

Title: Best evidence osteoarthritis care: What are the recommendations and what is needed to improve practice?

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Osteoarthritis, chronic disease, evidence-based practice, primary care, guideline-informed-care, quality indicators.

Key Points (3-5 bulleted sentences indicating the main takeaways/defining elements of the article)

- There is agreement on a core set of osteoarthritis (OA) treatment recommendations in leading clinical practice guidelines, although guidelines differ in adjunct treatment recommendations which can cause confusion for clinicians and people with OA.
- Different Models of Care, Models of Service Delivery and Osteoarthritis Management Programs have been employed internationally as implementation strategies to increase the uptake of best evidence care for OA.
- Evaluating the quality of OA service delivery using Quality Indicators may improve OA management by identifying elements of care requiring improvement at the consumer, system and organisational levels.

Synopsis (92/100 words)

This chapter provides an overview of osteoarthritis (OA) management recommendations and strategies to improve clinical practice concordance with clinical guidelines. In many countries, the primary point of care for a person with OA is typically general

practitioners and physiotherapists. Optimal primary care focuses on core OA treatments, namely education for self-management and lifestyle interventions encompassing increased physical activity, therapeutic exercise and weight-loss (if indicated). Quality indicators are used in clinical practice and research to determine quality of care and in some settings are used as knowledge translation tools to address existing evidence-to-practice-gaps.

Introduction and background

Osteoarthritis (OA) has an estimated prevalence of 20-30% of the population with the burden increasing, driven by factors including ageing populations, and increasing incidence of obesity and joint injuries¹. OA is the most common musculoskeletal condition in older adults worldwide, with significant and emergent societal and economic costs^{2,3}. At an individual level, OA can impact on wellbeing, quality-of-life, physical functioning and work capacity, resulting in substantial personal economic costs². People with OA often have multi-morbidities which further impair health outcomes and are costly to manage^{4,5}. Yet, despite the availability of OA clinical practice guidelines, the management of OA within healthcare services is often suboptimal⁶ and discordant with recommended care⁷. While there are many factors contributing to suboptimal OA care, variations in the recommendations between the guidelines can cause confusion among healthcare practitioners when implementing evidence-based care⁸.

A person with OA, also referred to as a 'consumer' in some countries, typically presents to primary care providers for advice on pain, stiffness or functional impairments. In many countries general practitioners (GPs), physiotherapists⁹ and other healthcare professionals (e.g., osteopaths and chiropractors) are the first points of contact. Optimally, primary care should focus on delivering the recommended "core" interventions to everyone with OA¹⁰. These interventions are consistently recommended in OA practice guidelines due to their effectiveness and safety, low-cost and high accessibility¹¹ and include education for self-management, physical activity, therapeutic exercise (e.g., strengthening, aerobic exercise) and weight-loss when indicated¹²⁻¹⁷.

Adjunctive treatments can be provided in addition to core treatments, if needed¹⁷.

However, their evidence-base is often less clear than for core treatments. Adjunctive treatments may incorporate a combination of modalities such as local assistive devices (e.g., braces and splints) or psychological support, tailored to meet individual needs and circumstances. They may also be recommended for a person with more severe or complex OA, for example, for those presenting with very high pain, depression or sleep impairment¹⁸. Appropriate evidence-based pharmacological interventions can also be used alongside core interventions, although, this is an area where guideline advice also differs^{10,12,14}. Surgical interventions are also an option, but should only be considered for people with end-stage OA, with symptoms that have a substantial impact on quality-of-life, and who have not responded to core treatments¹⁸.

Reasons for suboptimal care are multi-faceted^{7,19,20}, with barriers to uptake occurring at the consumer, practitioner and system level⁸. For people with OA, barriers include a lack of understanding on the role of lifestyle treatments, consequently resulting in poor adherence to those treatments²¹. Another major barrier is limited access to allied health services, due to both geographical location and poor referral to those services from general practice²². For healthcare practitioners, reported barriers include: i) gaps in the knowledge, confidence and attitudes of healthcare practitioners to deliver core interventions; ii) insufficient time and low prioritisation of holistic assessments, diagnosis and treatment planning; and iii) confusion about the recommended adjunctive therapies resulting from guideline discrepancies^{6,8}.

It has been shown that improved uptake of OA guidelines in clinical care can be supported by different strategies at distinct levels of the care pathway²³. From a clinical and service delivery perspective, strategies such as Osteoarthritis Management Programs (OAMP's) and coordinated interdisciplinary Models of Care (MOC) can facilitate translation of knowledge and improved uptake of best-evidence care^{21,24}. At the organisational level, policy and regulatory framework development can lead to regular updates of unbiased clinical practice guidelines, and thus optimise care delivery through improved workforce planning and strategic implementation⁴.

In this narrative review, we synthesise the treatment recommendations from seven current international OA clinical guidelines, and briefly discuss the underpinning evidence. We will also discuss strategies to improve uptake and implementation of the guidelines in primary care, including considerations for healthcare practitioners and in reference to consumer needs.

Summary of key osteoarthritis clinical practice guidelines and recommendations

Table 1. Summary of key osteoarthritis clinical practice guidelines and recommendations.

What are the core interventions?

There is international consensus on a recommended core set of OA interventions. The American College of Rheumatology (ACR)¹², European Society for Clinical and Economic Aspects of Osteoporosis, Osteoarthritis and Musculoskeletal Diseases (ESCEO)¹⁶, European League Against Rheumatism (EULAR)¹³, EULAR recommendations for the management of hand osteoarthritis¹⁷, National Institute for Health and Clinical Excellence (NICE)¹⁵, OA

Research Society International (OARSI)¹⁴ and the Royal Australian College of General Practitioners (RACGP)¹⁰ all strongly recommend a core set of interventions including self-management education, physical activity, therapeutic exercise and weight management, with weight-loss when indicated.

Self-management education: OA education should be the first step in any OA treatment, and include information on the nature and course of the condition, with explanation of benefits, likely outcomes, and potential risks of all treatment options^{10,12-16,25}. OA education alone has little effect on OA pain and function, but has been shown to influence self-efficacy for OA self-management, especially when paired with other treatments²⁶. OA self-management education is also suggested to increase treatment adherence^{12,13}.

Physical activity: Maintaining recommended levels of physical activity is essential for anyone with OA. It typically refers to activities of daily living and other exercise undertaken in daily life (e.g., walking or cycling to the shops or work)^{10,12-16}. Maintaining general physical activity levels has shown to be important both for managing OA clinical outcomes (e.g., reducing pain) and is essential for overall wellbeing and general health^{10,12-16}.

Therapeutic Exercise: Therapeutic exercise is any type of prescribed exercise which targets OA symptoms. It is often prescribed by a healthcare professional (e.g., physiotherapist, osteopath) and typically includes functional and/or neuromuscular goals²⁷. Prescribed therapeutic exercise, particularly land-based exercises, feature strongly in the clinical practice guidelines^{10,12-17}, with a broad range of exercise types, frequencies and intensities shown to be clinically effective. For example, the NICE guidelines endorse therapeutic

exercise comprising local muscle strengthening and general aerobic exercise¹⁵, whereas structured land-based exercise is recommended by OARSI as a core treatment for polyarticular and knee OA¹⁴. Water-based exercise programs are also specifically recommended in the OARSI and RACGP guidelines as low impact options^{10,14}. Aerobic, strength-based and specific neuromuscular/balance exercises are also of benefit^{10,12}. Regardless, prescription of therapeutic exercise should account for personal preferences, ability and accessibility for the person with OA to promote greater adherence¹².

Weight management and weight loss

For people with knee and hip OA, weight-loss is recommended in all clinical guidelines for anyone above a healthy weight (BMI $\geq 25\text{kg/m}^2$)^{10,12-16}. Exercise and weight-loss show the greatest clinical effect for improving pain and functional outcomes, particularly for knee OA²⁸. The mechanism by which weight-loss improves OA symptoms is poorly understood, however, it is thought to act through both reducing the biomechanical load and reducing the inflammatory stressors that contribute to the OA process²⁹. In hand OA, weight-loss is not a specific recommendation¹⁷.

Adjunctive treatments

Adjunctive treatments should ideally be evidence-based and delivered supplementary to core interventions. Adjunctive therapy recommendations show greater variability than core interventions, and are regularly updated as new evidence becomes available^{30,31}. Adjunctive treatments may include assistive devices, mind/body therapies, psychological support, massage and manual therapies or acupuncture. Similarly, pain relieving pharmacological treatments should be used judiciously, in combination with core interventions, and with full

consideration of the benefits and harms before prescription. Box 1 summarises the current recommendations for lifestyle, psychosocial, mind-body, and pharmacological treatments and highlights current variations between guidelines.

Box 1. Summary of adjunctive treatment variations

Lifestyle, psychosocial and mind-body treatments	
<p><i>Assistive devices, joint braces and joint taping</i></p>	<p><i>Hand OA:</i> ACR and EULAR guidelines provide a strong recommendation for the use of hand orthoses in carpometacarpal joint OA^{12,17}. The use of assistive devices for hand OA (e.g., jar-openers, ergonomic grip utensils) is also recommended by EULAR¹⁷.</p> <p><i>Lower Limb OA:</i> The ACR provides strong recommendation for tibiofemoral bracing for knee OA¹². Similarly, NICE and EULAR conditionally recommend bracing and strapping in knee and hand OA where required^{13,15}. Where knee and hip OA significantly affects ambulation, including balance, cane use is also strongly recommended¹². However, OARSI recommends against patella taping, patellofemoral braces, soft knee braces or varus/valgus braces as there is insufficient evidence to support efficacy¹⁴.</p>
<p><i>Footwear</i></p>	<p><i>Lower Limb OA:</i> Orthotic footwear and shock absorbing insoles are recommended by NICE and EULAR^{13,15}. Conversely,</p>

	<p>the RACGP and ACR recommend against the use of footwear marketed for OA due to the lack of high-quality evidence^{12,14}.</p>
<p><i>Mind/body therapies (e.g., Tai Chi, Yoga)</i></p>	<p><i>Lower Limb OA:</i> While not unanimously recommended across all clinical practice guidelines, Tai Chi and other mind/body exercises are gaining popularity. ACR strongly recommend Tai Chi for people with hip and knee OA for the positive mind-body impacts on balance, strength and emotional wellbeing¹². Likewise, although conditionally, the ACR recommend yoga for knee OA¹². OARSI guidelines conditionally recommend mind-body interventions such as Tai Chi and yoga as part of structured self-management programs because of the favourable efficacy and good safety profile for this intervention¹⁴.</p>
<p><i>Psychological therapies</i></p>	<p>Conditional recommendations are made by ACR, EULAR and NICE for psychological therapies for persons with knee, hip, and/or hand OA. Cognitive behavioural therapies (CBT) in particular are recommended as strategies to improve emotional wellbeing, encourage appropriate positive behavioural change and learn pain coping skills^{12,13,15}. Psychological therapies that target mood, sleep, stress and anxiety are also recommended ^{10,12}.</p>
<p><i>Other</i></p>	<p>Other adjunctive therapies are more cautiously recommended in different clinical guidelines, primarily due to the relative low</p>

	<p>level of evidence or quality of evidence available. NICE recommends the consideration of adjunctive therapies such as thermal interventions (heat/cold application), manipulation and stretching (particularly for hip OA), and Transcutaneous Electrical Stimulation (TENS)¹⁵. ACR also provide a conditional recommendation for thermal interventions (heat/cold application) and acupuncture¹². TENS has a conditional recommendation for use in the RACGP guideline¹⁰.</p> <p>However, ACR conditionally recommend against massage and manual therapy in people with hip and knee OA and TENS is strongly recommended against for hip and knee OA¹².</p>
<p>Pharmacologic treatments</p>	
<p><i>NSAIDs</i></p>	<p>Topical NSAIDs feature strongly as preferred treatments in all clinical practice guidelines and are especially appropriate for people with underlying gastrointestinal or cardiovascular conditions¹²⁻¹⁷.</p> <p>Oral NSAIDs are recommended for persons with knee, hip, and/or hand OA, although they should only be used for a short period of time and in conjunction with gastric protection from a proton pump inhibitor^{10,12-16}. Topical NSAIDs are recommended before oral NSAIDs due to their superior safety profile^{14,15}.</p>

Paracetamol / acetaminophen	<p>The efficacy and safety of paracetamol for OA pain relief is not clearly defined in the guidelines and remains a controversial issue³². The ACR give a conditional recommendation for the use of acetaminophen (paracetamol) and likewise, low dose, short-term acetaminophen use is a recommended first-line treatment in the ESCEO, EULAR and NICE guidelines^{13,15,16}. However, Paracetamol is no longer recommended by the OARSI guideline as first-line therapy due to greater risk of adverse effects (gastrointestinal adverse effects and multi-organ failure) compared to analgesic benefit¹⁴Use of paracetamol requires careful consultation with the patient.</p>
<i>Opioids</i>	<p>The use of Tramadol (and other opioids) is highly controversial and while the ACR guidelines recommend it (when NSAIDs are contraindicated and other therapies are ineffective)¹², most other guidelines do not.</p>
<i>Duloxetine</i>	<p>The ACR guidelines recommend Duloxetine, commonly used to treat major depressive disorders, as appropriate for people with knee, hip, and/or hand OA¹². OARSI provide recommendations for the prescription of Duloxetine for the management of OA if associated widespread pain and/or depression¹⁴.</p>
<i>Injectable therapies</i>	<p>Viscosupplements (e.g., hyaluronic acid injections) and other injectable therapies are other areas of debate. For</p>

	<p>viscosupplements, meta-analyses have found little additional benefit over saline injections³³. Conversely, the ACR, EULAR, NICE and OARSI guidelines recommend intra-articular glucocorticoid injection for relief of moderate to severe knee and hip OA pain¹²⁻¹⁵, although the RACGP guidelines caution against repeated use due to the associated risk of harm and decreasing effectiveness¹⁰.</p>
<i>Other</i>	<p>The use of topical capsaicin for knee and hand OA is endorsed in the RACGP, NICE and EULAR guidelines^{12,13,15}, while the ACR give a conditionally recommended for knee OA only¹². For other supplements, the ACR and RACGP recommend against fish oil, vitamin D, glucosamine and chondroitin for people with knee, hip, and/or hand OA^{10,12}, whereas as chondroitin is recommended for use in hand OA by EULAR¹⁷.</p>

Recommendations differ between guidelines, both in the adjunctive therapies included and the strength of the recommendations. The limited applicability, lack of stakeholder engagement, potential lack of editorial independence and potentially biased representation of committee members in the development of some leading practice guidelines have received criticism^{34,35}. This lack of consensus potentially influences interpretation and application of guidelines at the practitioner and consumer level. Interpretation of evidence is particularly controversial for manual therapy, acupuncture, intra-articular hyaluronic acid injections and many pharmacologic treatments³⁶ (Box 1).

Strategies to support moving from clinical guidelines to clinical care

Strategies to mobilise best evidence into clinical care for OA requires a pragmatic approach at all levels of care delivery. In Australia, the 'Living Well with OA' component of the National Osteoarthritis Strategy²¹ provides an organisational framework to support the uptake of evidence-informed approaches by healthcare practitioners for the management of OA. Implementation of guidelines through applicable MOC frameworks can facilitate practitioner and consumer access to training, resources, support networks and platforms to facilitate remote access to web-based tools and clinical guidelines³⁷. For example, web-based systems can support clinician decision-making by providing easy access to evidence-based clinical algorithms and decision aids that present treatment options based on patients' individual presentation in real time³⁸. Ensuring guidelines are presented in a stepwise, logical and visible format using algorithms may be one way to address the evidence-to-practice gap and help clinicians to contextualise best care pathways³⁹.

Models and programs to improve delivery of OA care

Internationally, a number of MOC and OAMPs are used to facilitate the translation of evidence into practice across primary, secondary and tertiary settings³⁷. These models and programs, while similar in the key aspects of OA care (the 'what'), vary in how the care is delivered (the 'how'), and ideally reflect the different health care systems in which they operate⁴⁰. A strength of these models is the ability to deliver the tailored, multidisciplinary care needed for OA, while adapting to different patient volumes. However, while there is evidence to support the effectiveness of different models and programs to improve the health outcomes of people with OA (Box 2), this is still an emerging area. More research is needed to determine the best models to use, how they perform in real world settings, and

the benefits of remotely-delivered versus traditional face-to-face care. Furthermore, longitudinal evaluations of long-term patient health outcomes and economic impact of different MOC is warranted.

Box 2: Clinical trial evidence for OA care pathways

Examples of recent large scale clinical trials that have tested new models to improve uptake of evidence-based OA care include the *'Primary care management on knee pain and function in patients with osteoarthritis'* (PARTNER, Australia)⁴¹, the *'Structured model for osteoarthritis care in primary healthcare'* (SAMBA, Norway)⁴² and the *'Management of osteoarthritis in consultations'* (MOSAICS, UK)⁴³. These clinical trials were underpinned by frameworks for encouraging behavioural change and promotion of OA self-management that could be delivered in primary care and community-based settings. Key findings from the MOSAICS trial evaluation highlighted the important role that multidisciplinary primary care practitioners play in the implementation of OA guidelines. The MOSAICS trial was described as a knowledge brokering service for people with OA, that facilitates adherence to core and adjunctive guideline-endorsed treatments³¹. The authors suggested successful implementation of the MOSAICS MOC in a real-world setting requires adequate resources, and appropriate infrastructure and institutional support³¹. Encouragingly, the results from the SAMBA trial showed that the MOC led to OA care that was more in line with current care recommendations, with better patient-reported quality of care and greater satisfaction compared to usual care⁴⁴.

OA programs implemented in the real world

Examples of programs developed and successfully implemented in real-world settings (i.e., not via a clinical trial) are summarised in Table 2. These programs include the *Osteoarthritis Chronic Care Program* (OACCP, Australia)⁴⁵, the *Joint Implementation for Guidelines for Osteoarthritis in Western Europe* (JIGSAW-E)⁴³, *Good Life with Osteoarthritis: Denmark* (GLA:D, international)²⁷ *Better Management of Patients with Osteoarthritis* (BOA) and its online counterpart *Joint Academy* (Sweden)⁴⁶ and *Active with Osteoarthritis* (AktivA, Norway)⁴⁷.

All of these programs deliver person-centred education, promote self-management strategies and provide exercise therapy, however the mode, delivery and intensity of interventions vary. Of note, only the OACCP and JIGSAW-E include weight-management, dietary or psychological support^{43,45}. Additionally, GLA:D, BOA and AktivA are mainly physiotherapy-led programs and do not routinely refer for pharmacologic treatment, orthoses or joint replacement surgery^{27,46,47}. The BOA also has an associated eHealth delivery option, *Joint Academy*⁴⁶. There are other stand-alone eHealth models and support programs for OA. The *MyJointPain*⁴⁸ in Australia and the *Join2move*³⁸ in the Netherlands are two examples that provide remote access to resources and interventions in a self-help format for people with OA. *Join2move*³⁸ provides education to improve physical activity and decrease pain with structured goal setting over eight modules. *MyJointPain*⁴⁸ incorporates a series of video resources and fact sheets to provide education on OA prognosis, treatment options and long-term management. It is designed to promote greater understanding and awareness of the condition for both practitioners and people with OA⁴⁸.

There are no studies comparing patient or economic outcomes across the various OA models or care pathways, primarily due to the expense and difficulty of doing so. However, there are some parallels in studies looking at the barriers and enablers for these individual programs. Eyles and colleagues investigated perceived barriers and enablers to implementing the OACCP in public hospitals, from the perspective of the clinicians delivering the program⁵¹. The OACCP was found to empower consumers through provision of self-supported management strategies and resources, while staff were supported to establish strong therapeutic alliances and shared case-loads with a focus on discrete multidisciplinary skills.

Table 2. Models of Care

Implementation and evaluation of OAMPs and MOCs across international and multisector healthcare systems are required if the full potential of OAMPs are to be realised⁴⁹. However, the optimal method/s for achieving widespread implementation in a format compatible with complex healthcare systems has not yet been determined. Effective implementation of OAMPs and MOCs may need to incorporate recommendations for setting-based redesign of service delivery, including changes to clinical information systems (e.g. electronic medical records) and development of more consumer or community-led initiatives. Ongoing education and training for health care providers delivering OA care has also been identified as a priority for optimising implementation to ensure that reform and sustainability of OAMPs and MOC continues to keep pace with clinical guidelines⁴⁹⁻⁵¹.

Evaluating the quality of OA care

Evaluation of the effectiveness of any program is essential to determine if guideline-informed care has been delivered by healthcare practitioners or healthcare services⁵². One method is routine monitoring of care using OA quality indicators (QIs) that target clinician-delivered care. Alternatively, process and structural indicators, which refer to where and how OA care is delivered in the broader context, can also be used to measure if guideline translation into the operational and service delivery mechanisms have been successful.

Determining the most appropriate QIs, however, is reliant on the setting and context of care delivery. Earlier research has indicated that QIs developed in one country are not always comparable for use across borders due to cultural and structural differences within the health care systems⁵³. Furthermore, measuring care is complex as assessing individual impact needs to be carefully considered to ensure the correct outcome is measured. For example, some QIs target different joints (e.g., hip vs knee OA), while others target the type or frequency of treatment⁵⁴, or are for use by different health professions (e.g., general practitioner or physiotherapist⁵⁵).

QI assessments can be undertaken through an audit of medical records, although QI results based on medical records should be treated with caution as consumer perceptions of their treatment outcome may be different from that of their healthcare practitioner⁵⁶. Therefore, consumer-reported QI sets developed from OA clinical practice guidelines are considered a better option to effectively monitor and evaluate care than medical records⁵⁷. One example is the OsteoArthritis Quality Indicator (OA-QI) questionnaire⁵⁷. This tool is based on international clinical practice guidelines and has been validated to assess patient-reported quality of OA care within OAMPs⁵⁷. Another example is the Quality Indicators for

Physiotherapy Management of Hip and Knee Osteoarthritis (QUIPA) tool, developed for use in physiotherapy⁵⁸. Both tools are used to assess and determine service delivery and outcomes of OA care^{57,58}.

Standardisation across QI sets and therefore better direction for their usage is needed. No clear synthesis or guidelines for the use of QIs currently exist, although QIs have been used effectively to evaluate care concordance in OAMPs and other service delivery models⁵⁴. Qualitative investigations into reasons underlying practice concordance with clinical guidelines is warranted to provide this direction⁶.

Summary and Conclusion

Translation of clinical practice guidelines into practice is essential to ensure practice concordance with current best-practice evidence²⁹. Although, strategies to mobilise best evidence into OA clinical care have been identified, an evidence-to-practice gap still exists with many people not receiving recommended care⁵⁹. The implementation of clinical practice guidelines for OA is a challenging task with many barriers at the practitioner and clinical management level still to be addressed³¹. Development of guidelines that accurately represent the best available evidence, are free from industry bias, and cognisant of consumer needs, are needed to ensure clinicians can be confident in the care they recommend. There are leading international examples of MOCs and OAMPs that can be used as the basis to implement evidence-based care for people with OA^{27,43,45-47} and QI's can be used in practice settings to evaluate the quality of care delivered^{53,54}.

'Clinics Care points'

- Core interventions should be offered to everyone with OA, with adjunctive therapies used as needed.
- When prescribing adjunctive therapies, individual circumstances of the person with OA should be taken into consideration to weigh up the cost and benefit of treatment.
- Implementation of clinical practice guidelines using different validated service delivery models can facilitate evidence-based treatments in all OA care pathways.
- Quality indicators are useful to evaluate evidence-based service delivery and quality of care.
- Models of care incorporating remote access, web-based delivery of OA care is a feasible and effective strategy to facilitate best outcomes for people with OA and provide support for health care practitioners.

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