clinical Trial, Phase II[ptyp] OR Comparative Study[ptyp] OR Controlled Clinical Trial[ptyp] OR Randomized Controlled Trial[ptyp] OR Twin Study[ptyp])) OR ((randomized controlled trial[Publication Type] OR (randomized[Title/Abstract] AND controlled[Title/Abstract] AND trial[Title/Abstract])) OR ((relative[Title/Abstract] AND risk*[Title/Abstract]) OR (relative risk[Text Word]) OR risks[Text Word] OR cohort studies[MeSH:noexp] OR (cohort[Title/Abstract] AND stud*[Title/Abstract])) OR (incidence[MeSH:noexp] OR mortality[MeSH Terms] OR follow up
  - studies[MeSH:noexp] OR prognos*[Text Word] OR predict*[Text Word] OR course*[Text Word])))

radiographic findings to quality of life and functional limitation, however, has been found to be largely mediated by pain, and pain is proposed as a better predictor of disability than radiographic change in a paper by Laslett *et al.* [17].

Nicholls *et al.* summarized the evidence for the factors associated with the severity and progression of pain and functional limitation in population studies of older adults with hand pain (**Box 3**) [16]. All of the eligible studies were found to be cross-sectional. Factors associated with hand-pain severity were age, impact, frustration, patient expectation of the duration of the condition and self-reported diagnosis. Factors associated with limited hand function were OA, hand pain, older age, female gender, manual occupation, neck or shoulder pain, weaker grip strength, illness perceptions and comorbidity.

There is emerging evidence that risk factors, such as pain, occupation, multisite involvement, illness perceptions and impact, should form part of a biopsychosocial assessment of hand OA. Future longitudinal studies are, however, needed to give further insights into risk factors for progression of radiographic hand OA and for changes in symptoms.

Comorbidities

New evidence for the link with comorbities is provided by two studies. Addimanda and colleagues investigated clinical associations with radiographic features and found a significantly increased odds ratio in patients with hand OA for hypercholesterolemia (odds ratio: 2.10) and autoimmune thyroiditis (odds ratio: 4.85) after adjusting for age, gender and BMI [18]. Patients with erosive hand OA and nonerosive hand OA showed similar risks and there were no increases in cardiovascular manifestations compared with controls. Massengale and colleagues also found that coronary heart disease was associated with intensity of chronic hand OA pain [19].

These studies represent new investigations into a broader understanding of potential mechanisms with respect to hand OA.

Mortality

A meta-analysis of mortality in rheumatic diseases found no studies of risk of mortality in hand OA or OA in general [20]. Whilst the burden of OA is a concern of the western world, we still have limited data on the impact of OA on mortality, and this represents an important gap in evidence.

Imaging

Haugen and colleagues have previously demonstrated that radiographic joint space narrowing and malalignment, as well as clinical soft tissue swelling, are strongly associated with the presence of MRI-defined bone marrow lesions in a cross sectional study from the Oslo hand OA cohort [21]. Imaging research has continued to expand in the field of hand OA and sensitive measures, such as MRI, may provide a greater insight into the progression of disease from onset to joint failure and the risk factors associated with disease progression [22–24].

Diagnostic phenotypes

New evidence on diagnostic phenotyping is provided by four studies within the review period. Marshall *et al.* found a similar frequency of joint involvement and patterning in erosive OA and nonerosive hand OA involving definite joint space narrowing, suggesting that erosive OA is a severe form of hand OA rather than a distinct entity [25]. Furthermore, Addimanda and colleagues found that an erosive subset of hand OA was characterized by more severe structural damage and central erosions, whereas marginal erosions were a feature common to all with hand OA [26].

Hand OA is a prerequisite for diagnosing generalized OA and two studies were identified in

the current search. Nelson and colleagues used cross-sectional data from the Johnston County OA Project and applied factor analysis to radiographic OA scores across multiple joint sites to quantify the burden of radiographic OA [27]. They found four distinct factors: interphalangeal and thumb-base OA; metacarpophalangeal joint OA; knee OA; and OA spine. The hip did not load onto any factor. These findings are helpful in understanding the overall pattern of multisite radiographic OA and in determining how generalized OA should be evaluated in future radiographic studies.

Moe and colleagues described and compared disease impact in patients with clinically diagnosed hand OA with those with hip or knee and generalized OA [28]. Generalized OA was considered in participants with more affected joint groups; however, spinal OA was not included. Considerable disease impact was noted across all presentations (OA at single sites and generalized OA) and functional impact was frequently significant at other sites beyond the primary OA site.

There is still a need for further research on the onset, presentation, risk factors for progression and impact for both specific hand OA phenotypes and for multisite joint OA in order to better inform healthcare professionals and patients in the optimal care for people with hand OA.

Management

The review of evidence from July to December 2012 identified nine eligible articles on the management of hand OA, one of which was a publication of a new guideline.

Guideline

The new guideline from the ACR considers guidance for knee, hip and hand OA, with evidence presented separately for each [29]. The guidance covers pharmacological and nonpharmacological modalities for hand OA. The evidence is provided by a systematic review conducted by the Institute of Population Health in Ottawa (Canada; to 31 December 2010). The base case described is a female with symptomatic hand OA without comorbidities having failed a course of over-the-counter paracetamol and with evidence of interphalangeal joint damage on x-ray. In line with previous international guidance, the ACR proposes joint protection techniques, provision of assistive devices, use of thermal therapy, splinting for thumb-base OA and an assessment of activities of daily living.

Consistent with previous guidelines, pharmacological options include oral and topical NSAIDs, tramadol and topical capsaicin. Topical NSAIDs are considered to be first line for adults aged >75 years ahead of oral NSAIDs. In contrast to earlier guidelines, intra-articular therapies and opioid analgesics are not recommended. For patients with thumb-base OA, the ACR guidelines recommend neither intra-articular corticosteroids nor hyaluronates. The absence of evidence for methotrexate, sulfasalazine and hydroxychloroquine led to no positive recommendation on these treatments.

ACR recommendations ranged from 'strong' to 'conditional' based on the available strength of evidence and on consensus judgment of clinical experts from multidisciplinary backgrounds. A supplementary bibliography can be accessed online [105]. TABLE 1 summarizes the core nonpharmacological interventions recommended across three international guidelines.

Implementation messages are consistent with previous guidance recommending core nonpharmacological approaches. In contrast to previous guidelines intra-articular corticosteroids for thumb-base OA and opioids as adjunctive treatments are not recommended by ACR 2012. This may reflect the opinions of the experts from different health economies as much as the evidence from which the recommendation is drawn; however, there are implications for a change in practice in relation to pharmacological treatment.

Box 3. Factors associated with the severity and progression of pain and functional limitation in population studies of adults with hand pain.

Factors associated with hand pain severity

- Age
- Impact
- Frustration
- Patient expectation of the duration of the condition
- Self-reported diagnosis

Factors associated with limited hand function

- Osteoarthritis
- Hand pain
- Older age
- Female gender
- Manual occupation
- Neck or shoulder pain
- Weaker grip strength
- Illness perceptions
- Comorbidity

Adapted with permission from [16].

Table 1. Core nonpharmacological interventions for hand osteoarthritis recommended by three international guidelines.

International guideline/ recommended therapy	NICE [102]	European League Against Rheumatism [7]	ACR [29]
Exercise joint protection	"Exercise should be a core treatment for people with OA, irrespective of age, comorbidity, pain severity or disability Exercise should include local muscle strengthening and general aerobic fitness"	"Education concerning joint protection (e.g., how to avoid adverse mechanical factors) together with an exercise regime (involving both range of motion and strengthening exercises) is recommended for all patients with hand OA"	ACR "conditionally recommend that health professionals should do the following – Evaluate the ability to perform ADLs – Instruct in joint protection techniques"
Assistive devices	"Assistive devices (e.g., tap turners) should be considered as adjuncts to core treatment for people with OA who have specific problems with ADLs Healthcare professionals might need to seek expert advice in this context (e.g., from occupational therapists)"	–	"Provide assistive devices as needed, to help patients perform ADLs"
Splints	"People with OA who have biomechanical joint pain or instability should be considered for assessment for joint supports as an adjunct to their core treatment"	"Splints for thumb-base OA and orthoses to prevent and/or correct lateral angulation and flexion deformity are recommended"	"Provide splints for patients with trapeziometacarpal joint OA"
Heat	"The use of local heat or cold should be considered as an adjunct to core treatment"	"Local application of heat (e.g., by use of paraffin wax or hot pack), especially prior to exercise, and ultrasound are beneficial treatments"	"Instruct in the use of thermal modalities"

ADL: Activity of daily living; OA: Osteoarthritis.

Original studies

Additional evidence from overviews, systematic reviews and original studies was identified by the search for both nonpharmacological and pharmacological management.

Nonpharmacological approaches

Thermotherapy

Kovács *et al.* studied the benefits of spa therapy, a treatment not available in some healthcare settings, for example the National Health Service, in patients with OA of the hand [30]. A total of 47 patients with ACR-defined hand OA were recruited to a double-blind, randomized, controlled study of balneotherapy, bathing in sulfurous thermal water for 20 min per session (15-times over 3 weeks) versus a control of warm tap water bathing. Assessments were undertaken at the beginning and at the end of the treatment, and 3 and 6 months after the beginning of the treatment. Benefits of spa therapy were seen for hand pain and disability within the first 6 months of follow-up.

A second prospective single-blind randomized controlled trial was conducted to evaluate the efficacy of paraffin bath therapy on pain, function and muscle strength in patients with bilateral hand OA (n = 56) [31]. Patients were randomized into two groups; group one had paraffin bath therapy five-times a week for 3 weeks for both hands; group two was the control. All patients had joint-protection information and use of paracetamol was noted. The primary outcome was pain at rest and during activities of daily living over the last 48 h and was assessed with a visual analog scale (0–10 cm) at 3 and 12 weeks. At follow-up participants allocated to paraffin therapy demonstrated a significant improvement in pain at rest at 3 and 12 weeks compared with the control group.

These studies provide confirmatory evidence to support the recommendation to use different applications of heat therapy in people with hand OA.

Exercise therapy

An overview synthesizing evidence from systematic reviews considered the effects of exercise on pain and physical function for patients with musculoskeletal conditions [32]. In addition, the evidence for the effect of exercise therapy on disease pathogenesis was also explored. Four common

conditions: fibromyalgia, low back pain, neck pain and shoulder pain, and four specific musculoskeletal diseases: OA (including hand OA), rheumatoid arthritis, ankylosing spondylitis and osteoporosis were reviewed. Cochrane reviews with the most recent update were first identified from January 2007 or later, and then non-Cochrane reviews published after this date were included.

Pain and physical functioning were selected as primary outcomes. Nine reviews comprising a total of 224 trials and 24,059 patients were included [32]. Only one review addressed the effect of exercise on pathogenesis. While strong evidence was found that supported exercise therapy in the overall management of musculoskeletal conditions, there was little or no evidence that exercise can influence disease pathogenesis.

The review provides additional support for the conflicting evidence for hand exercises [32]. Understanding the role and value of exercise in hand OA is one of the important priorities for study. Rather than producing more reviews and individual studies, the analysis of individual patient data from completed studies may provide some of the insights into subgroups of individuals in whom exercises are beneficial or deleterious, and such subgroups could be proposed by consensus.

Dynamic stability for thumb-base OA

O'Brien and colleagues report on findings from the only identified study focused on thumb-base OA [33]. They describe findings from a retrospective cohort study investigating the change in pain and disability in adults with thumb-base pain following an intervention described as a conservative dynamic stability interventional model for thumb pain. The approach is described in **Box 4**.

Participants were selected from consultation records using the International Classification of Disease codes ICD-9 (729.5 and 715.94) for upper limb pain and generalized OA of the thumb. A review of the medical records then identified participants with a diagnosis of thumb-base OA alone. This reduced the initial sample from 455 to 35. The generalizability of the findings is, therefore, limited to those with specific thumb-base problems without any coexisting hand condition. Of the 31 females and four males evaluated, average pain and disability scores improved and the average number of patient visits was 2.37 over an average of 44.5 days. While this study is limited in its retrospective design, its lack of a comparator group and small sample size, the intervention described is comprehensive and is a synthesis of previously recommended therapies. It represents an example of how model care could be implemented in routine practice.

Pharmacological approaches

NSAIDs

Topical NSAIDs for chronic musculoskeletal pain were reviewed to estimate treatment efficacy in studies of 8 weeks duration or longer [34]. The focus was on studies of high methodological quality and on those examining the measured effect of preparations according to study duration. At least ten participants were required in each treatment arm with application of treatment at least daily. Any topical formulation was eligible including creams, gel, patch and solution. Overall, topical NSAIDs were found to be significantly more effective than placebo for reducing pain. No difference in efficacy was demonstrated in the direct comparison of topical NSAIDs with oral NSAIDs. Mild skin reactions were the most common local adverse event for topical NSAIDs compared with oral medication. Gastrointestinal adverse events did not differ from placebo, but were less frequent than with oral NSAIDs. The review confirms the recommendation from international guidelines that topical NSAIDs used for 8 weeks or longer can be effective in relieving pain in hand OA [34].

Opioids for OA pain

The evidence for the benefits and risks for opioids for OA pain was reported for 'Tools for Practice' articles in *Canadian Family Physician* [35]. Only small improvements for opioids were identified in comparison with other oral medication. Opioid risks were dose-dependent and more than 100-mg morphine equivalent per day was associated with increased risk of opioid-related mortality. The overview concluded that long-term improvements in OA pain and function with opioids are not proven and opioids should not be routinely used in OA. This evidence is in line with the ACR 2012 hand OA recommendations.

Box 4. Dynamic stability for thumb-base osteoarthritis: conservative dynamic stability interventional model for thumb pain.

Modality

- Restoration of the thumb web space
- Re-education of intrinsic and extrinsic thumb muscles with an emphasis on:
  - The first dorsal interosseous and thumb opponents
  - Abductors and extensors for restoring stability and joint position
  - Joint mobilization for pain control
  - Muscle strengthening to maintain joint stability
- Orthotics to stabilize the thumb base as required
- Joint protection education
- Adaptive equipment

Adapted with permission from [33].

Ultrasound-guided intra-articular injections

Klauser and colleagues evaluated sonographic criteria in 33 patients with hand OA undergoing weekly ultrasound guided intra-articular injections of hyaluronic acid [36]. Measurements of joint thickening and joint inflammation were performed with grayscale semi-quantitative power-Doppler ultrasound. Sonographic measurements of decrease in joint thickening were significantly correlated with reduction in self-reported pain. Power-Doppler ultrasound scores were also associated with reduction in self-reported pain [36]. Whilst ultrasound may have a role in guiding injections the ACR recommend neither intra-articular corticosteroids nor hyaluronates [31].

Low-dose oral prednisolone

A randomized double-blind placebo-controlled trial of low-dose oral prednisolone evaluated whether it was an effective analgesic for hand OA compared with placebo [37]. Participants received 5 mg of prednisolone or placebo every day for 4 weeks. The primary outcome was the change in hand pain on a visual analog scale. Noncontrast 0.2 T MRI was performed on the most painful hand at baseline and at 4 weeks. No statistically significant benefit of prednisolone over placebo was found and baseline synovitis and effusion did not predict any response to treatment. This new evidence suggests that short-term low-dose oral prednisolone should not be offered for the treatment of hand OA.

■ Complementary & alternative therapies

A recent systematic review considered the evidence for the effectiveness of practitioner-based complementary and alternative therapies in the management of OA [38]. The review found insufficient evidence to either support or refute the efficacy of practitioner-based complementary therapies for OA.

This is disappointing for patients in particular who often prefer such approaches that harness contextual effects of therapies.

Conclusion

This review has taken a broad approach to provide an update on a variety of aspects in hand OA. While comprehensive, it has taken a limited time frame of 6 months and the review could be repeated every half year to give a complete picture of the evidence. Nevertheless, important judgments can be made on the publication of evidence for diagnosis and management of hand OA. Studies in diagnosis of hand OA showed an uptake of more sensitive imaging modalities (e.g., MRI) alongside traditional radiographic evaluation, allowing a more in depth understanding of different clinical phenotypes for targeted treatment in the future. There were surprisingly few studies of thumb-base OA in the 6-month period of the literature search, more attention had been given to the rarer subset of more severe hand OA, erosive OA.

Original studies on the management of hand OA, although fewer than those on diagnosis, were balanced between pharmacological and nonpharmacological approaches. Management of hand OA was also supported by the ACR 2012 clinical guideline. Whether guidelines can capture a multidimensional view of management has been discussed by authors such as Hughes and colleagues who selected five clinical guidelines covering the commonest causes of comorbidity (including OA) published since 2007 [39]. They found comorbidity and patient adherence were inconsistently accounted for in the guidelines and ranged from extensive discussion to none at all which reflects a general paucity of data on living with hand OA and self-management approaches [40]. There were limited disease-specific recommendations on patient-centered care. Individuals with hand OA commonly present in primary care and the sheer number of guidelines applicable to such chronic disease consultations is a challenge for primary care practitioners and patients.

The role of exercise in the relief of hand pain and improvement in functioning for hand OA continues to be a complex issue. This could be related to a lack of original studies, but also to different responses to exercise. Further individual trials may not clarify the inconsistencies, but individual patient data may have the potential to address important clinical questions relating to specific subgroups of patients and treatment response [41]. A pilot initiative, the OA Trial Bank, has been funded by the Dutch Arthritis Association and endorsed by EULAR and OA Research Society International (OARSI) in order to address important questions without the need to repeat large multicenter trials [106]. Initiatives such as this will also help to increase our understanding of diagnostic subsets and responses to treatment, strengthening existing guidance.

This review has focused on hand OA diagnosis and management. The initial search for evidence took a broad focus and identified a number of studies on hand OA and OA in general [42–87].

The review has some limitations: only two sources of evidence were searched on the Current Awareness Database at the Arthritis Research UK Primary Care Centre [103,104]; the date of the search was limited to a 6-month period from 1 July 2012 to 31 December 2012; and studies were selected by the author alone.

The review has included a range of study designs and has highlighted trends in evidence generated over a 6-month period with the identification of new guidance, the ACR 2012, which may stimulate a change in practice in the nonuse of intra-articular corticosteroids and opioids for hand OA.

Future perspective

Advancing imaging techniques will further our understanding of hand OA as a whole joint disease and will enable better differentiation of diagnostic phenotypes that may respond differently to different treatment approaches. In the meantime there are several findings that can be directly implemented into assessment and diagnosis for example, number of hand joints and other joints involved, the pattern of joint involvement.

The components of best care for OA have been defined as: consistency of care; continuity of care; patient-centered care; access to information and advice; support for self-management; and care compatible with a chronic long-term condition [88]. Lifestyle and behavior change interventions offer important ways to encourage a patient-centered approach where healthcare professionals can assist the patient with hand OA in their self-management of hand OA [89]. Evidence on implementing best practice for hand OA in the context of a consultation is underrepresented and methods for evaluating quality care such as those produced by the European Musculoskeletal Conditions Surveillance and Information Network (eumusc.net) project could provide opportunities to evaluate implementation efforts [90,107].

Future research is likely to be balanced between diagnostic studies, efficacy trials of new and existing interventions, trials determining the clinical and cost–effectiveness of packages of care and new models of care leading to complex designs, with patient and public priorities gaining greater prominence and shaping future direction [91,92].

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Executive summary

Diagnosis of hand osteoarthritis

- Hand osteoarthritis (OA) is a heterogeneous disease and even in the early stages the entire joint, including the articular cartilage, subchondral bone, synovial membrane and periarticular structures are involved.
- Erosive OA is a severe form of hand OA and is characterized by more severe structural damage and central erosions on imaging.
- Radiographic metacarpophalangeal joint OA may be distinct pattern from interphalangeal and thumb-base OA, knee and spinal OA.

Treatment recommendations for hand OA

- Advice and education is recommended with particular emphasis on joint protection education and hand exercises.
- Nonpharmacological approaches include the local application of treatments (e.g., heat), which are preferred over systemic treatments particularly if only selected joints are affected.
- Topical NSAIDs are the first-line pharmacological agent.

Conclusion

- The diagnosis and treatment of hand OA can be challenging.
- A range of factors, including different clinical phenotypes, risk factors, the numbers of joints affected, other joint sites involved and the impact on the individual, requires a holistic approach to assessment and management.
- There are a number of international guidelines for the diagnosis and management of hand OA and this review considers new evidence that strengthens existing recommendations.

References

Papers of special note have been highlighted as:
- of interest
- of considerable interest

1 Zhang Y, Niu J, Kelly-Hayes M *et al.* Prevalence of symptomatic hand osteoarthritis and its impact on functional status among the elderly: the Framingham study. *Am. J. Epidemiol.* 156(11), 1021–1027 (2002).

2 Kalichman L, Malkin I, Livshits G *et al.* The association between morbidity and radiographic hand osteoarthritis: a population-based study. *Joint Bone Spine* 73(4), 406–410 (2006).

3 Dziedzic K, Thomas E, Hill S *et al.* The impact of musculoskeletal hand problems in older adults: findings from the North Staffordshire Osteoarthritis Project (NorStOP). *Rheumatology.* 46(6), 963–967 (2007).

4 Hill S, Dziedzic KS, Ong BN. The functional and psychological impact of hand

osteoarthritis. *Chronic Illn*. 6(2), 101–110 (2010).

5 Hill S, Dziedzic KS, Nio Ong B. Patients' perceptions of the treatment and management of hand osteoarthritis: a focus group enquiry. *Disabil. Rehabil.* 33(19–20), 1866–1872 (2011).

6 Zhang W, Doherty M, Leeb BF *et al.* EULAR evidence-based recommendations for the diagnosis of hand osteoarthritis: report of a task force of ESCISIT. *Ann. Rheum. Dis.* 68(1), 8–17 (2009).

7 Zhang W, Doherty M, Leeb BF *et al.* EULAR evidence based recommendations for the management of hand osteoarthritis: report of a Task Force of the EULAR Standing Committee for International Clinical Studies including therapeutics (ESCISIT). *Ann. Rheum. Dis.* 66(3), 377–388 (2007).

8 Kjeken I, Smedslund G, Moe RH *et al.* Systematic review of design and effects of splints and exercise programs in hand osteoarthritis. *Arthritis Care Res. (Hoboken)* 63(6), 834–848 (2011).

9 Hochberg MC. Osteoarthritis year 2012 in review: clinical. *Osteoarthritis Cartilage* 20(12), 1465–1469 (2012).

10 Dziedzic KS. Osteoarthritis: best evidence for best therapies in hand osteoarthritis. *Nat. Rev. Rheumatol.* 7(5), 258–260 (2011).

11 Moe RH, Kjeken I, Uhlig T *et al.* There is inadequate evidence to determine the effectiveness of nonpharmacological and nonsurgical interventions for hand osteoarthritis: an overview of high-quality systematic reviews. *Phys. Ther.* 89(12), 1363–1370 (2009).

12 Madry H, Luyten FP, Facchini A. Biological aspects of early osteoarthritis. *Knee Surg. Sports Traumatol. Arthrosc.* 20(3), 407–422 (2012).

▪ **Highlights the importance of hand osteoarthritis (OA) as a whole joint disease.**

13 Blay SL, Fillenbaum GG, Andreoli SB, Gastal FL. Prevalence and concomitants of arthritis in the elderly in Rio Grande do Sul, Brazil. *PLoS One* 7(9), e45418 (2012).

14 Fejer R, Ruhe A. What is the prevalence of musculoskeletal problems in the elderly population in developed countries? A systematic critical literature review. *Chiropr. Man. Therap.* 20(1), 31 (2012).

▪ **Puts the prevalence of hand OA in context of other musculoskeletal conditions.**

15 Kwok WY, Plevier JW, Rosendaal FR, Huizinga TW, Kloppenburg M. Risk factors for progression in hand osteoarthritis: a systematic review. *Arthritis Care. Res. (Hoboken)* 65(4), 552–562 (2012).

16 Nicholls EE, van der Windt DA, Jordan JL, Dziedzic KS, Thomas E. Factors associated with the severity and progression of self-reported hand pain and functional difficulty in community-dwelling older adults: a systematic review. *Musculoskeletal Care* 10(1), 51–62 (2012).

17 Laslett LL, Quinn SJ, Winzenberg TM, Sanderson K, Cicuttini F, Jones G. A prospective study of the impact of musculoskeletal pain and radiographic osteoarthritis on health related quality of life in community dwelling older people. *BMC Musculoskelet. Disord.* 13(1), 168 (2012).

18 Addimanda O, Mancarella L, Dolzani P *et al.* Clinical associations in patients with hand osteoarthritis. *Scand. J. Rheumatol.* 41(4), 310–313 (2012).

19 Massengale M, Lu B, Pan JJ, Katz JN, Solomon DH. Adipokine hormones and hand osteoarthritis: radiographic severity and pain. *PLoS ONE* 7(10), e47860 (2012).

▪ **Places hand OA in the context of multimorbidity.**

20 Toledano E, Candelas G, Rosales Z *et al.* A meta-analysis of mortality in rheumatic diseases. *Rheumatol. Clin.* 8(6), 334–341 (2012).

▪▪ **Risk of mortality for rheumatic diseases is synthesized and the absence of data for OA is highlighted.**

21 Haugen IK, Englund M, Aliabadi P *et al.* Prevalence, incidence and progression of hand osteoarthritis in the general population: the Framingham Osteoarthritis Study. *Ann. Rheum. Dis.* 70, 1581–1586 (2011).

22 Ding C, Zhang Y, Hunter D. Use of imaging techniques to predict progression in osteoarthritis. *Curr. Opin. Rheumatol.* 25(1), 127–135 (2013).

23 Roemer FW, Guermazi A. Osteoarthritis year 2012 in review: imaging. *Osteoarthritis Cartilage* 20 (12), 1440–1446 (2012).

24 Menashe L, Hirko K, Losina E *et al.* The diagnostic performance of MRI in osteoarthritis: a systematic review and meta-analysis. *Osteoarthritis Cartilage* 20(1), 13–21 (2012).

25 Marshall M, Nicholls E, Kwok WY *et al.* Pattern of involvement and risk profile of symptomatic erosive osteoarthritis: results of an exploratory population-based study. *Osteoarthritis Cartilage* 20, S22 (2012).

26 Addimanda O, Mancarella L, Dolzani P *et al.* Clinical and radiographic distribution of structural damage in erosive and nonerosive hand osteoarthritis. *Arthritis Care. Res. (Hoboken)* 64(7), 1046–1053 (2012).

27 Nelson AE, De Vellis RF, Renner JB *et al.* Quantification of the whole-body burden of radiographic osteoarthritis using factor analysis. *Arthritis Res. Ther.* 13, R176 (2011).

▪▪ **Patterning of multisite OA, including hand OA, identifies metacarpophalangeal OA as distinct from thumb and interphalangeal OA.**

28 Moe RH, Grotle M, Kjeken I *et al.* Disease impact of hand OA compared with hip, knee and generalized disease in specialist rheumatology health care. *Rheumatology* 52, 189–196 (2013).

29 Hochberg MC, Altman RD, April KT *et al.* American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. *Arthritis Care. Res. (Hoboken)* 64(4), 455–474 (2012).

▪▪ **Newly published recommendations for the management of hand OA with an emphasis on nonpharmacological therapy and a do not use recommendation for intra-articular corticosteroid injections and opioids.**

30 Kovács C, Pecze M, Tihanyi Á *et al.* The effect of sulphurous water in patients with osteoarthritis of hand. Double-blind, randomized, controlled follow-up study. *Clin. Rheumatol.* 31(10), 1437–1442 (2012).

31 Dilek B, Gozum M, Sahin E *et al.* The efficacy of paraffin bath therapy in hand osteoarthritis: a single-blinded randomized controlled trial. *Arch. Phys. Med. Rehabil.* 94(4), 642–649 (2012).

32 Hagen KB, Dagfinrud H, Moe RH *et al.* Exercise therapy for bone and muscle health: an overview of systematic reviews. *BMC Med.* 10, 167 (2012).

▪▪ **Review of systematic reviews of the effectiveness of exercise in musculoskeletal pain and four conditions including OA and hand OA that highlights the conflicting evidence for exercise for hand OA.**

33 O'Brien VH, Giveans MR. Effects of a dynamic stability approach in conservative intervention of the carpometacarpal joint of the thumb: a retrospective study. *J. Hand Ther.* 26(1), 44–52 (2013).

34 Derry S, Moore RA, Rabbie R. Topical NSAIDs for chronic musculoskeletal pain in adults. *Cochrane Database Syst. Rev.* 9, CD007400 (2012).

35 Ivers N, Dhalla IA, Allan GM. Opioids for osteoarthritis pain: benefits and risks. *Can. Fam. Physician* 58, e708 (2012).

▪▪ **Evidence in support of ACR 2012 recommendations for not using opioids in the management of hand OA.**

36 Klauser AS, Faschingbauer R, Kupferthaler K *et al.* Sonographic criteria for therapy follow-

up in the course of ultrasound-guided intra-articular injections of hyaluronic acid in hand osteoarthritis. *Eur. J. Radiol.* 81(7), 1607–1611 (2012).

37 Wenham CY, Hensor EM, Grainger AJ *et al.* A randomized, double-blind, placebo-controlled trial of low dose oral prednisolone for treating painful hand osteoarthritis. *Rheumatology (Oxford)* 51(12), 2286–2294 (2012).

38 MacFarlane GJ, Paudyal P, Doherty M *et al.* A systematic review of evidence for the effectiveness of practitioner-based complementary and alternative therapies in the management of rheumatic diseases: osteoarthritis. *Rheumatology (Oxford)* 51(12), 2224–2233 (2012).

39 Hughes LD, McMurdo ME, Guthrie B. Guidelines for people not for diseases: the challenges of applying UK clinical guidelines to people with multimorbidity. *Age Ageing* 42(1), 62–69 (2013).

40 Dziedzic KS, Hill S, Nicholls E *et al.* Self-management, joint protection and exercises in hand osteoarthritis: a randomised controlled trial with cost effectiveness analyses. *BMC Musculoskelet. Disord.* 12, 156 (2011).

41 Vickers AJ, Cronin AM, Maschino AC *et al.* Acupuncture for chronic pain: individual patient data meta-analysis. *Arch. Intern. Med.* 1–10 (2012).

42 Alaaeddine N, Okais J, Ballane L, Baddoura RM. Use of complementary and alternative therapy among patients with rheumatoid arthritis and osteoarthritis. *J. Clin. Nurs.* 21(21–22), 3198–3204 (2012).

43 Arnstein PM. Evolution of topical NSAIDs in the guidelines for treatment of osteoarthritis in elderly patients. *Drugs Aging* 29(7), 523–531 (2012).

44 Brett Hauber A, Arden NK, Mohamed AF *et al.* A discrete-choice experiment of United Kingdom patients' willingness to risk adverse events for improved function and pain control in osteoarthritis. *Osteoarthritis Cartilage* 21(2), 289–297 (2013).

45 Choi TY, Choi J, Kim KH, Lee MS. Moxibustion for the treatment of osteoarthritis: a systematic review and meta-analysis. *Rheumatol. Int.* 32(10), 2969–2978 (2012).

46 Citrome L, Weiss-Citrome A. A systematic review of duloxetine for osteoarthritic pain: what is the number needed to treat, number needed to harm, and likelihood to be helped or harmed? *Postgrad. Med.* 124(1), 83–93 (2012).

47 Cohen, M. Rosehip – an evidence based herbal medicine for inflammation and arthritis. *Aust. Fam. Physician* 41, 495–498 (2012).

48 Colen S, Haverkamp D, Mulier M, van den Bekerom MP. Hyaluronic acid for the treatment of osteoarthritis in all joints except the knee: what is the current evidence? *Bio. Drugs* 26(2), 101–112 (2012).

49 Davis AM. Osteoarthritis year in review: rehabilitation and outcomes. *Osteoarthritis Cartilage* 20(3), 201–206 (2012).

50 Higgins TJ, Janelle CM, Naugle KM *et al.* Role of self-efficacy (SE) and anxiety among pre-clinically disabled older adults when using compensatory strategies to complete daily tasks. *Arch. Gerontol. Geriatr.* 55(3), 611–624 (2012).

51 Howe CQ, Sullivan MD, Saunders KW *et al.* Depression and ambivalence toward chronic opioid therapy for chronic noncancer pain. *Clin. J. Pain* 28(7), 561–566 (2012).

52 Huelin R, Pokora T, Foster TS, Mould JF. Economic outcomes for celecoxib: a systematic review of pharmacoeconomic studies. *Expert Rev. Pharmacoecon. Outcomes Res.* 12, 505–523 (2012).

53 Jimenez PJ. Psychological effects of Tai Chi Chuan. *Arch. Gerontol. Geriatr.* 55(2), 460–467 (2012).

54 Katz U, Shoenfeld Y, Zakin V, Sherer Y, Sukenik S. Scientific evidence of the therapeutic effects of dead sea treatments: a systematic review. *Semin. Arthritis Rheum.* 42(2), 186–200 (2012).

55 Kellner HL, Li C, Essex MN. Efficacy and safety of celecoxib versus diclofenac and omeprazole in elderly arthritis patients: a subgroup analysis of the CONDOR trial. *Curr. Med. Res. Opin.* 28(9), 1537–1545 (2012).

56 Kim IS, Chung SH, Park YJ, Kang HY. The effectiveness of an aquarobic exercise program for patients with osteoarthritis. *Appl. Nurs. Res.* 25, 181–189 (2012).

57 Knai C, Brusamento S, Legido-Quigley H *et al.* Systematic review of the methodological quality of clinical guideline development for the management of chronic disease in Europe. *Health Policy* 107(2–3), 157–167 (2012).

58 Lanas A, Goldstein JL, Chan FK *et al.* Risk factors associated with a decrease >/=2 g/dL in haemoglobin and/or >/=10% haematocrit in osteoarthritis patients taking celecoxib or a nonselective NSAID plus a PPI in a large randomised controlled trial (CONDOR). *Aliment. Pharmacol. Ther.* 36, 485–492 (2012).

59 Lee MS, Ernst E. Systematic reviews of t'ai chi: an overview. *Br. J. Sports Med.* 46(10), 713–718 (2012).

60 Luong ML, Cleveland RJ, Nyrop KA, Callahan LF. Social determinants and osteoarthritis outcomes. *Aging Health* 8, 413–437 (2012).

61 Mackenzie IS, Wei L, Macdonald TM. Cardiovascular safety of lumiracoxib: a meta-analysis of randomised controlled trials in patients with osteoarthritis. *Eur. J. Clin. Pharmacol.* 69(2), 133–141 (2012).

62 Maesschalck J. Is there a place for glucosamine in the community pharmacy? *J. Pharm. Belg.* 2, 13–23 (2012).

63 Martin KR, Schoster B, Woodard J, Callahan LF. What community resources do older community-dwelling adults use to manage their osteoarthritis? A formative examination. *J. Appl. Gerontol.* 31(5), 661–684 (2012).

64 McDonald DD, Molloy B. Factors predicting older adults' use of exercise and acetaminophen for osteoarthritis pain. *J. Am. Acad. Nurse Pract.* 24, 669–674 (2012).

65 Miranda VS, Decarvalho VB, Machado LA, Dias JM. Prevalence of chronic musculoskeletal disorders in elderly Brazilians: a systematic review of the literature. *BMC Musculoskelet. Disord.* 13(1), 82 (2012).

66 Mobasheri A. Intersection of inflammation and herbal medicine in the treatment of osteoarthritis. *Curr. Rheumatol. Rep.* 14(6), 604–616 (2012).

67 Mobasheri A. Osteoarthritis year 2012 in review: biomarkers. *Osteoarthritis Cartilage* 20(12), 1451–1464 (2012).

68 Murphy LB, Sacks JJ, Brady TJ, Hootman JM, Chapman DP. Anxiety and depression among US adults with arthritis: prevalence and correlates. *Arthritis Care Res.* 64(7), 968–976 (2012).

69 Nielen MM, van Sijl AM, Peters MJ, Verheij RA, Schellevis FG, Nurmohamed MT. Cardiovascular disease prevalence in patients with inflammatory arthritis, diabetes mellitus and osteoarthritis: a cross-sectional study in primary care. *BMC Musculoskelet. Disord.* 13(1), 150 (2012).

70 O'Neil CK, Hanlon JT, Marcum ZA. Adverse effects of analgesics commonly used by older adults with osteoarthritis: focus on non-opioid and opioid analgesics. *Am. J. Geriatr. Pharmacother.* 10(6), 331–342 (2012).

71 Pavelka K. A comparison of the therapeutic efficacy of diclofenac in osteoarthritis: a systematic review of randomised controlled trials. *Curr. Med. Res. Opin.* 28(1), 163–178 (2012).

72 Ragle RL, Sawitzke AD. Nutraceuticals in the management of osteoarthritis: a critical review. *Drugs Aging* 29(9), 717–731 (2012).

73 Roos EM, Juhl CB. Osteoarthritis 2012 year in review: rehabilitation and outcomes. *Osteoarthritis Cartilage* 20(12), 1477–1483 (2012).

74 Rubinstein I, Weinberg GL. Nanomedicines for chronic non-infectious arthritis: the clinician's perspective. *Maturitas* 73, 68–73 (2012).

75 Somers TJ, Wren AA, Shelby RA. The context of pain in arthritis: self-efficacy for managing pain and other symptoms. *Curr. Pain Headache Rep.* 16, 502–508 (2012).

76 Stam W, Jansen J, Taylor S. Efficacy of etoricoxib, celecoxib, lumiracoxib, non-selective NSAIDs, and acetaminophen in osteoarthritis: a mixed treatment comparison. *Open Rheumatol. J.* 6, 6–20 (2012).

77 Suteu C, Farcas DM. The physical and psychological consequences on quality of life in patients with upper limbs osteoarthritis. *Osteoporosis Int.* 23 (2), S335–S336 (2012).

78 Taibi DM, Vitiello MV. Yoga for osteoarthritis nursing and research considerations. *J. Gerontol. Nurs.* 38(7), 26–35 (2012).

79 Tamari K, Kawamura K, Sato M, Harada K. Health education programs may be as effective as exercise intervention on improving health-related quality of life among Japanese people over 65 years. *Australas. J. Ageing* 31(3), 152–158 (2012).

80 Taylor R Jr, Raffa RB, Pergolizzi JV Jr. Controlled release formulation of oxycodone in patients with moderate to severe chronic osteoarthritis: a critical review of the literature. *J. Pain Res.* 5, 77–87 (2012).

81 Tuzun S *et al.* How can we improve adherence to exercise programs in patients with osteoarthritis?: a randomized controlled trial. *Turk. Geriatri. Dergisi.* 15, 339–348 (2012).

82 van Laar M, Pergolizzi JV Jr, Mellinghoff HU *et al.* Pain treatment in arthritis-related pain: beyond NSAIDs. *Open Rheumatol. J.* 6, 320–330 (2012).

83 Van Vijven JP, Luijsterburg PA, Verhagen AP, van Osch GJ, Kloppenburg M, Bierma-Zeinstra SM. Symptomatic and chondroprotective treatment with collagen derivatives in osteoarthritis: a systematic review. *Osteoarthritis Cartilage* 20(8), 809–821 (2012).

84 Vandeweerd JM, Coisnon C, Clegg P *et al.* Systematic review of efficacy of nutraceuticals to alleviate clinical signs of osteoarthritis. *J. Vet. Intern. Med.* 26(3), 448–456 (2012).

85 Von Korff M, Vitiello MV, McCurry SM *et al.* Group interventions for co-morbid insomnia and osteoarthritis pain in primary care: the lifestyles cluster randomized trial design. *Contemp. Clin. Trials* 33(4), 759–768 (2012).

86 Vora A, Borg-Stein J, Nguyen RT. Regenerative injection therapy for osteoarthritis: fundamental concepts and evidence-based review. *PM R* 4(Suppl. 5), S104–S109 (2012).

87 Zweers MC, de Boer TN, van Roon J, Bijlsma JW, Lafeber FP, Mastbergen SC. Celecoxib: considerations regarding its potential disease-modifying properties in osteoarthritis. *Arthritis Res. Ther.* 13, 239 (2011).

88 Mann C, Gooberman-Hill R. Health care provision for osteoarthritis: concordance between what patients would like and what health professionals think they should have. *Arthritis Care Res. (Hoboken)* 63(7), 963–972 (2011).

89 Knittle K, De Gucht V, Maes S. Lifestyle- and behaviour-change interventions in musculoskeletal conditions. *Best Pract. Res. Clin. Rheumatol.* 26(3), 293–304 (2012).

90 Strombeck B, Petersson IF, Vliet Vlieland TP, for the EUMUSC.net WP6 group: health care quality indicators on the management of rheumatoid arthritis and osteoarthritis: a literature review. *Rheumatology (Oxford)* 52(2), 382–390 (2013).

91 Strauss VY, Carter P, Ong BN *et al.* Public priorities for joint pain research: results from a general population survey. *Rheumatology* 51(11), 2075–2082 (2012).

92 Cheraghi-Sohi, S *et al.* Patient priorities in osteoarthritis and co-morbid conditions: a secondary analysis of qualitative data. *Arthritis Care. Res. (Hoboken)* 65(6), 920–927 (2012).

Websites

101 Arthritis Research Campaign. Arthritis: the big picture (2002). www.arc.org.uk

102 NICE. Osteoarthritis: national clinical guideline for care and management in adults (2008). www.nice.org.uk/CG059

103 PubMed. www.ncbi.nlm.nih.gov/pubmed

104 Web of Science. http://thomsonreuters.com/products_services/science/science_products/a-z/web_of_science

105 ACR evidence for hand osteoarthritis. http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)2151–4658

106 The OA Trial Bank. EULAR OA Trial Data Bank Study. www.eular.org/myUploadData/files/EULAR%20OA%20Study%20Group_web.pdf

107 The European Musculoskeletal Conditions Surveillance and Information Network (EUMUSC). www.eumusc.net

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Activity evaluation: where 1 is strongly disagree and 5 is strongly agree.					
	1	**2**	**3**	**4**	**5**
The activity supported the learning objectives.					
The material was organized clearly for learning to occur.					
The content learned from this activity will impact my practice.					
The activity was presented objectively and free of commercial bias.					

1. Based on the review by Dr. Dziedzic, which of the following statements about clinical features and factors affecting management of hand osteoarthritis is **most likely** correct?

- ☐ **A** Hand osteoarthritis is not associated with significant disability
- ☐ **B** Hand osteoarthritis is limited to the articular cartilage only
- ☐ **C** Lipid abnormalities have not been reported as a comorbidity
- ☐ **D** Pain, occupation, multisite involvement, illness perceptions, and impact should form part of a biopsychosocial assessment of hand osteoarthritis, as these may affect management

2. Your patient is a 74-year-old male thought to have hand osteoarthritis. Which of the following statements about diagnosis of hand osteoarthritis is **most likely** correct?

- ☐ **A** Imaging shows that erosive osteoarthritis is a less severe form of hand osteoarthritis characterized by marginal erosions
- ☐ **B** Radiographic metacarpophalangeal joint osteoarthritis has a similar pattern to interphalangeal and thumb base osteoarthritis
- ☐ **C** Magnetic resonance imaging (MRI) may offer more insight into disease progression from onset to joint failure and risk factors associated with disease progression
- ☐ **D** The diagnosis of generalized osteoarthritis does not require hand osteoarthritis

3	Which of the following statements about treatment of hand osteoarthritis would **most likely** be correct?
☐	**A** Systemic treatments are preferred over nonpharmacological approaches
☐	**B** Oral nonsteroidal anti-inflammatory drugs (NSAIDs) are first-line pharmacotherapy
☐	**C** No guidelines are currently available for the diagnosis and management of hand osteoarthritis
☐	**D** Advice and education are recommended, emphasizing joint protection education and hand exercises