Guideline for the non-surgical management of hip and knee osteoarthritis

July 2009

Approved by NHMRC
on 23 February 2009

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The Royal Australian College of General Practitioners

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The National Health and Medical Research Council (NHMRC) is Australia's leading funding body for health and medical research. The NHMRC also provides the government, health professionals and the community with expert and independent advice on a range of issues that directly affect the health and wellbeing of all Australians.

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The guidelines were approved by the Chief Executive Officer of the NHMRC on 23 February 2009 under section 14A of the *National Health and Medical Research Council Act* 1992. Approval for the guidelines by NHMRC is granted for a period not exceeding 5 years, at which date the approval expires. The NHMRC expects that all guidelines will be reviewed no less than once every 5 years.

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INTRODUCTION

Chronic disease is a major public health burden on Australian society. An increasing proportion of the population has risk factors for, or at least one, chronic disease, leading to increasing public health costs. Health service policy and delivery must not only address acute conditions, it must also effectively respond to the wide range of health and public service requirements of people with chronic illness.[1,2] Strong primary health care policy is an important foundation for a successful national health delivery system and long term management of public health, and is linked to practical outcomes including lower mortality, decreased hospitalisation and improved health outcomes.[1] National strategic health policy has recently given increased recognition to the importance of chronic disease management, with the Australian Federal Government endorsement of a number of initiatives for the prevention (or delay in onset), early detection and evidence based management of chronic disease, including osteoarthritis.[1,3]

Chronic musculoskeletal conditions, including arthritis, account for over 4% of the national disease burden in terms of disability adjusted life years. Over 6 million Australians (almost one-third of the population) are estimated to have a chronic musculoskeletal disease; chronic musculoskeletal disease represents the main cause of long term pain and physical disability. In Australia, osteoarthritis is self reported by more than 1.4 million people (7.3% of the population[4]) and is the tenth most commonly managed problem in general practice.[5] This number is set to rise as the elderly population grows. Osteoarthritis exerts a significant burden on the individual and the community through reduction in quality of life, diminished employment capacity and an increase in health care costs. For further details, refer to the *Evidence to support the National Action Plan for Osteoarthritis, Rheumatoid Arthritis and Osteoporosis: Opportunities to improve health-related quality of life and reduce the burden of disease and disability* (2004).[6]

As such, federal government health policy has identified arthritis as a National Health Priority Area and adopted a number of initiatives aimed at decreasing the burden of chronic disease and disability; raising awareness of preventive disease factors; providing access to evidence based knowledge; and improving the overall management of arthritis within the community.[4] In 2002, all Australian health ministers designated arthritis and musculoskeletal conditions as Australia's seventh National Health Priority Area. In response, a National Action Plan was developed in 2004 by the National Arthritis and Musculoskeletal Conditions Advisory Group (NAMSCAG).[6] The aim of this document was to provide a blueprint for national initiatives to improve the health related quality of life of people living with osteoarthritis, rheumatoid arthritis and osteoporosis; reduce the cost and prevalence of these conditions; and reduce the impact on individuals, their carers and their communities within Australia. The National Action Plan was developed to complement both the National Chronic Disease Strategy – which is broader – and the National Service Improvement Framework for Osteoarthritis, Rheumatoid Arthritis and Osteoporosis, in addition to other national and state/territory structures.

The role of general practitioners

General practice plays an important role within the Australian health care system in the prevention, early detection and management of chronic disease. The nature of general practice provides opportunity for early screening for chronic disease and the address of preventable risk factors. Musculoskeletal conditions, particularly osteoarthritis, represented some of the diseases most commonly managed by Australian general practitioners in 2003–2004, accounting for 17% of consultations. To manage chronic illness effectively requires well coordinated, patient centred care that is continuous, comprehensive and consistent. General practitioners are well placed to provide care and coordination, as well as to play a monitoring role, for the multidisciplinary management of chronic disease.[1,2,4] The GP undertakes this role in consultation with other medical specialists as required. The role GPs play in chronic disease management through multidisciplinary care coordination and long term care planning is recognised within the national Medicare rebate framework. Patients with arthritis are eligible for broader funding arrangements under chronic disease management items for GP management plans and associated reviews.[2]

As part of the federal government's Better Arthritis and Osteoporosis Care (BAOC) 2006–2007 budget initiative,[7] guidelines for the management of arthritic conditions have been developed to inform evidence based primary care of chronic disease in general practice. Three guidelines focusing on osteoarthritis, rheumatoid arthritis and juvenile idiopathic arthritis have been developed.

This guideline on the management of osteoarthritis presents recommendations to assist GPs in managing patients with osteoarthritis. The guideline focuses on short term care; long term care planning and management; and coordination of multidisciplinary care needs. It is accompanied by algorithms and resources to assist in implementation of the recommendations.

Endorsement and expiry date for the recommendations

This guideline presents a comprehensive review of both pharmacological and nonpharmacological management of osteoarthritis within the Australian health care context, based on the best available evidence available up to July 2007. Evidence published after this date has not been reviewed for the guideline.

Recommendations for the non-surgical management of hip and knee osteoarthritis was approved by the CEO of the National Health and Medical Research Council (NHMRC) on 23 February 2009, under section 14A of the *National Health and Medical Research Council Act*, 1992. Approval for the guidelines by the NHMRC is granted for a period not exceeding 5 years; after 5 years the approval expires. The NHMRC expects that the guideline will be reviewed, and revised if necessary, no less than once every 5 years. Readers should check with The Royal Australian College of General Practitioners (RACGP) for any reviews of, or updates to, this guideline.

This document is a general guide to appropriate practice, to be followed only subject to the clinician's (or medical practitioner and patient's) judgment in each individual case. The guideline is designed to provide information to assist in decision making and is based on the best information available at the date of compilation. The guideline is not intended to have a regulatory effect. This project was managed by the Evidence Translation Section, National Health and Medical Research Council.

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This project was supported by the RACGP and the Australian Government Department of Health and Ageing (DoHA). The following experts were involved in the development of the guideline as part of the RACGP Osteoarthritis Working Group:

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Commonly used abbreviations

ACEI	angiotensin converting enzyme inhibitor
AE	adverse event
BMI	body mass index
CDM	chronic disease management
CI	confidence interval
COX-2	cyclooxygenase-2 selective inhibitor
DBRCT	double blind randomised controlled trial
ES	effect size (0.2 small effect, 0.5 moderate effect, 0.8 large effect)
ESR	erythrocyte sedimentation rate
GIT	gastrointestinal tract
GP	general practitioner
HA	hyaluronan and hylan derivatives
IA	intra-articular
ITT	intention-to-treat analysis
LLLT	low level laser therapy
MA	meta-analysis
MACTAR	McMaster Toronto Arthritis Patient Preference questionnaire
MSK	musculoskeletal
NNH	number needed to harm
NSAIDs	nonsteroidal anti-inflammatory drugs
NNT	number needed to treat
NHMRC	National Health and Medical Research Council
OA	osteoarthritis
OARSI	Osteoarthritis Research Society International
OMERACT	outcome measures in rheumatoid arthritis clinical trials
OR	odds ratio
PEMF	pulsed electromagnetic field
PPI	proton pump inhibitor
RACGP	[The] Royal Australian College of General Practitioners
RCT	randomised controlled trial
ROM	range of movement/motion
RPD	relative percentage difference
SMD	standardised mean difference
SMEP	self management education program
SR	systematic review (also used in this report to describe meta-analysis)
SRM	standardised response mean
TENS	transcutaneous electrical nerve stimulation
VAS	visual analogue scale
WOMAC	Western Ontario McMaster Osteoarthritis Index
WMD	weighted mean difference

BACKGROUND

Osteoarthritis

Osteoarthritis (OA) is the most common form of chronic arthritis, with radiological evidence of OA in more than 50% of people over 65 years of age.[8] Approximately 10% of men and 18% of women suffer symptomatic OA.[9]

Osteoarthritis is characterised by joint pain and mobility impairment associated with the gradual wearing of cartilage. There is currently no cure for OA. Treatment is aimed primarily at symptom relief, improving joint mobility and function, and optimising consumer quality of life.[10] The treatment of OA of the hip and/or knee (and other sites) includes the use of both nonpharmacological and pharmacological interventions. Joint replacement surgery is a cost effective intervention for people with severe OA who are unresponsive to conservative therapy.[10, 11]

Aim of the guideline

This guideline seeks to achieve some of the aims of the National Action Plan and National Service Improvement Framework by providing recommendations for effective non-surgical management of patients diagnosed with OA of the hip and/or knee within the primary care setting. The guideline seeks to assist primary health care professionals to:

- optimise quality of life
- optimise self management
- prevent repeated acute episodes
- prevent or delay complications associated with OA
- prevent progression to established disease.

Scope and target population

This guideline is intended primarily for use in the primary care setting by both GPs and their patients. It is intended that through the use of this guideline, all health care professionals that patients choose to consult regarding OA, will be aware of the evidence regarding effective management.

This guideline is intended to refer to all adult patients diagnosed with symptomatic OA of the hip and/or knee up until referral for joint replacement. Many of the recommendations may be considered for management of OA in other sites, where to date there is limited evidence available to guide management. Health care professionals managing patients waiting for joint replacement surgery should refer to care guidelines for the multidisciplinary management of patients on waiting lists for joint replacement.

This guideline has been developed for use in primary care settings in metropolitan, regional, rural and remote areas of Australia. It is also applicable to other settings in which patients with OA may be treated, such as specialist rheumatologist and orthopaedic practices.

Focus of the guideline

The focus of this guideline is on OA of the hip and knee. Although many of the recommendations are relevant to OA in other sites, research relating to other forms of OA was not included in the literature review. The following process model identifies the stages in chronic disease management (CDM) and the focus of the guideline.

Reducing the risk of osteoarthritis

Reduce joint injury

Health promotion

↓

Early diagnosis of osteoarthritis

Early and accurate diagnosis

Care and referral pathways

↓

Treatment and management in early stage of osteoarthritis

Best practice management:

- optimal use of medicines
- non-pharmacological management
- care and referral pathways
- patient self management education
- patient psychosocial support requirements

↓

Treatment and management during acute episodes of osteoarthritis

Best practice management:

- optimal use of medicines
- non-pharmacological management
- care and referral pathways
- patient self management education
- patient psychosocial support requirements

Episode prevention

↓

Long term management of osteoarthritis

Best practice management of chronic conditions:

- optimal use of medicines
- non-pharmacological management
- care and referral pathways
- patient self management education
- patient psychosocial support requirements

↓

Treatment and management in advanced stages of osteoarthritis

Best practice management to optimise quality of life:

- optimal use of medicines
- non-pharmacological management
- care and referral pathways
- patient self management education
- patient psychosocial support requirements

Carer support and information

Primary focus of guideline

Guideline touches upon

Methods

The process used to develop this guideline is outlined in full detail in the Process Report (*Appendix A*). The guideline is based on an evidence based literature review conducted to NHMRC requirements. The RACGP Osteoarthritis Working Group, who has overseen the development of the guideline and supporting documents comprised rheumatologists, GPs, patient representatives, arthritis organisation representatives and an NHMRC advisor.

The evidence for the guideline is based on:

- a review of the literature identified through a systematic search for Level 1 and Level 2 evidence published from June 2005 to March 2007
- an Australian national guideline for OA[12] which was assessed using the Appraisal of Guidelines Research and Evaluation (AGREE) instrument[13] and identified from 13 OA guidelines as being the most appropriate, recently published, high quality guideline to use as a primary reference
- a review of pertinent studies reported in the national guideline for OA[12] in areas where no additional evidence had been published from June 2005 to March 2007, and
- the RACGP Working Group's expert opinion.

Literature review

The method used to conduct the evidence based literature review is outlined in full in the Process Report (*Appendix A*) and in *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence (*www.racgp.org.au/guidelines/osteoarthritis/literaturereview).

The literature review extended the search conducted in the primary reference guideline *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006).[12] A search of Medline, EMBASE, CINAHL and the Cochrane library for English language publications published between June 2005 and December 2006 that contained papers on management of OA was performed. A second search was conducted in July 2007 for more recent literature; articles were also identified through review of reference lists of retrieved papers and research known to Working Group members. For interventions not represented in the initial search, pertinent studies reported in the national guideline for OA[12] were appraised and reported. Papers were initially selected for inclusion based on the reading of their title and/or abstract. Included literature was limited to Level 1 and Level 2 evidence graded according to the NHMRC *Additional levels of evidence and grades for recommendations for developers of guidelines* (2005).[14] Papers that met the inclusion criteria were critically appraised using checklists developed by The Scottish Intercollegiate Guidelines Network (SIGN)[15] and given an overall quality grade of high, moderate or low. Findings from the literature were reported descriptively and in a tabulated format. The full methods and findings are presented in *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence (*www.racgp.org.au/guidelines/osteoarthritis/literaturereview).

Recommendations

The method used to develop and grade recommendations is outlined in full in the Process Report (*Appendix A*). Recommendations were based on the literature review and primary reference guideline. The working group developed evidence statements from which each recommendation was developed; these are available in *Recommendations for the non-surgical management of hip and knee osteoarthritis (*www.racgp.org.au/guidelines/osteoarthritis/recommendations). Each recommendation statement is supported by a grading that reflects the strength of the recommendation and reflects how readily it can be implemented in terms of the trust or confidence practitioners can use it with in a clinical situation. The recommendation gradings used throughout the guideline are based on the NHMRC *Additional levels of evidence and grades for recommendations for developers of guidelines* (2005)[14] presented in *Table 1*.

Table 1. Recommendation grades[14]

A	Excellent evidence: body of evidence can be trusted to guide practice
B	Good evidence: body of evidence can be trusted to guide practice in most situations
C	Some evidence: body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Weak evidence: body of evidence is weak and recommendation must be applied with caution

The overall grade of each recommendation is based on a summation of an appraisal of individual components of the body of evidence on which the recommendation is based, including volume and consistency of the evidence. *Table 2* shows the body of evidence assessment matrix, listing all the components that were considered when assessing the body of evidence, together with the grades used.[14]

Table 2. Body of evidence assessment matrix[14]

Component	A	B	C	D
	Excellent	**Good**	**Satisfactory**	**Poor**
Volume of evidence	At least one good quality SR that has at least two good quality RCTs	At least two good quality RCTs or a moderate quality SR that has at least two moderate to good quality RCTs	At least two moderate quality RCTs	Less than two moderate quality RCTs
Consistency	All studies consistent	Most studies consistent and inconsistencies may be explained	Some inconsistency reflecting genuine uncertainty around clinical question	Evidence is inconsistent
Clinical impact	Very large	Substantial	Moderate	Slight or restricted
Generalisability	Population/s studied in body of evidence are the same as the target population for the guideline	Population/s studied in the body of evidence are similar to the target population for the guideline	Population/s studied in the body of evidence different to the target population for the guideline but it is clinically sensible to apply this evidence to the target population (eg. results in adults that are clinically sensible to apply to children)	Population/s studied in the body of evidence different to the target population for the guideline and hard to judge whether it is sensible to generalise to the target population
Applicability	Directly applicable to Australian health care context	Applicable to Australian health care context with few caveats	Probably applicable to Australian health care context with some caveats	Not applicable to Australian health care context

The guideline

This guideline has been designed to provide clear information to assist clinical decision making and support optimal patient care. It is based on the best evidence available up to July 2007. Where appropriate, the evidence has been interpreted with regard to the Australian context in which the guideline will be implemented. It is intended that the guideline be considered according to the limitations outlined in *Section 7* and used in conjunction with clinical judgment and patient preference. The guideline consists of:

Algorithms (flow charts)

The algorithms are detailed flowcharts for the diagnosis and management of OA and summarise the main recommendations of the guideline. They also provide an accessible desktop reference.

Recommendations

The 34 recommendations contained in the guideline are limited to patients over 18 years of age presenting with arthritic symptoms of the hip or knee, as well as those diagnosed as having OA of the hip or knee. The recommendations have been developed on the basis of the best evidence available up to July 2007.

Each recommendation has been graded (from A to D) according to the NHMRC *Additional levels of evidence and grades for recommendations for developers of guidelines* (2005).[14] The grade reflects the degree of 'trust' that the clinician can place in the clinical application of the recommendation. Each recommendation is supported by a summary of the evidence and pertinent information related to the recommendation. The Working Group supports all 34 recommendations and intends that they be used in conjunction with clinical judgment and patient preferences. The full grading and evidence base for each recommendation can be found in *Recommendations for the non-surgical management of hip and knee osteoarthritis* (www.racgp.org.au/guidelines/osteoarthritis/recommendations).

Resources

Useful references and supporting information are provided throughout the guideline. *Appendix B* contains additional resources, including an OA management plan template and contact details for organisations providing services and support to people with OA.

The Working Group recommends consulting the *Therapeutic Guidelines* (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including adverse effects.

Limitations of the guideline

Medication information

The literature search was not designed to retrieve safety trials for pharmacological interventions. The guideline does not seek to provide full safety and usage information on pharmacological interventions. The pharmacological interventions outlined in the guideline should not be applied without consideration of the patient's clinical profile and personal preferences. The Working Group recommends consulting the *Therapeutic Guidelines* (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including:

- indications
- drug dosage
- method and route of administration
- contraindications
- supervision and monitoring
- product characteristics.

Search date

The guideline is based on the best evidence available up to July 2007. Evidence published after this date has not been reviewed or considered for the guideline.

Interventions included

The search strategy was limited to include only papers graded as Level 1 or Level 2 evidence. As such, only interventions that could be investigated using a randomised controlled trial design, or that had been included in a previous systematic review/meta-analysis, were reviewed in the development of the recommendations. Other interventions that may have been investigated using different study designs (for example, 'dietician referral' and 'complex, multifaceted interventions') are not represented in the guideline. The guideline is not intended to confirm or refute the effectiveness of, nor provide guidance on the use of, interventions that have not been included, as the evidence has not been reviewed.

Lack of evidence

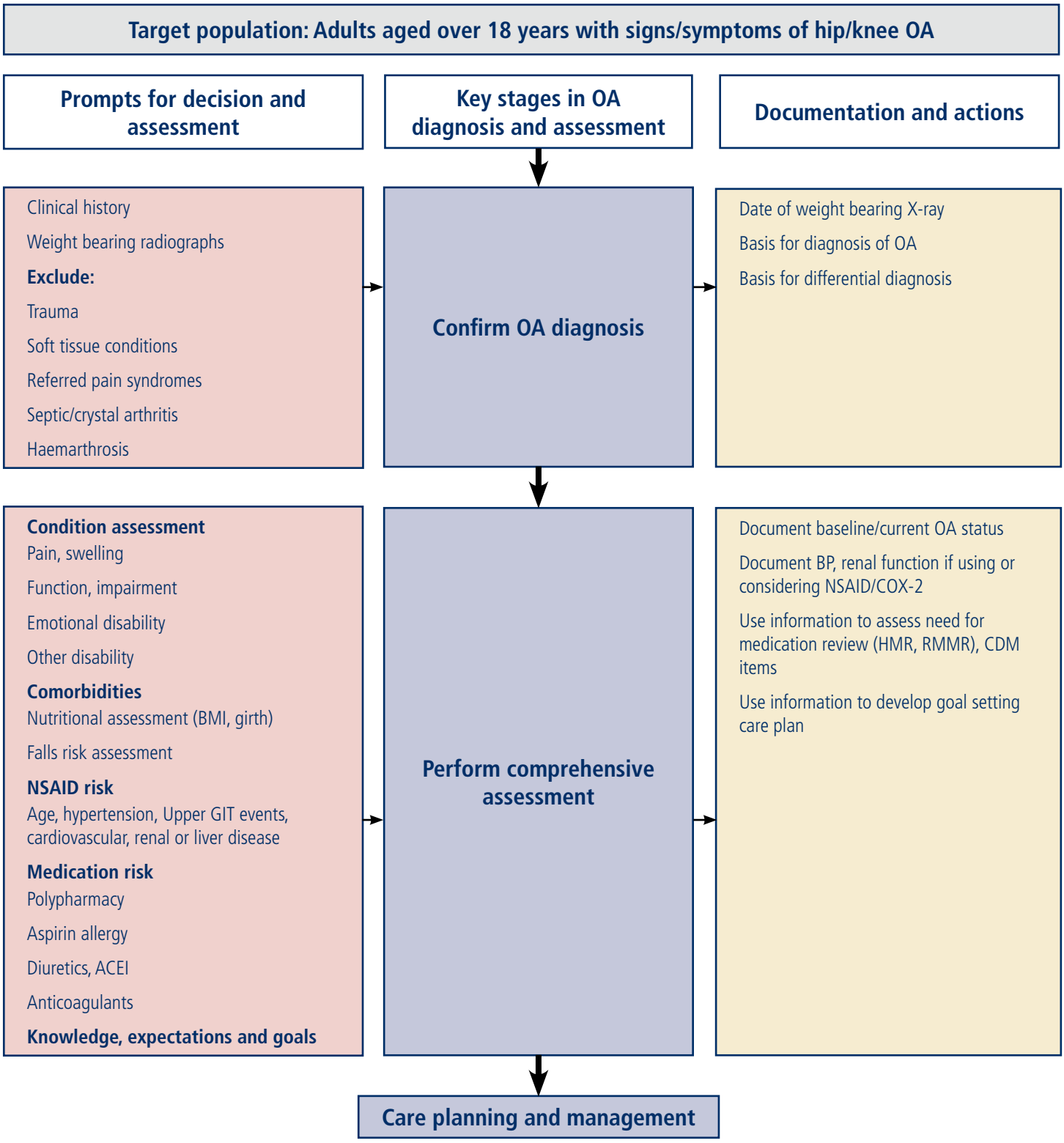
For some interventions included in the recommendations there was limited evidence from which to draw conclusions on the intervention's effectiveness. The Working Group acknowledges that lack of evidence is not evidence of lack of effect, and has attempted to reflect this in the strength of the grading given to recommendations on interventions that are not supported. In addition, some interventions were not supported in the recommendations due to lack of evidence of effect. The Working Group acknowledges that this refers to lack of evidence of effect over placebo – that is, patients may receive some beneficial outcomes from the intervention; however these do not exceed the beneficial effects that can be expected from a placebo therapy.

Cost effectiveness

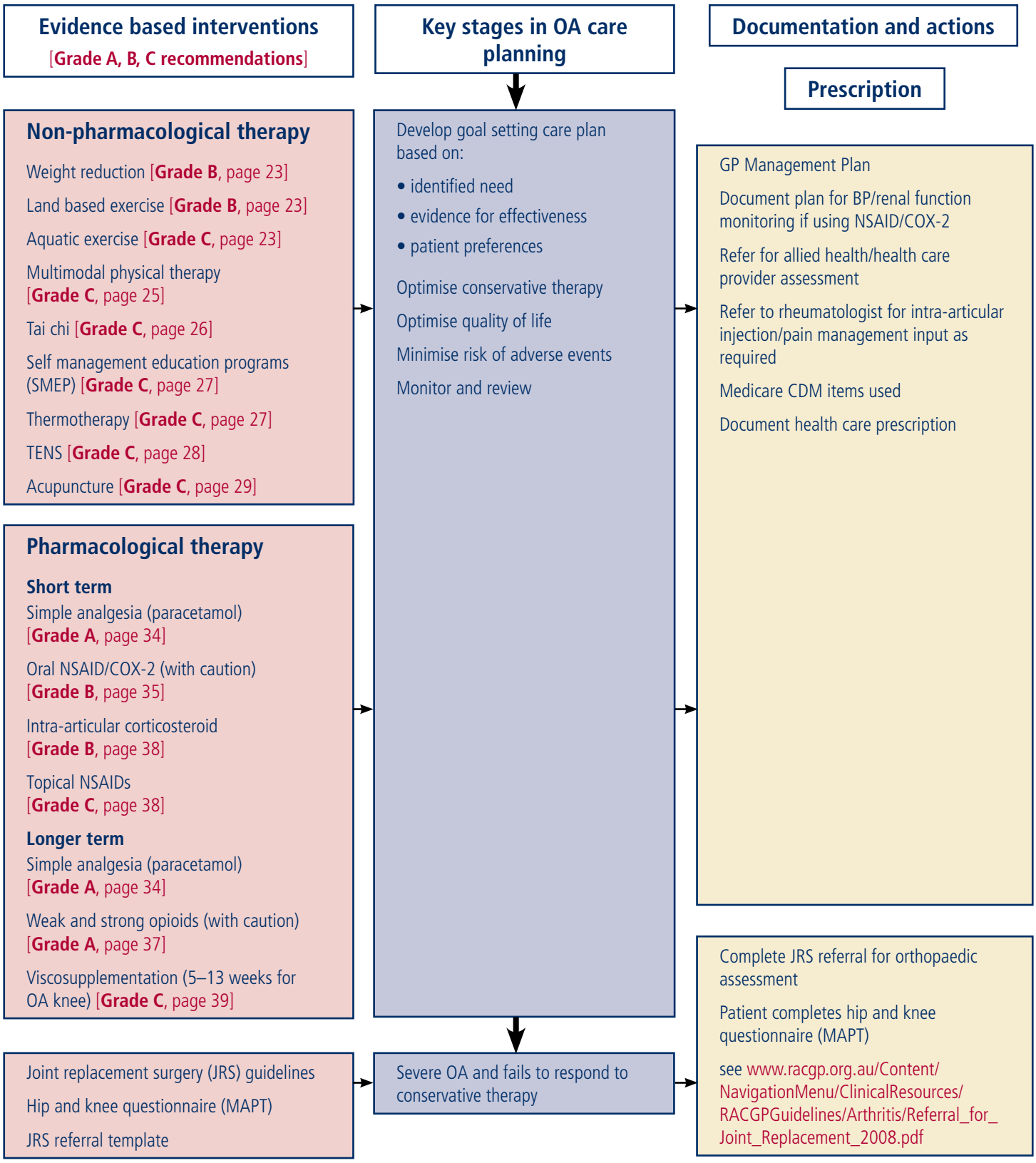
This guideline does not cover the cost effectiveness of the recommended practice versus current/established practice. It does not include the economic feasibility of the recommendations. When relevant evidence relating to cost effectiveness was reported in individual systematic reviews or randomised controlled trials (RCTs), this has been included in the guideline.

ALGORITHMS

Hip/knee osteoarthritis diagnosis and assessment algorithm



Hip/knee osteoarthritis care planning and management algorithm



Hip/knee osteoarthritis management flow chart

Assess non-pharmacological interventions for all patients according to individual need at all stages of OA

Optimise weight

[Grade B]

Optimal weight BMI 18.5 to 25

Combination of two or more interventions: nutritional education, cognitive behavioural therapy, low energy diet, exercise regimen

Dietician referral

Allied health interventions

Land based exercise program [**Grade B**]

Aquatic therapy [**Grade C**]

Multimodal physical therapy [**Grade C**]

Tai chi (especially if at risk/fear of fall) [**Grade C**]

Thermotherapy [**Grade C**]

TENS [**Grade C**]

Acupuncture [**Grade C**]

Patellar taping [**Grade D**]

Massage therapy [**Grade D**]

Low level laser therapy [**Grade D**]

Education/Self management Support

Self management and education programs (SMEP) [**Grade C**]

Monitoring strategies

Telephone support [**Grade D**]

Assess need and risk for additional pharmacological interventions

Provide pharmacological interventions in accordance with good practice principles

Refer to pharmacist for medication review as required (HMR, RMMR)

Search 'medication good practice principles' at www.health.gov.au

Mild-moderate persistent symptoms

Simple analgesia [Grade A]

Regular paracetamol (maximum 4 g/day)

and/or:

Topical therapies

Trial short term:

- NSAIDs **[Grade C]**
- capsaicin **[Grade D]**

if symptoms persist:

Oral NSAID [Grade B]

Trial short term

Check risk www.nps.org.au

Monitor blood pressure, renal function

Moderate-severe persistent symptoms in those whom mild-moderate strategies have not been successful

Check use of simple analgesia [Grade A]

Regular paracetamol (maximum 4 g/day)

and consider:

Oral NSAID [Grade B]

Trial short term

Check risk www.nps.org.au

Monitor blood pressure, renal function

then consider:

Viscosupplementation for the knee (eg. Hyaluronate) [Grade C]

Opioid therapy [Grade A]

Consider for severe symptoms where surgery is contraindicated or patient is on surgical waiting list and surgery cannot be expedited

Management of an acute flare of symptoms

Simple analgesia [Grade A]

Regular paracetamol (maximum 4 g/day)

and/or:

Topical therapies

Trial short term:

- NSAIDs **[Grade B]**
- capsaicin **[Grade D]**

and/or:

Oral NSAID [Grade B]

Trial short term

Check risk www.nps.org.au

Monitor blood pressure, renal function

and/or:

Intra-articular corticosteroid injection **[Grade B]**

Assess readiness for surgery for progressive OA where symptoms are not adequately controlled with conservative therapy

Refer to joint replacement surgery guidelines at www.racgp.org.au/Content/NavigationMenu/ClinicalResources/RACGPGuidelines/Arthritis/Referral_for_Joint_Replacement_2008.pdf

SUMMARY OF RECOMMENDATIONS

General recommendations

RECOMMENDATION 1 – GP EDUCATION (Grade D)
Health care professionals should have appropriate knowledge and skills to support assessment and management of exercise and nutrition lifestyle behaviour change.

RECOMMENDATION 2 – PERFORMING INTRA-ARTICULAR INJECTIONS (Grade D)
GPs who choose to perform intra-articular (IA) knee joint aspiration and injection should be appropriately trained. Intra-articular injection of the hip should be performed using appropriate imaging assistance.

RECOMMENDATION 3 – MULTIDISCIPLINARY CARE (Grade D)
Health care professionals should assess individual patient need for multidisciplinary care intervention for management of OA of the hip and/or knee.

RECOMMENDATION 4 – COMPREHENSIVE PATIENT ASSESSMENT (Grade D)
Health care professionals should perform a comprehensive assessment to confirm the diagnosis, assess health and medication risks, and to inform management for people with OA of the hip and/or knee.

Non-pharmacological interventions

RECOMMENDATION 5 – WEIGHT REDUCTION (Grade B)
There is good evidence to support GPs recommending weight reduction for obese patients with OA of the knee.

RECOMMENDATION 6 – LAND BASED EXERCISE (Grade B)
There is good evidence to support GPs recommending land based exercise for people with OA of the hip and knee.

RECOMMENDATION 7 – AQUATIC THERAPY (Grade C)
There is some evidence to support GPs recommending aquatic therapy for treatment of OA of the hip and knee.

RECOMMENDATION 8 – MULTIMODAL PHYSICAL THERAPY (Grade C)
There is some evidence to support GPs recommending multimodal physical therapy (up to 3 months) for treatment of OA of the hip or knee.

RECOMMENDATION 9 – TAI CHI (Grade C)
There is some evidence to support GPs recommending tai chi for treatment of OA of the knee.

RECOMMENDATION 10 – SELF MANAGEMENT EDUCATION PROGRAMS (Grade C)
There is some evidence to support GPs recommending self management education programs for treatment of OA of the hip and knee.

RECOMMENDATION 11 – THERMOTHERAPY (Grade C)
There is some evidence to support GPs recommending cold therapy.

RECOMMENDATION 12 – TENS (Grade C)
There is some evidence to support GPs recommending use of TENS for at least 4 weeks for treatment of OA of the knee.

RECOMMENDATION 13 – ACUPUNCTURE (Grade C)

There is some evidence to support GPs recommending acupuncture for treatment of OA of the knee.

RECOMMENDATION 14 – PATELLAR TAPING (Grade D)

There is weak evidence to support GPs recommending patellar taping for treatment of OA of the knee.

RECOMMENDATION 15 – MASSAGE THERAPY (Grade D)

There is weak evidence to support GPs recommending massage therapy for treatment of OA of the hip or knee.

RECOMMENDATION 16 – TELEPHONE SUPPORT (Grade D)

There is weak evidence to support GPs recommending telephone treatment counselling support from a trained health or non-medical person.

RECOMMENDATION 17 –- MAGNETIC BRACELETS (Grade D)

There is weak evidence to support GPs recommending magnetic bracelets for treatment of OA of the hip or knee.

RECOMMENDATION 18 – LOW LEVEL LASER THERAPY (Grade D)

There is weak evidence to support GPs recommending low level laser therapy for short term treatment of OA of the knee.

RECOMMENDATION 19 – LEECH THERAPY (Grade D)

There is weak evidence to support GPs recommending leech therapy for treatment of OA of the hip or knee.

Pharmacological interventions

RECOMMENDATION 20 – PARACETAMOL (Grade A)

There is excellent evidence to support GPs prescribing paracetamol in regular divided doses to a maximum of 4 g/day as first line pharmacological therapy for treating persistent pain in people with OA of the hip or knee.

Note: The most recent research on paracetamol suggests it is efficacious in the management of pain related to knee and hip OA. Although not as effective as nonsteroidal anti-inflammatory drugs (NSAIDs), the lower risk of adverse events, particularly of the gastrointestinal system, makes paracetamol a first line medication consideration.

RECOMMENDATION 21 – ORAL NSAIDS (Grade B)

There is good evidence to support GPs prescribing NSAIDs or COX-2 NSAIDs for reducing pain in the short term treatment of OA of the hip or knee where simple analgesia and non-pharmacological measures are ineffective. The potential small benefits of NSAIDs need to be measured in relation to potential harms.

Note: GPs should apply caution when using traditional NSAIDs and COX-2 NSAIDs in view of the known side effects, especially in those at risk such as the elderly, and those on concomitant medication. Careful monitoring of blood pressure and renal function is indicated for older people and others at risk when using these agents. For patients with high NSAID risk for whom NSAIDs are considered a necessary part of treatment, GPs should prescribe a traditional NSAID plus proton pump inhibitor (PPI) or COX-2 inhibitor.

RECOMMENDATION 22 – WEAK AND STRONG OPIOIDS (Grade A)

There is good evidence that GPs consider prescribing weak or strong opioids with caution for treating at least moderate or severe pain in people with OA of the hip or knee who have not responded to, or are unable to tolerate, other analgesic medications or NSAIDS, and in whom joint replacement surgery is contraindicated or delayed.

Note: GPs should commence opioids at a low starting dose with slow titration of dose, particularly in people at increase risk of adverse effects, such as the elderly, and closely monitor patients for adverse events.

RECOMMENDATION 23 – INTRA-ARTICULAR CORTICOSTEROID INJECTION (Grade B)

There is good evidence to support GPs prescribing IA corticosteroid injections for short term treatment of OA of the hip and knee.

RECOMMENDATION 24 – TOPICAL NSAIDS (Grade C)

There is some evidence to support GPs recommending short term treatment of OA of the knee with topical NSAIDs.

RECOMMENDATION 25 – TOPICAL CAPSAICIN (Grade D)

There is weak evidence to support GPs recommending topical capsaicin for short term treatment of OA of the hip and knee.

RECOMMENDATION 26 – VISCOSUPPLEMENTATION FOR KNEE OA (Grade C)

There is some evidence to suggest hyaluronic acid is of some benefit for OA of the knee.

RECOMMENDATION 27 – GLUCOSAMINE (Grade C)

The role of glucosamine products, including types and dose, remains uncertain. GPs may inform patients about the availability and safety of these agents.

Interventions not supported by current evidence

RECOMMENDATION 28 – BRACES AND ORTHOSES (Grade B)

There is good evidence to suggest that knee brace, neoprene sleeve or lateral wedged insoles are of little or no benefit for treatment of OA of the knee. GPs could inform patients about lack of evidence of benefit over placebo.

RECOMMENDATION 29 – ELECTROMAGNETIC FIELDS (Grade B)

There is good evidence to suggest that electromagnetic field or electric stimulation interventions are of no benefit in the treatment of OA of the knee. GPs could inform patients about lack of evidence of benefit over placebo.

RECOMMENDATION 30 – VISCOSUPPLEMENTATION FOR HIP OA (Grade C)

There is some evidence to suggest hyaluronic acid is of no benefit for OA of the hip. GPs could inform patients with hip OA about the lack of evidence of benefit over placebo.

RECOMMENDATION 31 – CHONDROITIN SULPHATE (Grade C)

There is some evidence to suggest that chondroitin sulphate is of no benefit in treating OA of the knee. GPs could inform patients about the lack of evidence of benefit over placebo.

RECOMMENDATION 32 – VITAMIN, HERBAL AND OTHER DIETARY THERAPIES (Grade C)

There is some evidence to suggest that vitamin, herbal and other dietary therapies are of limited or no benefit in treating OA of the hip or knee. GPs could inform patients about the lack of evidence of benefit, or limited evidence for benefit over placebo.

RECOMMENDATION 33 – THERAPEUTIC ULTRASOUND (Grade C)

There is some evidence to suggest that therapeutic ultrasound is of no benefit in treating OA of the knee or hip. GPs could inform patients about lack of evidence of benefit over placebo.

RECOMMENDATION 34 – SOCIAL SUPPORT (Grade D)

There is weak evidence to suggest cognitive behavioural therapy is of limited or no benefit in treating OA. GPs could inform patients about lack of available evidence.

HIP AND KNEE OSTEOARTHRITIS RECOMMENDATIONS

These recommendations are intended for adult patients diagnosed with symptomatic OA of the hip and/or knee up until referral for joint replacement. Many of the recommendations may be considered for management of OA in other sites where, to date, there is limited evidence available to guide management. Full evidence statements and grading for each recommendation are outlined in *Recommendations for the non-surgical management of hip and knee osteoarthritis* (www.racgp.org.au/guidelines/osteoarthritis/recommendations).

The Working Group supports the use of the recommendations in conjunction with clinical judgment and patient preference. Consult the Therapeutic Guidelines (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including adverse effects.

General recommendations

GP education

Recommendation 1 (Grade D)

Health care professionals should have appropriate knowledge and skills to support assessment and management of exercise and nutrition lifestyle behaviour change.

The importance of lifestyle modification, particularly weight loss and undertaking appropriate exercise, has been well recognised in both the prevention and management of OA.[6, 16] Health professionals require access to current education on lifestyle modification including risk modification, smoking cessation, joint protection and evidence based management strategies for OA to ensure patients receive the most recent health advice.[17]

Evidence statement

It is the opinion of the Working Group that promotion of preventive and therapeutic lifestyle strategies by GPs is important in the management of hip and knee OA. A full review of the literature relevant to this consensus recommendation was not undertaken.

Management of chronic disease requires both preventive and therapeutic lifestyle strategies. Education and behavioural modification can reduce the risk of developing OA and prevent further joint injury in at risk populations. The role of the GP in CDM increasingly incorporates self management support, including emphasis on patient self education, self care, and counselling in behavioural change. To undertake the important role of providing patients with self care skills and knowledge, the GP needs a current awareness of health promotion and disease prevention issues.[6, 18–20]

A large multicentre study investigated the effectiveness of a training program for GPs that focused on non-pharmacological and lifestyle pain management interventions and appropriate analgesic prescription for patients with OA. Patients of GPs who received this training intervention were found to have improved pain relief (316 +/ 290 mm/day vs. 265 +/– 243 mm; $p<0.0001$); greater improvement in Lequesne and WOMAC scores ($p<0.0001$); and better overall perception of treatment ($p=0.002$) than patients of GPs who received a placebo training unit.[21]

In a Canadian study including 650 family GPs, the researchers used an audit of medication prescriptions to evaluate the effectiveness of a medical education program consisting of case study workshops run by a trained facilitator aimed at increasing the knowledge and skills of GPs in managing chronic musculoskeletal disorders. The study found that education on non-pharmacological intervention, including lifestyle change, contributed to improved management of chronic musculoskeletal disease by GPs, including a reduction in NSAID use.[22]

In a prospective French study, adherence to EULAR recommendations by 1030 randomly selected GPs on management of knee OA was investigated. The researchers established that adherence to both pharmacological and non-pharmacological/lifestyle recommendations was positively influenced by participation of the GP in ongoing education on current OA management strategies (OR: 0.76, 95% CI: 0.59–0.98).[23]

Performing intra-articular injections

Recommendation 2 (Grade D)

GPs who choose to perform IA knee joint aspiration and injection should be appropriately trained. Intra-articular injection of the hip should be performed using appropriate imaging assistance.

Evidence statement

It is the opinion of the Working Group that safe performance of IA injection is imperative. A full review of the literature relevant to this consensus recommendation was not undertaken.

Clinicians should be appropriately trained and experienced in the safe performance of IA injection procedures.[24] Adverse reactions of IA injection (eg. injury, infection, bruising) are minimised and clinical efficacy is increased by accuracy of needle placement and adherence to an appropriate sterile technique during the injection procedure.[25, 26]

One Irish survey of GPs' experiences and attitudes found that the main perceived barrier to performing IA injections for GPs was lack of ability to maintain appropriate clinical skills. GPs who had access to postgraduate training and the ability to maintain injection skills were more confident in performing IA injection and more likely to perform the procedure.[27] An Australian study into the effectiveness of continuing medical education on patient clinical outcomes found statistically significant improvements in pain and physical function in those receiving IA injection from a GP who had recently acquired the necessary joint injection skills.[28]

Depth of the joint, as well as the close proximity of sensitive structures such as the femoral artery and nerves, complicates IA injection of the hip joint. One study reported that specialist rheumatologists were only 53% accurate in the placement of IA hip injections administered blindly.[25] To increase the precision of medication administration to the joint, and to reduce the risk of adverse events, hip IA injection should always be performed under X-ray screening or ultrasound guidance.[24–26, 29]

Multidisciplinary care

Recommendation 3 (Grade D)

Health care professionals should assess individual patient need for multidisciplinary care intervention for management of OA of the hip and/or knee.

Management of OA requires a multidisciplinary approach with regular communication between health practitioners (eg. GP, rheumatologist, physiotherapist) to facilitate holistic management for the patient. GPs should refer patients to appropriate health practitioners for input in the patient's management plan. Referral to a rheumatologist should be considered for elderly patients, patients with significant comorbidity, those with extensive disease or when the diagnosis is uncertain.[17, 30, 31]

Evidence statement

It is the opinion of the Working Group that multidisciplinary care is important in the management of hip and knee OA. A full review of the literature relevant to this consensus recommendation was not undertaken.

National strategic health policy has given increased recognition to the importance of CDM, with a number of recent federal government initiatives for the prevention or delay in onset; early detection; and evidence based management of chronic disease, including OA. The role of multidisciplinary input in the management of chronic disease is highlighted throughout CDM policy, with focus on improving capacity, effectiveness and efficiency of multidisciplinary collaboration.[1–3, 32]

There is support throughout this guideline, and other primary OA guidelines, of the importance multidisciplinary collaboration plays in the ongoing management of patients with hip or knee OA, particularly for patients accessing the broad range of non-pharmacological interventions used in OA treatment. Weight loss, a range of exercise interventions and multimodal therapies, as well as numerous other non-pharmacological interventions, are regularly provided by multidisciplinary health care providers including physiotherapists, occupational therapists, massage and manual therapists, personal trainers, dieticians, and nurses. In addition, various health professionals (eg. GP, rheumatologist, orthopaedic surgeon, other specialists, pharmacist) may have involvement in the patient's pharmacological regimen. Multidisciplinary collaboration and communication is essential to promote continuous, coordinated, patient centred care.[11, 12, 33–35]

A wide range of interventions implemented by multidisciplinary health care providers were reviewed for these recommendations. In the vast majority of trials, the intervention of interest was implemented by a health care provider with specific training and qualifications. Seeking health advice and management from an appropriately trained health care provider is considered to be a component of effective and safe therapy.[36]

Comprehensive patient assessment

Recommendation 4 (Grade D)

Health care professionals should perform a comprehensive assessment to confirm the diagnosis, assess health and medication risks, and to inform management for people with OA of the hip and/or knee.

Confirm osteoarthritis diagnosis

Diagnosis of OA is usually made based on a detailed patient history and clinical presentation. Presenting signs and symptoms suggestive of OA include: symmetrical joint symptoms, usually in one or two joints; pain and stiffness; decreased joint mobility; joint swelling; crepitus; and increased age.[6, 17, 31, 37–40]

If the patient has a recent history of infection or fever, is less than 40 years of age, or presents with abnormal routine blood tests, other forms of arthritis (eg. rheumatoid, septic) should be considered. Laboratory tests (eg. ESR, rheumatoid factor, synovial fluid analysis) may be used to rule out alternative diagnoses.[31, 37, 39, 40]

Radiographs (particularly weight bearing X-rays) may be used to confirm diagnosis and exclude alternative diagnoses (eg. trauma), however findings are often non-specific. Radiographic findings indicative of OA include narrowing of the cartilage space, marginal osteophyte formation, subchondral sclerosis, and breaking of the tibial spines; however, these may not be observed in early disease. In addition, some patients may show radiographic changes of OA without significant symptoms, therefore X-ray should be used in conjunction with clinical presentation to make a diagnosis.[6, 37–40]

Perform a comprehensive assessment

Comprehensive assessment of the patient with knee and/or hip OA should include:

1. Joint signs and symptoms:[17, 31, 37–39, 41]
    - joint pain, often after weight bearing activity
    - joint stiffness, particularly after periods of inactivity (eg. morning)
    - joint inflammation
    - decrease in joint mobility and/or function
    - crepitus (a crinkly, crackling or grating feeling in the joint)
    - joint tenderness upon palpation.

2. Comorbidities:
    - nutritional assessment: overweight and obesity are risk factors for development of OA and may contribute to disease progression. Patients with OA should be screened for the need to lose weight, as this is one of the most significant modifiable risk factors[6, 17]
    - other comorbidities: other diseases may impact on the management of OA. Comorbidities such as cognitive impairment, cardiovascular disease, peptic ulcer disease, renal disease, diabetes, asthma, allergies and liver disease may influence the patient's ability to self manage their OA, the appropriateness of specific non-pharmacological interventions, and implications for pharmacological therapy.[17, 41]
3. Psychosocial assessment:

    Patients with chronic disease such as OA have a higher rate of depression and anxiety than the general population. Chronic pain is related to feelings of helplessness, anxiety and self image. Understanding of the disease process and management; ability to manage self care and make health care decisions; and ability to cope with the often debilitating effects of OA are influenced by the patient's psychosocial state. Osteoarthritis may also have a significant impact on the patient's social wellbeing and participation in leisure, relationships, and community, and these factors should be considered in holistic patient assessment.[6, 41]
4. Falls risk assessment:

    Pain and decline in function from knee or hip OA may impact upon mobility and contribute to risk of falls. Assessment for a history of falls is recommended. A falls risk assessment should be considered for patients with a history of falls. In high risk settings, such as residential care, regular assessment is recommended.[17]
5. Medication and NSAIDs risk:

    Assess for the presence of risk factors for OA medications (particularly NSAIDs) including age, hypertension, upper gastrointestinal events, and cardiovascular, renal or liver disease. Consider aspirin allergy and polypharmacy (eg. concurrent use of diuretics, ACEI and/or anticoagulants).[17]

The Working Group recommends consulting the Therapeutic Guidelines (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including adverse effects.

Development of a care plan

Development of an OA management plan should be based on individual needs established during patient assessment, evidence of effectiveness of specific interventions and the patient's personal preferences. Aims of management plans should focus on optimising the patient's quality of life (eg. decreasing pain, improving function), providing the patient with appropriate knowledge and skills to manage chronic disease and minimising risk of adverse events.[31] An OA management plan template is included in the resources section (*Appendix B*).

Non-pharmacological interventions

Non-pharmacological interventions are the mainstay management strategies for knee and hip OA. Non-pharmacological interventions, which often involve the clinical input of the multidisciplinary health care team, include patient education; aerobic and resistive exercises; lifestyle changes and weight loss; and various physical therapies. These interventions generally have low or no side effects and are used in conjunction with a pharmacological regimen to decrease pain and promote functioning and quality of life.

Weight reduction

Recommendation 5 (Grade B)

There is good evidence to support GPs recommending weight reduction for obese patients with OA of the knee.

Obesity is a risk factor for developing OA, particularly for women. Overweight people are at higher risk of their OA being symptomatic and progressing. This is thought to be related to the increased load placed on weight bearing joints and increased stress on cartilage.[6, 39, 42, 43] Body mass index (BMI) (kg/m^2) is suggested as the most appropriate determinate of healthy weight range. An acceptable weight range is considered to be a BMI 18.5–25; BMI of 25–29 is considered overweight; and BMI over 30 is obese.[4]

Weight loss and strategies to avoid gaining weight are suggested as primary preventive strategies for knee and hip OA.[39] For patients with OA who are overweight or obese, weight loss is related to an improvement in symptoms of pain and disability, and weight control programs are appropriate.[6, 30, 42, 43]

An excellent volume of evidence of satisfactory consistency provided support for the recommendation that obese patients with knee OA undertake weight reduction programs.

Evidence statement

There is evidence from a recent good quality SR including four RCTs and 454 participants, to support the benefit of weight reduction (6.1 kg, 95% CI: 4.7–7.6) in reducing pain (effect size 0.2) and physical disability (effect size 0.23) in obese people with knee OA. A significant benefit was noted with more than 5% weight reduction or, at a weight reduction rate of at least 0.24% per week.[44]

Exercise

Recommendation 6 (Grade B)

There is good evidence to support GPs recommending land based exercise for people with OA of the hip and knee.

Recommendation 7 (Grade C)

There is some evidence to support GPs recommending aquatic therapy for treatment of hip and knee OA.

Caution note: Consideration should be given to comorbidities, particularly cardiovascular disease, in prescribing exercise programs for patients with OA. Exercise is generally contra-indicated for patients with uncontrolled arrhythmias; third degree heart block; recent changes on ECG; unstable angina; acute myocardial infarction and acute congestive heart failure. Exercise should be prescribed with caution and supervision for patients with cardiomyopathy, valvular heart disease, uncontrolled metabolic disease or poorly controlled blood pressure.[42] Before undertaking a physical exercise program the patient should receive a comprehensive assessment by an appropriately qualified health care provider. This assessment should include clinical evaluation of the patient's OA, as well as identification of other health conditions that may be exacerbated by exercise. Exercise programs should be individualised to the patient's specific needs, abilities and preferences and implemented by an appropriately trained health care provider.[11, 42, 43]

Exercise is an important component of management of OA as both a preventive strategy and to treat symptoms. Increasing physical activity improves general physical health; reduces the risk of other chronic disease development (eg. coronary artery disease, diabetes); facilitates weight control; and may have psychological and social benefits that improve the patient's overall quality of life.[39, 42, 43]

Particularly in OA of the knee, weakness of the quadriceps muscles contributes to functional disability caused by joint instability, therefore appropriate exercise also has a role in reducing signs and symptoms of OA.[42] Physical exercise of a light to moderate intensity increases muscle strength as well as range of motion, aerobic capacity, and endurance that contributes to improved physical functioning and pain reduction. A range of both supervised and home based exercise programs are available for patients with OA, including quadriceps muscle strengthening, resistance training, aerobic exercise, and flexibility exercises. Various programs offer different benefits and no specific type of exercise regimen has been shown to be superior.[11, 31, 39, 42, 43]

Aquatic exercise programs, performed in either group or individual settings, provide the same general benefits as land based exercise programs but with reduced stress to the joints due to buoyancy. This form of exercise may be better tolerated than land based exercise for some patients with hip and knee OA (eg. obese patients with excess joint stress). Patients do not need the ability to swim to undertake aquatic exercise, however level of comfort in the water and personal preferences are primary considerations in selecting this form of exercise.[11, 30, 39]

A large volume of evidence of good consistency provided support for the recommendation that GPs recommend exercise for patients with knee and hip OA.

Evidence statement: land based exercise

One good quality SR including 13 RCTs with 2304 participants with knee OA, reported benefit from aerobic walking in reducing pain (ES 0.52) and self reported disability (ES 0.46), and from quadriceps strengthening exercise in reducing pain (ES 0.39) and self reported disability (ES 0.46) compared to education and lifestyle advice, telephone support, no intervention and sham intervention. There was variation in program content and duration (8 weeks to 2 years) of program. Adverse events were not reported.[45]

One moderate quality SR including 16 RCTs and two quasi controlled trials with 2154 participants with knee OA, reported modest benefit for exercise in improving perceived physical health (ES 0.29) and overall impacts (a composite measure) (ES 0.20) compared to no treatment, standard care, attention, sham electrical stimulation. There was heterogeneity in study design, definition of exercise program, intensity of exercise program, and methods of impact assessment. Adverse events were not reported.[46]

A moderate quality systematic review including 17 RCTs (knee OA) and two RCTs (hip OA) with 2562 participants reported small benefits of land based exercise (simple to complex programs including aerobic walking, resistance, stretching, strengthening, and manual therapy) for treatment of hip or knee OA, delivered either individually or in groups, compared to controls (including no treatment, waiting list, education, telephone support). The benefits varied with SMD 0.39 (95% CI: 0.3–0.47) for self reported pain, and SMD 0.31 (95% CI: 0.23–0.39) for self reported physical function. The benefit was similar for both individual and group exercise classes. Adverse events were not reported.[47]

A good quality SR, including one low-moderate quality small RCT, with only 39 participants with knee OA, reported no difference in pain, functional state, gait and aerobic capacity between low intensity and high intensity exercise for knee OA over 10 weeks follow up. It is doubtful with a sample size of 39 whether there was adequate power to detect a difference if one truly existed. Adverse events were not reported.[48]

A moderate quality RCT that included 109 participants over 55 years with hip OA assessed the effectiveness of an exercise program with routine treatment. The study reported a small positive clinical effect measured by Harris hip scale (HHS) pain (ES 0.38), HHS total score (ES 0.34), timed 'Up and go' test (ES 0.35), and walking test (0.22).[49]

Evidence statement: aquatic therapy

There is evidence from a good quality single blinded RCT with 312 participants with hip or knee OA reported benefit for aquatic therapy in reducing WOMAC pain scores (ES 0.44, 95% CI: 0.03–0.85) and improving WOMAC physical function (ES 0.76, 95% CI: 0.33–1.17) at 12 week assessment compared to usual care. A small benefit was also reported at 12 months (ES 0.25, 95% CI: 0.02–0.47), however the effect was not significant at 18 months.[50]

Evidence is also provided by a moderate quality single blinded RCT with 71 participants with hip or knee OA for the benefit of a 6 week course of twice weekly aquatic physical therapy. Improvements in primary outcome measure of VAS pain on movement (ES 0.24) and secondary outcomes including WOMAC pain (ES 0.28), stiffness (ES 0.24), function (ES 0.08) and physical function (75% vs. 17%) were achieved at the 6 week assessment compared to a waiting control group. The benefits were sustained at 12 weeks although control data was not available at this time point. The number needed to treat (NNT) for both pain and for physical function improvement was two. Minor adverse events were reported that did not affect participation.[51]

A further moderate quality RCT included 152 participants with hip or knee OA and compared 12 weeks aquatic therapy to two control groups, tai chi and waiting list control. Benefits were reported for aquatic therapy and tai chi in improving WOMAC function scores (aquatic therapy SRM 0.62, 95% CI: 0.49–0.75, tai chi SRM 0.63, 95% CI: 0.5–0.76) at 12 week assessment. Aquatic therapy, but not tai chi reduced WOMAC pain scores (SRM 0.43, 95% CI: 0.3–0.56). Of those assessed as OMERACT responders at 12 weeks, 66% aquatic therapy and 58% tai chi responders demonstrated sustained response at 24 weeks. The 11 reported adverse events did not relate to the interventions.[52]

Multimodal physical therapy

Recommendation 8 (Grade C)

There is some evidence to support GPs recommending multimodal physical therapy (up to 3 months) for treatment of OA of the knee or hip.

Caution note: Multimodal physical therapy is generally well tolerated, with no adverse effects reported in the reviewed studies.[53–56] Multimodal physical therapy regimens often include non-pharmacological interventions discussed in more detail elsewhere in the guideline. Caution notes for each specific intervention that have been included with other relevant recommendations should be considered.

Multimodal physical therapy involves different therapeutic strategies aimed at relieving pain and stiffness and improving joint mobility and overall function. Therapies include: range of motion exercise, soft tissue mobilisation, and muscle strengthening and stretching.[30, 31, 56] Multimodal therapy generally includes manual therapy consisting of muscle stretching and passive range of movement exercise as an adjunct to an active exercise component of treatment.[53] Studies suggest that patients with OA receive moderate short term (up to 8 weeks) clinical impact measured on WOMAC global and pain scores from multimodal physical therapy.[53–56]

A satisfactory volume of evidence that was of good consistency provided support for the recommendation that GPs recommend multimodal physical therapy for patients with knee OA.

Evidence statement

A moderate quality RCT involving 134 participants with knee OA, provided evidence that participants in a clinically based physical therapy (CPT) program that included supervised exercise and individualised manual therapy (no placebo group) achieved greater benefit at 8 weeks measured by global WOMAC score ($p<0.001$) compared to participants in a home based exercise (HE) program. Average 6 minute walk distances improved by approximately 10% (95% CI: 30–48 metres) in both groups. At 1 year follow up both groups improved over baseline measurements, with no difference between groups for rate of knee surgery (CPT 11% vs. HE 10%) or rate of steroid injection (CPT 3% vs. HE 2%). CPT participants were less likely to be taking medications for knee OA (48% vs. 68%, $p=0.03$).[54]

Evidence from a moderate quality RCT involving 109 participants with hip OA showed participants in a manual physiotherapy program focusing on specific manipulations and mobilisation of the hip had greater benefit at 5 weeks in general improvement measured on a Likert scale (OR 1.92, 95% CI: 1.30–2.60), VAS pain at rest and on walking (both ES 0.5, $p<0.005$), stiffness and range of motion measures ($p<0.05$), hip function (HHS ES 0.9, $p<0.05$), walking speed (ES 0.3, $p<0.05$), and SF-36 role physical function subscale (ES 0.4, $p<0.05$), than those in an exercise program that focused on active exercises to improve muscle function and joint motion. This study was underpowered due to a high drop out rate (more than 20% drop out from the intervention group). Adverse effects were not reported.[56]

Evidence from a moderate quality RCT involving 325 adults aged over 55 years with knee pain reported short term benefit (not sustained beyond 3 months) for community physiotherapy compared to a group receiving a pharmacy review and a control group (advice leaflet and follow up telephone call) for pain (adjusted change score 1.19, 95% CI: 0.3–2.1, $p=0.008$); and function (adjusted change score 3.65, 95% CI: 1.0–6.3, $p=0.008$) scores measured on WOMAC. These differences were not sustained at 6 or 12 month follow up. Caution is required in interpreting these results in view of the lack of blinding and broad inclusion diagnosis of knee pain.[55]

Evidence from one low quality RCT involving 83 participants with knee OA found statistical improvements from baseline in 6 minute walk distance (12.3% vs. 13.1%, $p<0.05$) and WOMAC total scores (51.8% vs. 55.8%, $p<0.05$) at 4 and 8 weeks for participants in a manual physical therapy and exercise (MPT) group (n=42) compared to a placebo group who received ultrasound therapy only (n=41). At 1 year follow up the rate of knee surgery was 5% in the MPT group and 20% in the control group. In this study the control group did not receive any supervised exercise program and it is unclear what effect was due to manual physical therapy compared to the exercise component of the intervention. Adverse events were not addressed.[53]

Tai chi

Recommendation 9 (Grade C)

There is some evidence to support GPs recommending tai chi for treatment of OA of the knee.

Caution note: Patients who are aged over 40 years, overweight, suffering from a chronic illness, or have not participated in recent regular exercise should be reviewed by the GP before commencing a new exercise program. Programs for pregnant women should be modified by an appropriately qualified health care provider.[57, 58]

Tai chi is a Chinese exercise that involves slow, fluid movements designed to improve cardiac and respiratory fitness, flexibility, balance, and muscle strength. Traditional tai chi may also improve psychological wellbeing and relaxation. Tai chi is considered a safe form of exercise for most people, with minor adverse events (eg. muscle soreness, foot/ankle pain) reported by some participants.[57–59]

A small volume of evidence that was of satisfactory consistency provided support for the recommendation that GPs recommend tai chi for patients with knee OA.

Evidence statement

A moderate quality RCT included 152 participants with hip or knee OA and compared 12 weeks aquatic therapy to two control groups: tai chi and waiting list control. Benefits were reported for aquatic therapy and tai chi in improving WOMAC function scores at 12 week assessment (aquatic therapy SRM 0.62, 95% CI: 0.49–0.75, tai chi SRM 0.63, 95% CI: 0.5–0.76). Aquatic therapy but not tai chi reduced WOMAC pain scores (SRM 0.43, 95% CI: 0.3–0.56). Of those assessed as OMERACT responders at 12 weeks, 66% of aquatic therapy and 58% of tai chi responders demonstrated sustained response at 24 weeks. The 11 reported adverse events did not relate to the interventions.[52]

One low quality, small RCT including 41 participants with knee OA provided evidence for a small benefit of tai chi (TC: 6 weeks group then 6–7 weeks home based program) in reducing pain and physical function compared to an attention control group (AT: 6 week course of lectures). There was benefit for tai chi over the aquatic therapy group at 6 and 9 weeks for mean maximum pain measured using a VAS, but not at other time points up to 12 weeks. The overall WOMAC score was only different between the two groups when measured at 9 weeks postintervention. The absolute size of the benefit was reported only in graphic format.[59]

Self management education programs

Recommendation 10 (Grade C)

There is some evidence to support GPs recommending self management education programs for treatment of OA of the hip and knee.

Self management education programs (SMEPs) are interventions designed to educate the patient on self care activities that promote health and management of chronic diseases such as OA. SMEPs aim to provide patients with knowledge of their disease, and the motivation and practical skills to relieve pain and reduce the impact of functional deficits on their life. By combining patient education with behavioural modification and empowerment techniques, SMEPs also aim to increase patient adherence to treatment, promote decision making related to CDM, and manage psychosocial impacts of disease such as anxiety, low self image and/or confidence, depression and helplessness.[6, 60–63] For some patients, participation in SMEPs has been associated with positive outcomes such as decreased pain and improved quality of life.[39, 43, 46, 62, 63]

Effectiveness of SMEPs is likely to be influenced by the content of the program (eg. relevance of information to patient, level to which information is aimed), delivery of the program (eg. format, speed) and patient characteristics (eg. readiness for education).[43] There is insufficient research on these factors to recommend specific SMEPs. In reviewed studies, one program included education, demonstration and participation in a group setting[62] and another used lecture style delivery.[46] Content of programs included joint preservation and protection; evaluating and controlling pain; treatments recommended for OA; aids and devices; exercise; and diet management including low fat food, setting goals and weight loss counselling.[46, 62]

A good volume of evidence of good consistency provided support for the recommendation that GPs recommend SMEPs for patients with OA.

Evidence statement

There is evidence from one moderate quality SR of 16 RCTs[46] and two moderate quality RCTs.[62, 64] There is variation in content and definition of the SMEP interventions, which makes comparisons of the results of different studies difficult. In addition, studies commonly use outcomes of pain and physical function, which may not be the primary focus of the intervention. There is evidence of a small positive benefit of SMEP on psychological outcomes after participating in a program.[46, 64]

There was evidence of benefit of SMEP in conjunction with an exercise component on psychological outcomes (mean ES 0.19). There was some evidence that SMEPs without an exercise component have no effect on physical function.[46]

The research methods (particularly the outcomes measured) may not have been able to answer the question of interest. There is currently a lack of evidence pertaining to other patient health outcomes, such as ability to self manage.

Thermotherapy

Recommendation 11 (Grade C)

There is some evidence to support GPs recommending cold therapy to treat symptoms of OA.

Caution note: Thermotherapy is generally well tolerated, with few adverse effects reported in the literature.[65, 66] Hot and cold packs should not be placed directly against the skin due to the risk of burn or frostbite. Thermotherapy is contraindicated for patients with reduced sensation, impaired communication and/or cognition or thermoregulatory impairments. Avoid heat therapy when a malignancy or acute injury (eg. open wounds, areas of recent bleeding, acute dermatitis, psoriasis, infection) is present. Patients with a history of peripheral vascular disease, diabetes, cardiovascular disease and hypertension, or who are pregnant, should use thermotherapy with caution.[67]

Thermotherapy involves the application of heat or cold (eg. heat or ice pack, ice massage) to treat symptoms of OA.[43,66] Cold has an effect by reducing swelling and inflammation, numbing pain and blocking nerves impulses and muscle spasms to the joint.[61, 68] Treatment appears to be most effective in an acute flare of OA, when minor joint inflammation is present, and is administered through the application of an ice pack wrapped in a towel for 20 minutes, 5 days a week for 2 weeks.[66, 69]

There was no research using sound study designs available on use of heat therapy in managing OA, however some patients may prefer it to cold treatments. Application of heat to the joint may reduce pain and stiffness through promotion of relaxation, joint flexibility and blood flow to the joint, although these effects may contribute to inflammation and oedema.[66, 69] Mild to moderate heat is applied using moist towels or heat packs wrapped in a towel for 15–20 minutes.[30, 68]

A good volume of evidence that was of poor consistency provided support for the recommendation that GPs recommend cold thermotherapy for patients with knee OA. No evidence was available on the use of heat therapy in managing OA.

Evidence statement

A moderate quality SR including three RCTs, studying different types of thermotherapy and including a total of 179 patients, reported conflicting results for treatment of knee OA. One RCT reported that ice massage had a beneficial effect on range of movement (ROM), function and knee strength but not on pain when used for 20 minutes, 5 days per week for 2 weeks. Another trial reported that cold packs decreased swelling, but hot packs had no similar beneficial effect. A further trial reported that ice packs did not affect pain significantly. No adverse effects were reported in included trials.[66]

TENS

Recommendation 12 (Grade C)

There is some evidence to support GPs recommending use of TENS for at least 4 weeks for treatment of OA of the knee.

Caution note: Manufacturers of TENS devices warn that they may interfere with pacemakers or other medical devices (eg. cochlear implants), and may not be suitable for those with epileptic conditions. Because TENS may interfere with blood pressure, the electrodes should not be placed over the carotid sinus. It is recommended that electrodes not be placed on areas with reduced sensitivity or over broken skin. The safety of TENS during pregnancy has not been established.[70, 71]

Transcutaneous electrical nerve stimulation (TENS) is a non-invasive therapy with no known side effects. TENS is administered through the stimulation of cutaneous nerve fibres by a device worn and operated by the patient.[61, 68, 72] It is theorised that TENS provides pain relief by inhibiting the transmission of painful stimuli to the spinal cord and brain pain receptors. The type of device, wave form produced by the device (eg. amplitude, rate and width of pulse), and the location in which stimulators are placed, all influence the quality of TENS administered to the patient and are generally adjusted by the clinician depending on the patient's response. Various TENS regimens are used in clinical practice: high frequency (>50 Hz), low frequency (<10 Hz) and burst frequency or hyper-stimulation (high frequency bursts of stimulation using various pulse widths).[68, 72]

A good volume of evidence of satisfactory consistency provided support for the recommendation that GPs recommend TENS for patients with OA.

Evidence statement

A moderate quality Cochrane SR of seven moderate quality RCTs involving 294 participants with knee OA reported benefit for TENS (high frequency and strong burst mode) compared to placebo for both pain relief measured on a VAS (WMD –0.448), and knee stiffness (WMD –5.972) when TENS was applied for more than 4 weeks duration.[72]

A low quality RCT including 60 participants with knee OA reported no difference over a 6 month follow up between use of IA injection of hylan (three injections given once weekly over 3 weeks) in reducing pain and stiffness and improving function and Lequesne index compared to TENS (applied five times per week for 20 minutes at 150 Hz for 3 weeks). There was no placebo group. Effect sizes were not stated and adverse events were not reported.[73]

A second low quality RCT including 51 participants with knee OA provided evidence that TENS or interferential current (IFC) treatments given twice weekly at standard doses for 20 minutes and in association with 20 minutes exercises had no benefit over a 20 minute exercise program alone (isometric quadriceps exercises, aerobic and resistance training). All groups showed improvement in WOMAC score over time. There was no placebo group.[74]

Acupuncture

Recommendation 13 (Grade C)

There is some evidence to support GPs recommending acupuncture for treatment of OA of the knee.

Acupuncture is a therapy administered through the insertion of sterile needles into specifically identified acupuncture points. After insertion needles are manually manipulated. The therapy is theorised to have an effect on pain through the triggering of endogenous opioid pathways.[68] Acupuncture has few reported serious side effects when administered by an appropriately trained health care provider.[16]

A good volume of evidence that was inconsistent in its findings provided support for the recommendation that GPs recommend acupuncture for patients with knee OA.

Evidence statement

There is evidence from a moderate quality SR of acupuncture used for chronic knee pain in OA, including 13 RCTs, eight of which were included in a meta-analysis with 2362 participants, for a small benefit for acupuncture in reducing pain and improving function compared to sham acupuncture for treatment of knee OA (when used for at least six treatments given at least once weekly with at least 4 points per painful knee needled for 20 minutes for up to 12 weeks). The overall effect size for use of acupuncture in chronic knee pain was 0.4 (95% CI: 0.1–0.6). Caution needs to be applied as the SR provided an overall validity score but did not clearly indicate which studies had adequate randomisation, randomisation allocation, or blinding. There was considerable heterogeneity between studies. Adverse events were not reported.[75]

A further moderate quality SR included 18 RCTs, of which 14 were knee OA RCTs, and 12 of these were included in the review by White (2006). Meta-analysis data from three trials (two knee OA, one hip OA) found small benefits in pain reduction (SMD 0.24, 95% CI: 0.01–0.47) for manual acupuncture compared to sham acupuncture for treatment of hip and knee OA. When two of the knee trials were analysed alone the heterogeneity of studies for electromagnetic acupuncture precluded meta-analysis.[76]

One recent and large good quality RCT included 3633 participants with hip or knee OA, of whom 357 were randomised to receive acupuncture (non-standardised intervention for up to 3 months duration), 355 randomised to a control (delayed treatment) group and 2921 included in a preference based non-randomised intervention group. Neither patients nor doctors were blinded to randomisation status. The study reported significant benefits (based on WOMAC scores) for the acupuncture group at 3 months. The proportion of responders (defined as 50% reduction in WOMAC score) was 34.5% in the intervention group compared to 6.5% in the control group. Caution is required in interpreting these results in view of the lack of blinding and questionable appropriateness of the control group. Adverse effects were reported in 5.2% (n=184) participants including minor local bleeding (66%), and pain at the needle site (5%). No life threatening side effects were seen.[77]

There is additional evidence from a recent moderate quality RCT with 52 participants with knee OA that 904 nm low level laser acupuncture provided 20 minutes per day for 5 days per week (total 10 sessions), in association with an exercise program, provides no additional benefit to sham laser acupuncture other than for knee circumference measurement when assessed at 2 and 12 weeks. No information was provided

regarding the inter- or intra-rata reliability of this measurement. Both laser and sham laser acupuncture were associated with improvements in pain on walking (VAS scale) and 50 feet walking time over 12 weeks. There were no local nor systemic adverse events.[78]

One further moderate quality placebo (Streitberger needle) controlled RCT provided evidence for benefit in reducing VAS pain for true acupuncture when used once weekly for 12 sessions in conjunction with diclofenac 50 mg three times daily compared to placebo.[79]

Patellar taping

Recommendation 14 (Grade D)

There is weak evidence to support GPs recommending patellar taping for treatment of OA of the knee.

Patellar taping has been used as a strategy to reduce pain in knee OA by stabilising the knee joint and altering the distribution of stress and joint pressure, thereby reducing strain on inflamed joint tissue. Patellar taping is generally used as a short term, intermittent treatment, particularly when the patient is performing activities that aggravate their condition.[80–82] Effectiveness of patellar taping appears to be related to the strapping technique used and the length of time taping remains in place. Although some patients may experience topical irritation from tape application, no significant adverse effects have been reported.[80–83]

A poor volume of evidence of satisfactory consistency provided support for the recommendation that GPs recommend patellar taping for patients with knee OA.

Evidence statement

A moderate quality RCT involving 87 participants with knee OA showed those treated with therapeutic medial patellar taping had significant improvement on 10 cm VAS for pain on movement (ES 1.19) and during worst activity (ES 1.00) after 3 weeks of taping (reapplied weekly) compared to neutral taping or no tape. This effect was sustained at 6 weeks. Compared to no taping, there was a RR of 7.0 (95% CI: 2.34–20.92) of participants in the therapeutic taping group reporting improvement in pain status following 3 weeks of treatment (neutral taping group RR 4.67, 95% CI: 1.50–14.53). Therapeutic taping was associated with improvements in WOMAC pain (ES 0.82) and WOMAC function (ES 0.83) at 3 weeks but not at 6 weeks. Outcome measures were subjective and participants were not blinded. 28% of participants in the therapeutic taping group experienced minor skin irritations.[81]

There is one small low quality RCT involving 18 participants with painful OA knee randomly assigned to two different knee taping techniques (therapeutic tape or neutral tape) or no taping. The study reported benefits for participants in the therapeutic taping group of reduced pain during gait ($p<0.017$), stair climbing ($p<0.017$), step test ($p<0.017$) but not in walking speed or 'timed up and go' compared to the neutral taping intervention and untaped groups. No adverse symptoms were observed during the study period. The allocation concealment methods and blinding of the assessors was of low quality and results may relate to placebo effect.[82]

A low quality RCT involving 14 participants with painful OA knee assessed three types of patellar taping (medial, lateral and neutral) for 4 days each in a randomised regimen order. The study reported reduced pain for days 2 to 4 for participants when using the medial taping technique ($p<0.05$) compared to the neutral and lateral taping. No benefits were reported for lateral taping over neutral taping. No functional outcome measures were used and participants were not blinded. No adverse symptoms were observed during the study period.[84]

Massage therapy

Recommendation 15 (Grade D)

There is weak evidence to support GPs recommending massage therapy for treatment of OA of the knee or hip.

Caution note: Massage therapy is generally a safe intervention. Patients may experience minor discomfort. A small number of serious adverse events have been reported, however the risk is low if the therapy is performed by a trained practitioner.[85]

Massage is the use of manual techniques such as stroking, friction and compression to apply traction and pressure to the soft tissues, including skin and underlying muscle tissue. The therapy aims to relieve pain and promote function through reduction of muscle tension and spasm, increase in circulation of blood and lymph, and promotion of mental relaxation. Massage may also contribute to positive outcomes for the patient through the therapeutic benefit of touch.[61, 68, 85, 86] A wide variation of massage types are available including conventional muscular massage (Swedish massage), deep tissue massage, and Shiatsu, however there is limited research on their use in osteoarthritis and no research comparing the effective various massage forms.[86]

There was only one low quality study on massage therapy, hence the recommendation that there is weak evidence to support massage therapy in the treatment of OA of the knee or hip.

Evidence statement

There is one low quality RCT involving 68 participants aged over 35 years with radiographically confirmed and symptomatic knee OA that reported a reduction in mean WOMAC scores for global pain, stiffness, and physical function domains (all $p<0.001$), VAS pain score ($p<0.001$), range of motion using goniometric assessment ($p=0.03$), and time to walk 50 feet ($p<0.01$) for participants receiving standard Swedish massage for 8 weeks compared to controls. At 8 weeks the effect size for change on WOMAC scores ranged from 0.64–0.86 but beneficial effects were no longer statistically significant at 16 weeks. One participant reported adverse events of increased discomfort. The allocation concealment method was of poor quality, lack of blinding outcome assessors and the study was underpowered due to the small sample size and the high number of drop outs (56% in the treatment group; 47% in the control group).[87]

Telephone support

Recommendation 16 (Grade D)

There is weak evidence to support GPs recommending telephone treatment counselling support from a trained health or non-medical person.

Telephone support has been proposed in the ongoing management of chronic diseases as a cost effective intervention that may be associated with positive clinical outcomes through increasing patient contact with health care providers.[39, 61]

There was only one low quality study on telephone support for patients with OA, hence the recommendation that there is weak evidence to support telephone support in the management of OA of the knee or hip.

Evidence statement

A low quality RCT including 405 participants with rheumatoid arthritis or hip or knee OA, randomised to telephone treatment counselling (n=135), telephone symptom monitoring (n=135), or usual care (n=135) reported benefit for telephone treatment counselling over other groups for total health status measured by the Arthritis Impact Measurement Scale-2 (ES 0.3, 95% CI: 0.0–0.56). There were differences between arthritis groups, with OA patients demonstrating improvements in physical function and pain, but minimal improvement in psychological effects. The mean number of medical visits reduced in the OA group. There is no cost effectiveness data.[88]

Magnetic bracelets

Recommendation 17 (Grade D)

There is weak evidence to support GPs recommending magnetic bracelets for treatment of OA of the hip or knee.

Caution note: Manufacturers of magnetic bracelets warn that magnetic devices may interfere with pacemakers and other medical devices. Because magnet therapy may increase the blood flow in areas where magnets are placed, it is recommended that they not be placed near transdermal medication delivery patches (eg. nicotine).[89]

A range of static magnetic devices are used for therapeutic purposes. These include bracelets, shoe inserts and pillows.[90] Static magnets have an unchanging magnetic field that has a unidirectional configuration and are available in different intensities, measured in gauss (G).[91, 92] Magnets are either worn directly over the affected area for a specified period each day, or on the wrist to provide an effect on the entire body.[92]

There are many theories on how magnetic therapy may have an effect on pain, however, research on magnetic therapy is hindered by the difficulty in adequately blinding participants to the presence of magnetic fields.[90, 91] One theory suggests that magnets may increase blood flow through the skin and muscles; while others focus on biological changes related to polarisation.[91] Only one study provided evidence on the effectiveness of magnetic bracelets in treating OA.

Evidence statement

One moderate quality RCT including 194 participants aged 45–80 years with hip or knee OA, reported that pain measured on the WOMAC scale from hip and knee OA decreased by a small amount (mean difference between standard strength and placebo for WOMAC pain scale was –1.3 points) when wearing standard strength static bipolar magnetic bracelets compared to weak magnetic or non-magnetic 'dummy' magnets for 12 weeks. The mean difference between standard and weak magnet groups was not significant. The effect of the standard strength group may have been related to a placebo effect as there is likely to have been unblinding of participants (54% standard magnet and 47% placebo group correctly identified which group they were in).[93]

Laser therapy

Recommendation 18 (Grade D)

There is weak evidence to support GPs recommending low level laser therapy for short term treatment of OA of the knee.

Low level laser therapy (LLLT) is applied using a device that generates pure light in a single wavelength that causes cellular photochemical reaction.[61] Clinical outcomes with LLLT may depend on the device, method and site of application, wavelength and treatment regimen.[61, 94]

One low quality study suggested there was no clinical benefit of LLLT over placebo for patients with OA of the knee or hip. One SR published after the search timeframe and not subjected to critical appraisal provided additional evidence on the effectiveness of LLLT in treating knee OA.

Evidence statement

There is evidence from one low quality RCT including 60 participants with knee OA treated daily for 5 days, that low level laser therapy has no effect on WOMAC pain, stiffness or disability, compared to placebo laser treatment when observed at week 3 and month 6 following treatment. The study reported that no side effects were observed.[94]

* One recent meta-analysis identified after the search timeframe and not subjected to critical appraisal, provided evidence from five moderate-to-good quality RCTs that used an optimal therapy dosage (n=222) for a clinically relevant benefit of LLLT in reducing OA knee pain on 100 mm VAS after 4 weeks therapy

(WMD 24.2 mm, 95% CI: 17.3–31.1mm, $p<0.00001$). Optimal dose of LLLT was reported as 904 nm with doses of 2–12 Joules or 830 nm with doses of 20–48 Joules applied to 2–8 points over the joint capsule. No adverse events were experienced in the trials.[95]

Leech therapy

Recommendation 19 (Grade D)

There is weak evidence to support GPs recommending leech therapy for treatment of OA of the knee or hip.

Caution note: Although no adverse events were reported in a study of OA patients[96] undertaking leech therapy, previous research in other populations has reported a risk of severe progressive cellulitis from application of leeches.[97]

Leech therapy has been proposed for the treatment of OA. Proponents of leech therapy suggest that leech saliva has analgesic effects, however early research has failed to demonstrate either the ability of leech salivary secretions to reach the joint or the analgesic properties of leech saliva content.[97]

There was only one moderate quality study on leech therapy, hence the recommendation that there is weak evidence to support leech therapy in the treatment of OA of the knee or hip.

Evidence statement

Evidence from one moderate quality RCT including 51 participants with OA of the knee receiving a single treatment of 4–6 locally applied medicinal leeches, reported benefit for pain at 7 days compared to diclofenac topical gel treatment for 28 days (WOMAC pain subscale group difference 23.9, 95% CI: 32.8–15.1). Differences in pain scores were no longer significant after day 7; however, differences in function, stiffness, total symptoms and quality of life remained significant in favour of leech therapy at 4 weeks.[96]

Pharmacological interventions

The main goals of pharmacological interventions for OA are relieving pain and reducing inflammation. Treatment aims to improve functioning and quality of life while minimising the risk of side effects.[98, 99]

The Working Group recommends consulting the Therapeutic Guidelines (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including adverse effects.

Paracetamol

Recommendation 20 (Grade A)

There is excellent evidence to support GPs prescribing paracetamol in regular divided doses to a maximum of 4 g/day as first line pharmacological therapy for treating persistent pain in patients with OA of the hip or knee.

Note: The most recent research on paracetamol suggests it is efficacious in the management of pain related to knee and hip OA. Although not as effective as NSAIDs, the lower risk of adverse events, particularly of the gastrointestinal system, makes paracetamol a first line medication consideration.

Caution note: Many common over-the-counter preparations (eg. cold and flu tablets) contain paracetamol. Patients should be warned of the risk of overdose when combining medications. Hepatotoxicity is a potential severe side effect, particularly in patients with pre-existing liver disease, chronic alcohol use, or those who take higher than recommended doses. Paracetamol should be used cautiously in patients at risk.[98–100] Paracetamol is also known to prolong the half life of warfarin, therefore patients taking these medications concurrently should have regular international normalised ratio (INR) monitoring.[99] GPs are advised to review the most recent Therapeutic Guidelines for prescribing details and full review of adverse events.

Paracetamol is the oral analgesic of choice for management of OA. Because it reduces pain and fever, but has minimal effect on inflammation, it is used more often in mild to moderate OA. Paracetamol is generally well tolerated with few side effects when used at the recommended dose of up to 4 g/day (usually taken as two 500 mg tablets up to 4 times daily) for up to 12 months. Effectiveness of paracetamol is related to adequate dosage and patients should be encouraged to take medication regularly according to the directions to reduce pain episodes.[16, 31, 98–100]

An excellent volume of evidence of excellent consistency provided support for the recommendation that GPs prescribe paracetamol as a first line pharmacological treatment for patients with OA.

Evidence statement

A good quality SR including 15 RCTs with 5986 participants with hip or knee OA provided evidence for the effectiveness of paracetamol for between 7 days and 12 months, when provided in regular divided doses to a maximum dose of 4 g/day, in treating pain (SMD –0.13, 95% CI: –0.22 to –0.04) in people with hip and knee OA compared to placebo. The NNT was 4–16. Paracetamol was found to be as safe as placebo. In 10 comparator controlled RCTs, paracetamol was less effective than NSAIDs (WOMAC total SMD –0.46, 95% CI: –0.73 to –0.19), but there was a higher risk of gastrointestinal adverse events (RR 1.47, 95% CI: 1.08–2.0) among patients using traditional NSAIDs.[101]

A moderate quality RCT including 581 participants with mild to moderate hip or knee OA provided evidence of benefit of paracetamol (4 g/day) and naproxen (750mg/day) compared to placebo in reducing WOMAC pain for 6–12 months, but no difference in effectiveness between the two active agents.[102] A low quality RCT with a small number of participants (n=20) with knee OA reported similar effectiveness of paracetamol (mean improvement 40.7 mm) and rofecoxib (42.5 mm) compared to placebo for VAS pain and for WOMAC function for 3 months.[103]

Oral NSAIDs

Recommendation 21 (Grade B)

There is good evidence to support GPs prescribing NSAIDs or COX-2 NSAIDs for reducing pain in the short term treatment for hip or knee OA where simple analgesia and non-pharmacological measures are ineffective. The potential small benefits of NSAIDs need to be measured in relation to potential harms.

Note: GPs should apply caution when using traditional NSAIDs and COX-2 NSAIDs in view of the known side effects, especially in those at risk such as the elderly, and those on concomitant medication. Careful monitoring of blood pressure and renal function is indicated for older people and others at risk when using these agents. For patients with high NSAID risk for whom NSAIDs are considered a necessary part of treatment, GPs should prescribe a traditional NSAID plus a PPI or COX-2 inhibitor.

Caution note: Traditional NSAIDs and COX-2 NSAIDs should be used with caution in elderly patients and those with renal disease, cardiovascular disease and/or aspirin induced asthma. Traditional NSAIDs have a significant risk of GIT events (eg. perforation, ulceration and bleeding). COX-2 NSAIDs have a lower risk of GIT adverse events, but are associated with an increased risk of myocardial infarction, stroke, heart failure and hypertension. There is a higher risk of adverse events for patients with concomitant use of diuretics, ACEIs, angiotensin 2 receptor blockers, cyclosporin, warfarin, oral corticosteroids or aspirin.[16, 98–100, 104, 105] GPs are advised to review the most recent Therapeutic Guidelines for prescribing details and full review of adverse events.

NSAIDs are recommended for treatment of acute pain due to their anti-inflammatory and antinociceptive effects. When inflammation of a joint is present, and paracetamol is not sufficient for pain relief, an appropriate traditional NSAID or COX-2 NSAID may be added to the patient's pharmacological regimen.[16, 31, 99] Due to the range of adverse events related to these medications, particularly in elderly patients, the lowest dose should be prescribed for the shortest duration. Using paracetamol in conjunction with a NSAID may achieve effective pain management with a lower NSAID dose, as may the use of an intermittent dose taken before aggravating activities, rather than a continuous dose.[31, 98, 100, 104, 105]

An excellent volume of evidence of good consistency provided support for the recommendation that GPs prescribe NSAIDs for the pharmacological treatment of patients with OA.

Evidence statement

NSAID efficacy

There is evidence from a good quality SR of 23 trials with 10 845 participants with OA knee pain to support a small benefit (10.1 mm VAS scale) for oral NSAIDs, including cyclo-oxygenase agents, in reducing the intensity of pain at 2–13 weeks follow up. On average, people with knee OA who were on NSAIDs, were 15.6% better off than placebo. This benefit may not be of clinical importance as the minimally important clinical difference for knee OA has been estimated to be a change from baseline of at least 17–22%. In addition, benefit was not seen at longer time periods (1–4 years). Harms were not reported.[106]

One good quality RCT including 13 274 participants with OA of the hip, knee or hand reported evidence to support equivalent efficacy of celecoxib 200 mg or 400 mg per day in divided doses, compared to diclofenac 50 mg twice daily, or naproxen 500 mg twice daily over a duration of 12 weeks. There were fewer ulcer complications in the celecoxib group (0.8/100 patient years traditional NSAID, 0.1/100 patient years celecoxib, OR 7.02, 95% CI: 1.46–33.8), and no difference in the number of cardiovascular thromboembolic events. However, the number of such events was low and the study was not powered to detect such differences. Patients requiring daily use of anti-ulcer medications were excluded from the trial.[107]

A low quality placebo controlled RCT including 511 participants with hip or knee OA reported differential benefit of treating knee or hip OA with improvement in WOMAC pain (ES knee 0.8, ES hip 0.5), stiffness (ES knee 0.8, hip 0.55) and physical function (ES knee 0.78, hip 0.51) compared to placebo when measured at 6 weeks. Adverse events were not reported.[108]

NSAID safety

There is evidence that use of oral NSAIDS is associated with a number of side effects[109] including GIT adverse effects (risk of perforation or bleeding 1/50–100 patient years[110]), increase in blood pressure, aggravation of cardiac failure, renal failure and drug interactions, and that this risk is increased by older age, concomitant medication use and duration of use. However, there are no head-to-head trials or cost effectiveness analyses of COX-2 medications versus traditional NSAIDs used in conjunction with effective anti-ulcer preparations such as misoprostol, H2 receptor antagonists, PPIs or antacids.

A low quality SR reported the risk of atherothrombosis associated with traditional and COX-2 NSAIDs. There is evidence to support a moderately increased risk (1.86, 95% CI: 1.33–2.59) of myocardial infarction with COX–2 NSAIDs (0.6%/year) compared to placebo (0.3%/year). There is evidence to support equal risk (1.16, 95% CI: 0.97–1.38) among COX-2 (1.0%/year) and traditional NSAIDs (0.9%/year) for serious vascular events with some heterogeneity between naproxen (0.92), ibuprofen (1.51) and diclofenac (1.63).[111]

A moderate quality RCT involving 34 701 participants (pooled data from three studies) aged over 50 years reported on cardiac thrombotic events in participants taking NSAIDs, the majority of whom (24 913) had OA of the hip, knee, hand or spine. When treated for an average period of 18 months, there was similar cardiac thrombotic event rates for etoricoxib (1.24/100 patient years) prescribed at doses of 60–90 mg/day and diclofenac (1.3/100 patient years) prescribed in a divided daily dose of 150 mg/day, resulting in a hazard ratio of 0.95 (95% CI: 0.81–1.11). The rates of upper GIT perforation, bleeding, obstruction and ulcers were lower with etoricoxib compared to diclofenac (0.67 vs. 0.97/100 patient years). There was no placebo group. Participants were able to use prophylactic low dose aspirin and PPIs, or misoprostol was recommended for patients at high risk of upper GIT clinical events. Subgroup analyses of these patients in relation to outcomes was not provided.[112]

Evidence from a moderate quality RCT involving 287 participants with arthritis and a history of ulcer bleeding after using NSAIDs, but at a stage when their ulcers had healed (negative for H. pylori), showed that combination treatment of 75 mg diclofenac twice daily plus 20 mg of omeprazole daily (n=143) had a reduced risk of recurrent ulcer compared to celecoxib 200 mg twice daily plus a daily placebo (n=144) for 6 months. Probability of recurrent bleeding during the 6 month period was 4.9% (95% CI: 3.1–6.7) for celecoxib compared to 6.4% (95% CI: 4.3–8.4) for diclofenac plus omeprazole (difference –1.5%, 95% CI: –6.8–3.8). Renal adverse events, including hypertension, peripheral oedema, and renal failure occurred in 24.3% of participants in the celecoxib group and 30.8% of those receiving diclofenac plus omeprazole. A number of GIT events were questionably excluded as adverse event cases. There was no placebo group and participants with active ulcers were excluded, which may have contributed to the favourable results.[113]

Evidence from a moderate quality RCT involving 273 arthritis participants who had a history of previous, now healed gastric ulcer as a result of taking non-selective NSAIDs (negative for H. pylori) showed that combination treatment with 400 mg/day celecoxib and 20 mg esomeprazole twice daily (n=137) was more effective than 400 mg/day celecoxib and placebo (n=136) for 12 months for prevention of recurrent ulcer bleeding. 13 month cumulative incidence of recurrent ulcer bleeding was 0% in the combined treatment group and 12 (8.9%) in the controls (95% CI: difference: 4.1–13.7; p=0.0004). Discontinuation of treatment and the incidence of adverse events were similar in the two treatment groups.[114]

A low quality SR including 114 double blind RCTs involving 116 094 participants with different comorbidity status (OA being most common) provided evidence on the safety of oral NSAIDs. Analysis of 127 trials (40 rofecoxib, 37 celecoxib, 29 valedecoxib/parecoxib, 15 etericoxib and six lumiracoxib) found that celecoxib was associated with lower risk of both renal dysfunction (RR 0.61, 95% CI: 0.40–0.94) and hypertension (RR 0.83, 95% CI: 0.71–0.97) compared to rofecoxib. No significant increased risk was established for valedecoxib/parecoxib, etericoxib or lumiracoxib.[115]

Note: Rofecoxib and lumiracoxib have been withdrawn from use.

Weak and strong opioids

Recommendation 22 (Grade A)

There is good evidence that GPs consider prescribing weak or strong opioids with caution for treating at least moderate or severe pain in people with OA of the hip or knee who have not responded to, or are unable to tolerate, other analgesic medications or NSAIDS, and in whom joint replacement surgery is contraindicated or delayed.

Note: GPs should commence opioids at a low starting dose with slow titration of dose, particularly in those at increase risk of adverse effects, such as the elderly, and closely monitor patients for adverse events.

Caution note: In an acute overdose, opioids may cause respiratory depression. Adverse events including dry mouth, nausea, vomiting, dizziness, somnolence and constipation are commonly reported by patients and regularly lead to patients ceasing opioid therapy. A small risk of addiction suggests stronger opioids should be used with caution in patients with a history of drug/alcohol abuse, psychiatric problems, psychosis or suicidal tendency. Patients should be warned against driving under the influence of opioids. Patients may experience withdrawal effects (eg. insomnia, muscle contractions) that may be reduced through dose tapering.[16, 99, 116–118] GPs are advised to review the most recent Therapeutic Guidelines for prescribing details and full review of adverse events.

Opioids have a modest effect in managing moderate to severe OA pain in patients for whom paracetamol is ineffective, and who do not respond to, or have contraindications for, NSAIDs. However, most of the research on opioid use has been in short term trials and long term efficacy has not been shown. Because of the high rate of adverse effects that impact upon patients' quality of lives, the modest benefit to be gained from opioid therapy should be considered carefully.[16, 99, 117, 118]

The use of weak opioids (eg. codeine) should also be considered cautiously as these preparations are less effective than strong opioids with the same adverse effects. Consider referring patients who require opioid therapy for review by a pain specialist/clinic.[100]

An excellent volume of evidence of excellent consistency provided support for the recommendation that GPs consider weak or strong opioids for management of moderate to severe OA pain in some patients.

Evidence statement

There is evidence from a moderate quality SR of weak (codeine, propoxyphene, tramadol) and strong (oxycodone, oxymorphone, fentanyl, morphine sulphate) opioids used for up to 13 weeks for benefit in reducing pain intensity and improving physical function when used in treating hip and knee OA compared to placebo. There was a high proportion of patients reporting adverse effects including nausea (30%), constipation (23%), dizziness (20%), somnolence (18%) and vomiting (13%), resulting in discontinuation of therapy in 25% patients taking strong opioids and 19% taking weak opioids compared to placebo (7%).[119] The findings support previous evidence from systematic reviews on tramadol,[120] oxymorphone[121] and fentanyl.[122]

There is evidence of small benefit of tramadol for 7 days to 3 months duration, when provided in divided doses of up to 400 mg/day, in treating persistent moderate to severe OA hip and knee pain. The NNT for benefit was six.[120] The use of tramadol in mild to moderate pain is limited by drug interactions and CNS adverse effects. Tramadol was associated with a greater risk of adverse events compared to placebo (NNH for minor adverse events was five; major adverse events eight).[120] Tramadol had greater risk of adverse events than diclofenac or dextropropoxyphene but a lower risk compared to pentazocine. There is potential multiple drug interactions. In particular, the combination of tramadol with other serotonergic drugs must be avoided due to the risk of serotonin syndrome (refer to NPS *Analgesic choices in persistent pain*[104]). The most commonly reported adverse events were nausea, vomiting, dizziness, constipation, somnolence, tiredness and headache.

There is evidence of small benefit of oxymorphone (an opioid analgesic medication) when used for at least 2 weeks, and provided in doses of 20–50 mg twice daily, in treating persistent pain of at least moderate intensity in patients with hip and knee OA, who have had suboptimal response to simple analgesia. There was a high withdrawal rate due to adverse events.[121]

There is evidence of moderate benefit for the knee and small benefit for the hip, of transdermal fentanyl (an opioid analgesic medication) used for 5 weeks duration when provided in doses of 1–4 patches (25 µg) every 72 hours, in treating persistent pain of at least moderate intensity in patients with hip and knee OA awaiting joint replacement surgery who have had suboptimal response to simple analgesia. Use of transdermal fentanyl was associated with a higher rate of adverse events and withdrawal symptoms compared to placebo.[122]

Intra-articular corticosteroid injection

Recommendation 23 (Grade B)

There is good evidence to support GPs prescribing IA corticosteroid injections for short term treatment of OA of the knee and hip.

Caution note: Rarely, complications including fluid retention, hyperglycaemia (particularly in diabetic patients) and hypertension may occur due to absorption of IA corticosteroid into the body.[26, 98] GPs are advised to review the most recent Therapeutic Guidelines for prescribing details and full review of adverse events. The procedure of IA injection carries some risk, including allergic reaction to the medication and/or dressing, postinjection swelling due to increased fluid within the joint, haematoma, and (rarely) infection. Practitioners administering IA medication should be appropriately trained (see *Recommendation 2*).[26, 98]

Intra-articular corticosteroid injection is indicated for short term symptom management when the patient has an acutely painful, swollen joint. Generally synovial fluid is aspirated from the joint to reduce swelling prior to the administration of the corticosteroid directly into the joint cavity. The procedure allows for a greater concentration of medication at the site of action, with a lower risk of systemic side effects.[26, 31, 98, 99]

Due to possible cartilage damage from repeated IA injections, the number of corticosteroid injections is generally limited to three times per year for large weight bearing joints and four times per year for smaller joints. Intra-articular injections to the same joint are usually administered at no shorter than 3 monthly intervals.[26, 39, 98]

An excellent volume of evidence of good consistency provided support for the recommendation that GPs recommend IA corticosteroids for short term symptom management in patients with knee OA .

Evidence statement

One good quality systematic review of 28 RCTs with 1973 participants with knee OA provided evidence for short term (1–34 weeks) benefit for pain reduction and patient global assessment, but not physical function of IA corticosteroid preparations. The NNT to improve pain and patient global assessment was 3–4. Nine trials compared corticosteroid injection with hyaluronan and hylan derivatives. HA products demonstrated a similar but slower onset but were more durable with clinical benefit being detected at 5–13 weeks postinjection. There is limited data comparing different corticosteroid preparations. The authors were unable to recommend one preparation over another. There were no major adverse effects reported. Compared to placebo there was no greater number of participants reporting postinjection flare.[26]

One moderate quality RCT of 101 participants with hip OA provided evidence for short term (28 days) benefit on pain on walking (ES 0.6) for a single IA injection of 1 mL methylprednisolone and two placebo injections, compared to three placebo injections and three injections of 2 mL HA. There were no serious adverse events.[123]

Topical NSAIDs

Recommendation 24 (Grade C)

There is some evidence to support GPs recommending short term treatment of OA of the knee with topical NSAIDs.

Caution note: Some patients report local adverse effects including skin dryness, pruritus and/or rash. Patients should be advised to follow the manufacturer's directions when using over-the-counter topical preparations. Systemic side effects of NSAIDs such as GIT effects may be experienced, however the risk is significantly lower than for oral NSAIDs.[16, 99, 124–126]

Topical NSAIDs have an analgesic and anti-inflammatory effect related to suppression of local prostaglandin synthesis.[99] Topical NSAIDs are applied to the skin over the affected joint and absorbed into the tissue, producing an increased concentration of the drug at the local site while minimising systemic drug levels. The benefit is a reduced risk of side effects and medication interactions compared to oral NSAIDs.[98, 124]

A satisfactory volume of evidence of satisfactory consistency provided support for the recommendation that GPs recommend short term use of topical NSAIDs for patients with knee OA.

Evidence statement

There is evidence from one low quality SR, including four RCTs (no quality assessment provided) with 811 participants with knee OA, treated for 4–12 weeks, of a very small benefit (ES –0.28, 95% CI: –0.42 to 0.14) for topical NSAIDs (diclofenac and eltenac) in reducing pain associated with knee OA compared to placebo or vehicle. Adverse effects reported included self limited local skin reactions (dryness, rash, pruritus).[126]

There is evidence from a good quality RCT with 238 participants with knee OA, that diclofenac gel, applied 4 times/day for up to 1 minute each time for 3 weeks compared to placebo, was no different at 1 week but provided a small benefit with reduced pain on movement (reduced VAS score 4 mm) and reduced total WOMAC score (6 mm) during the second week, and that this response was sustained in week 3. Four patients reported local skin reactions.[125]

Topical capsaicin

Recommendation 25 (Grade D)

There is weak evidence to support GPs recommending topical capsaicin for the short term treatment of OA of the hip and knee.

Caution note: Local adverse reactions such as stinging, burning and erythema are commonly reported by patients using capsaicin cream. These effects are reported to diminish with repeated use. Patients may apply capsaicin cream with a glove to prevent inadvertent spread to eyes and other mucous membranes.[16, 39, 99, 124, 127] Patients should be advised to follow the manufacturer's directions when using over-the-counter topical preparations.

Capsaicin cream is a topical preparation derived from chillies that is available over-the-counter in various concentrations.[39, 99, 124, 128] Capsaicin cream causes a reduction in sensation through its effect in depleting a chemical (substance P. neuropeptide) associated with sensory nerve transmissions.[99, 128]

There was only one low quality study on topical capsaicin, hence the recommendation that there is weak evidence to support its use in the treatment of OA of the knee or hip.

Evidence statement

A low quality placebo controlled RCT with 200 participants with OA of the hip (n=33), knee (n=66), shoulder and hand reported statistically significant reduction in VAS measured pain for 0.025% capsaicin cream used in combination with 1.33% GTN cream when applied four times daily over the affected joint for 6 weeks; however, no effect size was reported. There was no difference in improvement in pain reported for use of capsaicin or GTN when used alone compared to placebo.[129]

Participants using capsaicin and/or GTN creams were reported to be more likely to prefer therapy continuation than those using placebo; however, non-completers were not included in the analysis. This study included small numbers of participants with OA of the hip (n=33) and knee (n=66) in each group, and was probably underpowered to analyse differences between the four groups.[129]

The participants using capsaicin had higher baseline discomfort scores associated with application (averaged over the first 5 days) than other groups; however, this settled with continued use. No other potential adverse events were reported.[129]

Viscosupplementation (hyaluronan and hylan derivatives) for knee OA

Recommendation 26 (Grade C)

There is some evidence to suggest hyaluronic acid is of some benefit for OA of the knee.

Caution note: Intra-articular injection carries some risks, including allergic reaction to the medication and/or dressing, postinjection swelling due to increased fluid within the joint, haematoma, and (rarely) infection. Practitioners administering IA medication should be appropriately trained (see *Recommendation 2*).[26, 98]

Viscosupplementation is the procedure of administering synthetic hyaluronic acid or hylan (HA) products into the joint via IA injection. Hyaluronic acid is a naturally occurring substance in the body that contributes to the elasticity and lubrication of synovial and cartilage within the joints. In patients with OA, the concentration and molecular weight of naturally produced HA is reduced, providing a rationale for supplementing natural HA by viscosupplementation. The aim of viscosupplementation is to relieve pain and improve mobility by restoring the protective functions performed by HA.[16, 39, 98, 130, 131] Various HA products are available, and research suggests there may be differences in efficacy between particular products. HA products are produced with either low or high molecular weights, which influences the number of injections and amount of medication administered in the viscosupplementation course.[98, 131, 132]

An excellent volume of evidence of good consistency provided support for the recommendation that viscosupplementation provides some benefit for patients with OA of the knee.

Evidence statement

There is evidence from one good quality SR of 76 RCTs of moderate quality that found varying levels of benefit for pain, function and global assessment for 5–13 weeks for viscosupplementation compared to placebo in treating knee OA. The SR reported viscosupplementation was equivalent to ongoing use of NSAIDs and superior to placebo. The results need to be interpreted with caution, as there was heterogeneity manifested by differences in the magnitude of clinical impact as measured by WMD of clinical effect across product class as well as studies. No major safety issues were detected. There is inadequate evidence about differences in benefit between products. There is some evidence for similar, but more sustained benefit of HA products compared to corticosteroid injection.[131]

A moderate quality RCT with 106 participants with knee OA reported reduced pain at 3 weeks with a 6 week course of weekly IA injections of HA compared to placebo, but this was not sustained at 6 weeks or 12 weeks.[133]

A low quality RCT with 60 participants with knee OA reported benefits in reducing pain and improving function for both IA injection of hylan (three injections given once weekly over 3 weeks) and TENS (applied five times per week for 20 minutes at 150 Hz) but no difference between the two groups. The improvements were noted up to 6 months after treatment, however effect sizes were not stated. Adverse events were not reported.[73]

A low quality RCT with 157 participants with knee OA reported no difference in benefit between mean VAS improvement of high molecular weight HA given over 3 weeks (26 mm) and low molecular weight HA given over 5 weeks (27 mm). Adverse events (most common pain at the injection site) were reported in approximately one-third of participants in both groups.[132]

Glucosamine hydrochloride and glucosamine sulphate

Recommendation 27 (Grade C)

The role of glucosamine products, including type and dose, remains uncertain. GPs may inform patients about the availability and safety of these agents.

Caution note: Glucosamine products contain shellfish extracts and should be avoided by patients with shellfish allergy. Glucosamine may influence blood glucose levels. People taking glucosamine, especially those with diabetes, should be monitored for signs of glucose intolerance such as increased urination, infections and disturbed vision. There is insufficient evidence on the safety of glucosamine during pregnancy.[134]

Glucosamine is found naturally in articular cartilage and has a role in cartilage formation and repair. Glucosamine has been used in the management of OA as an analgesic and for restorative properties, although no good quality research supports the role of glucosamine in cartilage repair. Research on effectiveness of glucosamine has produced varied results that may be related to length of therapy and/or severity of OA.[135, 136] Glucosamine is available over-the-counter in Australia as glucosamine sulphate or glucosamine hydrochloride dietary supplements. The usual dosing is 1500 mg/day in three divided doses. Research suggests improvement in symptoms requires at least 4 weeks of therapy, and this is generally well tolerated with no significant adverse events reported. Gastrointestinal upsets, sleepiness, headaches and skin reactions have been reported in some people.[134, 135]

A good volume of evidence was available on glucosamine use in OA, however there were significant inconsistencies in the findings.

Evidence statement

There is conflicting evidence of benefit for glucosamine sulphate and glucosamine hydrochloride in the treatment of the symptoms of OA of the knee. There is insufficient evidence to support benefit for preventing progression of knee OA cartilage loss. In all reported studies, glucosamine was safe compared to placebo.[137–139]

A moderate quality SR included 20 studies. Subgroup analysis of the best designed studies (eight with adequate allocation concealment) found no benefit of glucosamine sulphate or glucosamine hydrochloride over placebo when used in variable doses between 400–1500 mg/day for up to 6 months for treatment of OA knee. The review reported that subgroup analysis of one product, the Rotta preparation (10 studies), demonstrated small improvements in pain and function using the Lequesne index but no benefit as assessed by the WOMAC pain, stiffness or function subscales. However, the two Rotta studies with the largest number of participants were negative and analysis of other products did not demonstrate benefit. The pooled results demonstrated a small benefit (0.61 improvement out of 10 for pain) for glucosamine which is unlikely to be of clinical importance, and the results need to be interpreted with caution in view of inclusion of poor quality RCTs.[139]

A recent good quality RCT involving 318 participants with knee OA provided some evidence for a small benefit of glucosamine sulphate (1500 mg/day) for treatment of knee OA compared to placebo or paracetamol (3 g/day) when measured using the composite Lequesne or WOMAC composite scores, but no benefit for reducing pain as measured using the WOMAC pain scale. The difference of 1.2 points in Lequesne scale between glucosamine sulphate and placebo (the overall scale being 1–24) may be of doubtful clinical significance. In addition, evidence for effectiveness of chondroitin sulphate in treatment of OA knee is lacking (see below).[137]

One moderate quality large RCT compared glucosamine hydrochloride (1500 mg/day), alone or in combination with chondroitin sulphate (1200 mg/day) to placebo and celecoxib (200 mg/day). Glucosamine alone, or in combination with chondroitin sulphate, was found to have no benefit over placebo in reducing pain for patients with knee OA. The response to combined therapy was higher in a subset of patients with moderate to severe OA, however these results need to be interpreted with caution as this was a post-hoc subgroup analysis.[138]

Interventions not supported by current evidence

A number of interventions were reviewed for which current evidence shows no benefit over and above placebo for patients, or for which there is insufficient evidence to support their recommendation.

Braces and orthoses

Recommendation 28 (Grade B)

There is good evidence to suggest that knee brace, neoprene sleeve or lateral wedged insoles are of little or no benefit for treatment of knee OA. GPs could inform patients about lack of evidence of benefit over placebo.

Braces and orthotics are used to provide increased stability and support to weak muscles and joints and redistribute weight load to the joint. Splints are also used to rest joints. Both custom fitted and over-the-counter products are available, including heel wedges/insoles, knee braces and splints.[30,31,140] Current research does not support the hypothesis that braces and orthoses improve the symptoms of knee or hip OA. There appears to be limited risk of side effects, with a small number of patients reporting increased pain in various areas (eg. lower back, foot sole).[31, 140]

A good volume of evidence of good consistency provided support for the recommendation that there is no benefit over and above placebo from braces and orthoses for patients with OA.

Evidence statement

There is evidence from one good quality SR based on three low to moderate quality RCTs with 334 participants diagnosed with knee OA, that a lateral wedged insole did not reduce pain, stiffness nor improve function (WOMAC score), but was associated with reduced NSAID intake compared to a neutral insole. Participant compliance was marginally better with the lateral wedged insole in treatment of knee OA.[140]

The same review reported one study of 119 participants that demonstrated benefit of a valgus knee brace and neoprene sleeve above no support with improvement in pain, stiffness and physical function. The brace was more effective than the sleeve. It is uncertain whether outcome assessment was blinded. The four included studies had inadequate or unreported allocation concealment and blinding, and it is unlikely the findings are of clinical significance.[140]

There is evidence from one low quality SR, based on one prospective 6 month multicentred, double blinded RCT that a neutrally wedged insole had no benefit compared with lateral wedge insoles. At 6 month follow up there were no significant differences in any clinical outcome measures. Some decrease in concomitant drug therapy in the participants with lateral wedge insoles was observed.[141]

Electromagnetic fields (pulsed electromagnetic fields or electrical stimulation)

Recommendation 29 (Grade B)

There is good evidence to suggest that electromagnetic field or electric stimulation interventions are of no benefit in the treatment of knee OA. GPs could inform patients about lack of evidence of benefit over placebo.

Caution note: Clinical trials of PEMF therapy have reported no major adverse events. Manufacturers of PEMF devices do not recommend use of the product by people with a pacemaker or other implanted device, epilepsy, cancer, diabetes, cardiac infarction less than 2 months ago, congenital pathology of central nervous system or kidney disease. Use of PEMF devices is not recommended during pregnancy.[142, 143]

Pulsed electromagnetic field (PEMF) therapy is a non-invasive treatment in which electromagnetic field pulses are delivered to the painful area via a specific device. The small pulses of athermal electrical fields are applied either through direct placement of electrodes on the skin over the area requiring treatment or through a non-contact technique. The therapy is used to reduce pain and inflammation,[61, 144, 145] however current research does not support this hypothesis.

A good volume of evidence of good consistency provided support for the recommendation that there is no benefit over placebo from PEMF for patients with OA.

Evidence statement

A good quality SR provides evidence from five moderate to good quality RCTs (276 patients) that PEMF therapy (two studies used low frequency, three studies used pulsed short wave high frequency) has no effect over placebo on pain or function in knee OA for patients aged over 18 years treated for 2–6 weeks. The review did not report on adverse events.[144]

Viscosupplementation (hyaluronan and hylan derivatives) for hip OA

Recommendation 30 (Grade C)

There is some evidence to suggest HA is of no benefit for OA of the hip. GPs could inform patients with OA of the hip about the lack of evidence of benefit over placebo.

Caution note: Intra-articular injection carries some risks, including allergic reaction to the medication and/or dressing, postinjection swelling due to increased fluid within the joint, haematoma and (rarely) infection. Practitioners administering IA medication should be appropriately trained (see *Recommendation 2*).[26, 98]

Viscosupplementation is the procedure of administering synthetic HA products into the joint via IA injection. Hyaluronic acid is a naturally occurring substance in the body that contributes to the elasticity and lubrication of synovial and cartilage within the joints. In patients with OA the concentration and molecular weight of naturally produced HA is reduced, providing a rationale for supplementing natural HA by viscosupplementation. The aim of viscosupplementation is to relieve pain and improve mobility by restoring the protective functions performed by HA.[16, 39, 98, 130, 131] Various HA products are available, and research suggests there may be differences in efficacy between particular products. HA products are produced with either low or high molecular weights, which influences the number of injections and amount of medication administered in the viscosupplementation course.[98, 131, 132]

A satisfactory volume of evidence of good consistency provided support for the recommendation that viscosupplementation provides no benefit over placebo for patients with OA of the hip.

Evidence statement

There is evidence from a low quality SR of eight studies with participants with hip OA, only two of which were RCTs, that HA provided no benefit measured by WOMAC scores or Lequesne index when assessed for 3 months to 1 year. No major adverse events occurred.[130]

A moderate quality RCT with 101 participants with hip OA reported evidence for no benefit of three IA injections of 2 mL HA (hyalgan) on reducing pain on walking for up to 90 days compared to placebo. There were no serious adverse events.[123]

Chondroitin sulphate

Recommendation 31 (Grade C)

There is some evidence to suggest that chondroitin sulphate is of no benefit in treating OA of the knee. GPs could inform patients about the lack of evidence of benefit over placebo.

Caution note: Chondroitin may increase the risk of bleeding and should be used cautiously in patients taking anticoagulants.[134]

Chondroitin is found naturally in the body and has a role in preventing degradation of articular cartilage by body enzymes. Chondroitin sulphate supplement, generally taken in conjunction with glucosamine, may be used in the management of OA, although its effectiveness as either an analgesic or a restorative agent is not supported by good quality research. Chondroitin sulphate supplements are available over-the-counter in Australia and have a usual dose of 1200 mg/day in three divided doses. There have been few reported adverse effects, with minor GIT upset reported by some patients.[134–136]

One low quality systematic review provided support for the recommendation that chondroitin sulphate provides no benefit over placebo for patients with OA of the knee or hip.

Evidence statement

Evidence from a recent low quality SR based on analysis of 20 high quality RCT studies (3846 participants) demonstrated that chondroitin sulphate (800–1200 mg/day) for up to 2 years is not associated with clinical benefit in treatment of OA of the hip or knee.[146]

Vitamin, herbal and other dietary therapies

Recommendation 32 (Grade C)

There is some evidence to suggest that vitamin, herbal and other dietary therapies are of limited or no benefit in treating OA of the hip or knee. GPs could inform patients about the lack of evidence of benefit, or limited evidence for benefit over placebo.

Caution note: Although generally considered to have low risk of serious side effects, herbal and dietary supplements may have harmful effects, particularly through interaction with other medication the patient may be taking. Health professionals should ask about complementary therapies when conducting medication reviews.[98, 134]

Patients often seek alternative therapies for treatment of OA, particularly if they have had insufficient results from conventional medication. Alternative therapies used for the treatment of OA include herbs, vitamins and/or mineral supplements, aromatherapy, naturopathic and homeopathic products. These products are widely available without prescription in Australia.[98, 135] Research on the use of a wide range of vitamin, herbal and other dietary therapies in the treatment of OA does not demonstrate any clinical benefits above placebo.

A satisfactory volume of evidence of good consistency provided support for the recommendation that there is limited, or no evidence, of benefits over and above placebo from vitamin, herbal or other dietary therapies for patients with OA.

Evidence statement

There is evidence from one low quality SR including 52 RCTs of variable (mostly low) quality including participants with OA (knee hip, spine and possibly other sites*) of:

- no benefit above placebo for clinically important outcomes with use of Rosa Canina, salix , vitamin E, ginger, Uncaria guianensis, cetyl myristoleate
- conflicting or very limited evidence for benefit with use of ASU, New Zealand mussel powder, bromelain (this agent was associated with side effects and requires further investigation of safety), Harpagophytum procumbens, flavonoids, vitamin C, Duhuo jisheng wan
- limited evidence for benefit with use of SK1306X in treating hip or knee OA compared to placebo or diclofenac 100 mg/day. Three severe adverse events (not described) were reported with SK1306X compared to 11 with use of diclofenac
- limited evidence for benefit with use of methylsulfonylmethane (MSM) for treating knee OA.[147]

There is insufficient information provided about each RCT to assess adequacy of randomisation or blinding.[147]

* Not all studies adequately described the patient populations included in the study.

Therapeutic ultrasound

Recommendation 33 (Grade C)

There is some evidence to suggest that therapeutic ultrasound is of no benefit in treating OA of the knee or hip. GPs could inform patients about lack of evidence of benefit over placebo.

Caution note: Therapeutic ultrasound is generally well tolerated, with few adverse effects reported in the literature.[65, 148] Therapeutic ultrasound should be avoided in patients with impaired circulation, venous thrombosis, malignancy, those fitted with a pacemaker or other implanted electrical devices, or pregnancy women.[67]

Therapeutic ultrasound is a form of therapy consisting of high frequency inaudible acoustic vibrations that are either applied in a continuous or pulsed fashion to skin over the painful joint to reduce inflammation and improve flexibility through increasing collagen elasticity.[68, 148] Frequencies of ultrasound range from 0.75 and 3.0 mHz and intensity between 0.5–3.0 W/cm^2, with lower frequencies having deeper penetration.[68] Pulsed ultrasound has non-thermal effects, while continuous ultrasound has a thermal effect that contributes to therapy benefits.[148]

Low quality evidence of good consistency provided support for the recommendation that there is no benefit over placebo from therapeutic ultrasound for patients with OA.

Evidence statement

There is evidence from a moderate quality SR of three studies including 294 participants, of no benefit for therapeutic ultrasound above placebo, for treatment of OA of the hip and knee, when assessed immediately after therapy or after 2 months. There were no adverse events.[148]

Social support

Recommendation 34 (Grade D)

There is weak evidence to suggest cognitive behavioural therapy is of limited or no benefit in treating OA. GPs could inform patients about lack of available evidence.

Cognitive behaviour modification therapy and other psychosocial therapies are proposed to assist patients in the long term management of chronic disease. Social support interventions aim to improve the general wellbeing of patients through educational interventions, lifestyle modification, and support networks and are conducted in a group setting, often including the patient's family and/or other significant others.[16, 149, 150] However, research on the effectiveness of social support interventions for patients with OA has shown no significant benefit to patients.[149]

There was only one low quality study on social support, hence the recommendation that there is no evidence to support its use in the treatment of OA.

Evidence statement

There is one small, low quality RCT involving 40 participants diagnosed with OA, randomly assigned to cognitive behaviour modification sessions (n=20) provided once weekly for 10 weeks or 10 weekly didactic lectures (n=20). The study reported no difference in measurement on the quality of wellbeing (QWB) scale between the groups at 12 months follow up. There was a non-significant trend toward improvement in QWB scale from baseline in the CBT group. There was no placebo group.[149]

FURTHER INFORMATION

Full details of the evidence on which the guideline is based is presented in the companion documents *Recommendations for the non-surgical management of hip and knee osteoarthritis* (www.racgp.org.au/guidelines/osteoarthritis/recommendations) and *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence* (www.racgp.org.au/guidelines/osteoarthritis/literaturereview).

The Process Report (*Appendix A*) outlines the full method used in the development of these recommendations.

Appendix B lists additional resources, as well as contact details for organisations providing services and support to people with OA.

The Working Group recommends consulting the Therapeutic Guidelines (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information including:

- indications
- drug dosage
- method and route of administration
- contraindications
- supervision and monitoring
- product characteristics.

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APPENDIX A. PROCESS REPORT

This report outlines the process used for the development of the evidence based *Recommendations for the non-surgical management of hip and knee osteoarthritis*.

The project consisted of the following major phases:

- formation of a multidisciplinary expert working group (see *Appendix B*)
- development of a scoping document outlining the scope and objectives of the project, including the process to be used in guideline development
- identification and appraisal of relevant existing clinical guidelines, leading to the selection of an existing guideline for use as a primary reference
- systematic literature searches to identify more recent evidence
- synthesis of new evidence and evidence from the primary reference guideline into graded clinical recommendations and algorithms
- peer review and appraisal through a public consultation process, and
- response to feedback and completion of final guideline.

Figure 1 provides an overview of the primary phases in guideline development.

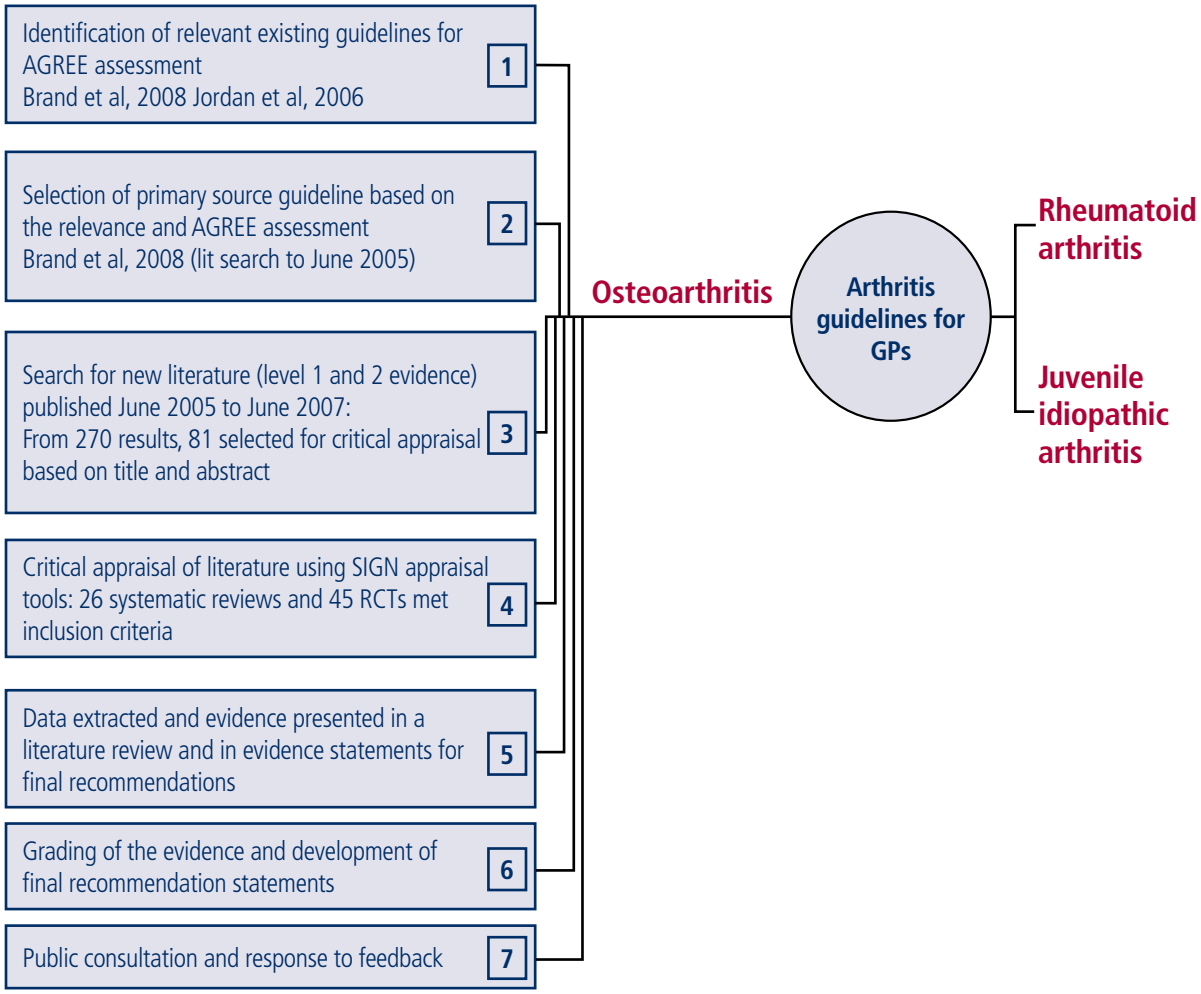

Figure 1. Process of guideline development

Identification of the guideline focus

A process model developed by the RACGP Steering Committee was used to identify the primary focus of the guideline (see the Guideline: *Background*). The Working Group reached consensus opinion on the primary focus of the guideline through discussion of areas considered most important for the primary audience (Australian GPs), with consideration to the feasibility of completing the guideline within the prescribed timeframe and budget. Clinical questions relevant to the area of guideline focus were developed to focus the search for relevant literature.

Identification, appraisal and selection of existing clinical guidelines

Due to extensive research that has been published on arthritis and its management, it was not feasible for the Working Group to conduct appraisals and a review of all the relevant research within the time and budget constraints of this project. As clinical guidelines have previously been published on the management of osteoarthritis, it was determined that the most feasible methodology would be to use an appropriate existing guideline as a primary reference and conduct a literature search to identify newly available evidence.

Existing guidelines were identified through database searches and those known to the Working Group. Guidelines considered to be the most relevant were selected for appraisal using the AGREE instrument.[13] Developers of the AGREE tool propose its use to assess '…the confidence that the potential biases of guideline development have been addressed adequately and that the recommendations are both internally and externally valid, and are feasible for practice.'[13] The AGREE tool includes 21 questions organised into six quality domains: scope and purpose; stakeholder involvement; rigour of development; clarity and presentation; applicability; and editorial independence. Each question is scored on a 4–point Likert scale (strongly agree, agree, disagree and strongly disagree) and the scores from multiple reviewers are used to calculate an overall quality percentage for each domain.

The Working Group identified 13 relevant existing guidelines, many of which had already been appraised using the AGREE tool as part of a Commonwealth Government funded AMQuIP project on management of osteoarthritis.[151] Identified guidelines for which scores were not available from the AMQuIP project were assessed by three reviewers using the AGREE tool. The following 13 guidelines were assessed and the results are presented in *Table 1*:

- Brand C, Cox S. Evidence-based clinical pathway for best practice management of OA of the hip and knee (and appendices), 2006.
- Jordan KM. et al. EULAR Recommendations 2003: An evidence based approach to the management of knee osteoarthritis: Report of a Task Force of the Standing Committee for International Clinical Studies Including Therapeutic Trials (ESCISIT). Ann Rheum Dis 2003;62(12):1145–55.
- Tannenbaum H, et al. An evidence-based approach to prescribing NSAIDs in the treatment of osteoarthritis and rheumatoid arthritis: The Second Canadian Consensus Conference. Can J Clin Pharmacol 2000;7(Suppl A Autumn):4A–16A.
- Hochberg MC, et al. Guidelines for the medical management of osteoarthritis. Part I. Osteoarthritis of the hip. American College of Rheumatology. [see comment]. Arthritis Rheum 1995;38(11):1535–40.
- Hochberg MC, et al. Guidelines for the medical management of osteoarthritis. Part II. Osteoarthritis of the knee. Arthritis Rheum 1995;38(11):1541–6.
- Altman R, et al. Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update. American College of Rheumatology Subcommittee on Osteoarthritis Guidelines. [see comment]. Arthritis Rheum 2000;43(9):1905–15.
- Mazieres B, et al. EULAR recommendations for the management of knee osteoarthritis. Report of a task force of the Standing Committee for International Clinical Studies Including Therapeutic Trials. Joint Bone Spine: Revue du Rhumatisme 2001;68(3):231–40.
- Lee A, et al. Clinical guidelines for managing lower-limb osteoarthritis in Hong Kong primary care setting. 2004.
- Brighton S, et al. Osteoarthritis: Clinical guideline 2003. S Afr Med J 2003;93(12 II):972–90.
- American Academy of Orthopaedic Surgeons. Clinical guideline on osteoarthritis of the knee. Support document. 2003.

- American Academy of Orthopaedic Surgeons. Clinical guideline on osteoarthritis of the knee (phase II): support document. 2003.
- Scott D. Guidelines for the diagnosis, investigation and management of osteoarthritis of the hip and knee. Report of a Joint Working Group of the British Society for Rheumatology and the Research Unit of the Royal College of Physicians. Journal of the Royal College of Physicians of London 1993;27(4):391–6.
- Ottawa Panel. Ottawa Panel evidence-based clinical practice guidelines for therapeutic exercises and manual therapy in the management of osteoarthritis. Physical Therapy 2005;85(9):907–71.

The guideline selected as the primary source of evidence was *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006). This guideline presented a comprehensive review of pharmacological and non-pharmacological management of knee and hip osteoarthritis within the Australian health care context, based on evidence identified in literature searches to June 2005.

The Chair, Associate Professor Brand acknowledged her potential conflict of interest as Project Director for Development of *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006)[12] and was not involved in the assessment of existing guidelines using the AGREE instrument, nor in the decision to use *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006)[12] as the primary reference guideline.

Table 1. AGREE scores for identified guidelines. Shaded guideline was selected as primary source

	AGREE domain scores					
Guideline	**Domain 1. Scope and purpose**	**Domain 2. Stakeholder involvement**	**Domain 3. Rigour of development**	**Domain 4. Clarity and presentation**	**Domain 5. Applicability**	**Domain 6. Editorial independence**
Brand and Cox, 2006 (OA Pathways)	52%	44%	40%	78%	56%	17%
Jordan et al, 2006 (EULAR – knee only)	72%	17%	72%	50%	17%	17%
Tannenbaum, et al, 2000*	44%	25%	33%	66%	0%	0%
Hochberg et al, 1995a*	66%	0%	19%	8%	0%	0%
Hochberg et al, 1995b*	66%	0%	19%	8%	0%	0%
Altman et al, 2000*	44%	0%	29%	25%	11%	0%
Mazieres et al, 2001*	78%	17%	62%	25%	0%	16%
Lee et al, 2004*	22%	33%	48%	66%	0%	0%
Brighton et al, 2003*	22%	8%	14%	66%	11%	16%
AAOS, 2003a*	11%	8%	38%	66%	0%	0%
AAOS, 2003b*	11%	8%	38%	66%	0%	0%
Scott, 1993*	33%	8%	29%	75%	55%	16%
Ottawa Panel, 2005*	44%	25%	62%	33%	0%	16%
* Guidelines reviewed as part of the Commonwealth funded AMQuIP project						

Identification, appraisal and synthesis of new evidence

A search was conducted for new evidence published after the literature search conducted for the *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006). The process used for the literature search is reported in more in detail in *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence* (www.racgp.org.au/guidelines/osteoarthritis/literaturereview).

Search strategy

The MEDLINE, EMBASE and CINAHL databases and the Cochrane Library including CENTRAL Cochrane Controlled Trial Register were initially searched for evidence published between June 2005 and December 2006. An additional search was conducted in March 2007 to identify evidence for interventions not represented in the initial search. Articles identified via personal contact with authors were also considered for inclusion. For interventions where no recent evidence was found, evidence included in the *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006) was also appraised. The following initial search strategy applied to the MEDLINE database and was adapted to apply to the other databases.

1. exp osteoarthritis/
2. (degenerative adj2 arthritis). tw
3. osteoarthr$.tw
4. or/1–3
5. hip.sh
6. knee.sh
7. or 5–6
8. 3 and 7
9. randomized controlled trial.pt.
10. controlled clinical trial.pt.
11. randomized controlled trials.sh.
12. random allocation.sh.
13. double blind method.sh.
14. single blind method.sh.
15. or/9–15
16. (animals not human).sh.
17. 15 not 16
18. clinical trial.pt.
19. exp clinical trials/
20. (clin$ adj25 trial$).ti,ab.
21. ((singl$ or doubl$ or trebl$ or tripl$) adj25 (blind$ or mask$)).ti,ab.
22. placebos.sh.
23. placebo$.ti,ab.
24. random$.ti,ab.
25. research design.sh.
26. or/18–25
27. 26 not 16
28. 24 not 17.

Inclusion/exclusion criteria

Types of studies

Only studies considered to be of NHMRC Level 1 or Level 2 evidence (*Table 2*) that evaluated the effectiveness and/or safety of interventions for hip or knee osteoarthritis in adults were considered for inclusion. RCTs that were reported in systematic reviews already selected for inclusion in this literature review were not subjected to individual critical appraisal to prevent replication of data.

Types of participants

Studies that included adults (aged 18 years or more) with a diagnosis of osteoarthritis of the hip and/or knee were considered for inclusion.

Types of interventions

Both pharmacological and non-pharmacological interventions were eligible for inclusion in this review. Surgical interventions and interventions for patients following joint replacement surgery were not eligible for inclusion.

Table 2. NHMRC levels of evidence for intervention studies

Level of evidence	Description
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly designed randomised controlled trial.
III–1	Evidence obtained from well designed pseudo randomised controlled trials (alternate allocation or some other method).
III–2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case control studies, or interrupted time series with a control group.
III–3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pre-test and post-test.

Critical appraisal

One reviewer critically appraised all studies that met the inclusion criteria, with a second reviewer appraising 40% of the papers. There was a high level of consensus between reviewers, with 100% agreement on Jadad scoring and minor discrepancies in SIGN scoring resolved by a third reviewer.

The following critical appraisal tools were used:

- SIGN appraisal tool for systematic reviews (www.sign.ac.uk/guidelines/fulltext/50/checklist1.html)
- SIGN appraisal tool for RCTs (www.sign.ac.uk/guidelines/fulltext/50/checklist2.html).

Studies were graded as being of good, moderate or low quality based on the results of appraisal using the SIGN tools.

Data extraction

The primary reviewer used the NHMRC RCT data extraction tool (www.nhmrc.gov.au) and the Joanna Briggs Institute data extraction tool for systematic reviews (available on request from JBI or NHMRC) to extract data from the included studies in a systematic manner. A second reviewer checked data extraction for 40% of the papers and no discrepancies were found. Data from included studies was presented in a descriptive literature review as well as a tabulated format. (Available in *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence* (www.racgp.org.au/guidelines/osteoarthritis/literaturereview).

Special populations

The search strategy was designed to retrieve all available evidence meeting the inclusion criteria, including research specific to special populations identified by NHMRC – Indigenous Australians (Aboriginal and Torres Strait Islanders); rural and remote communities; Muslim Australians; and Vietnamese Australians. The literature

searches identified minimal-no evidence directly related to these populations, thus a broader search was conducted to identify any research that addressed management of arthritis in the special population groups.

The following search was conducted in MEDLINE, CINAHL, EMBASE and Cochrane Library to identify relevant information:

- Arthritis/ OR Osteoarthritis, Hip/ OR Osteoarthritis/ OR Osteoarthritis, Knee OR Arthritis.mp
- 2 and 3.

Ten papers were identified for retrieval – five papers related to Australian Aborigines, three papers related to rural health and two focussed on Muslim populations. All 10 papers were excluded as they did not directly relate to osteoarthritis, or were historical health information.

Development and grading of the recommendations

Through group meetings, email circulation and feedback, the Working Group used the new evidence, together with evidence from the primary reference guideline and expert opinion to develop recommendations relevant to general practice within Australia.

Evidence statements were developed that represented a summary of the most relevant evidence from the literature, or where there had been no newly published research, from *Evidence-based clinical pathway for best practice management of OA of the hip and knee* (2006). A body of evidence assessment matrix developed by the NHMRC[14] (*Table 3*) was used to assess the volume and consistency of evidence supporting each recommendation; as well as the clinical impact, generalisability and applicability of the recommendation.

Each recommendation was given a final grading (*Table 4*) representing its overall strength. The gradings reflect implementability in terms of confidence practitioners can use in a clinical situation. The overall grade of each recommendation was reached through consensus and is based on a summation of the grading of individual components of the body of evidence assessment. In reaching an overall grade, recommendations did not receive a grading of A or B unless the volume and consistency of evidence components were both graded either A or B.

Table 3. NHMRC body of evidence assessment matrix[14]

Component	A Excellent	B Good	C Satisfactory	D Poor
Volume of evidence	At least one good quality SR that has at least two good quality RCTs	At least two good quality RCTs or a moderate quality SR that has at least two moderate-good quality RCTs	At least two moderate quality RCTs	Less than two moderate quality RCTs
Consistency	All studies consistent	Most studies consistent, and inconsistencies may be explained	Some inconsistency reflecting genuine uncertainty around clinical question	Evidence is inconsistent
Clinical impact	Very large	Substantial	Moderate	Slight or restricted
Generalisability	Population/s studied in the body of evidence are the same as the target population for the guideline	Population/s studied in the body of evidence are similar to the target population for the guideline	Population/s studied in the body of evidence different to the target population for the guideline but it is clinically sensible to apply this evidence to the target population	Population/s studied in the body of evidence different to the target population for the guideline and hard to judge whether it is sensible to generalise to the target population
Applicability	Directly applicable to Australian health care context	Applicable to Australian health care context with few caveats	Probably applicable to Australian health care context with some caveats	Not applicable to Australian health care context

Table 4. NHMRC grade of recommendations[14]

Grade	Description
A	Body of evidence can be trusted to guide practice
B	Body of evidence can be trusted to guide practice in most situations
C	Body of evidence provides some support for recommendation(s) but care should be taken in its application
D	Body of evidence is weak and recommendation must be applied with caution
Note: A recommendation cannot be graded A or B unless the volume and consistency of evidence components are both graded either A or B.	

Consultation phase

Draft versions of the *Guideline for the non-surgical management of hip and knee osteoarthritis, Recommendations for the non-surgical management of hip and knee osteoarthritis* and *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence* were presented for public feedback via the RACGP website. An interactive survey was designed to collect comments from all potential stakeholders. The public consultation period was advertised in major national newspapers and over 200 known stakeholders (eg. members of RACGP musculoskeletal group, consumer groups) were sent personal invitations to review the material. Feedback collected from the survey and independent submissions were collated and addressed by the Working Group.

The Working Group would like to thank respondents who provided feedback during the consultation phase of the project.

Dissemination

Final versions following consultation of the *Guideline for the non-surgical management of hip and knee osteoarthritis, Recommendations for the non-surgical management of hip and knee osteoarthritis* and *Non-surgical management of hip and knee osteoarthritis: a literature review of recent evidence*, together with supporting resources, will be made available to Australian general practitioners and the public on the RACGP website.

The RACGP has submitted to the Australian Government Department of Health and Aging (DoHA), a detailed dissemination plan based on the NHMRC standards. The dissemination process is based upon four lines of deliberate action:

- specified target groups
- the most appropriate media
- resources allocated for the design, production and distribution of materials, and
- the design, production and distribution process managed as a project, with appropriate evaluation and feedback.

APPENDIX B. RESOURCES

Resources

- Useful publications
- Useful electronic sources
- Related evidence published following the development of the Guideline
- Chronic disease management musculoskeletal flow chart
- Assessment and management of osteoarthritis flow chart
- GP management plan for osteoarthritis.

Useful publications

National Health and Medical Research Council. Making decisions about tests and treatments: Principles for better communication between healthcare consumers and healthcare professionals. Canberra: NHMRC, 2005.

National Prescribing Service Limited. Indicators of quality prescribing in Australian general practice. Sydney: National Prescribing Service Limited (NPS), 2006.

National Health and Medical Research Council. Dietary guidelines for Australian adults. Canberra: NHMRC, 2003.

The Working Group recommends consulting the Therapeutic Guidelines (www.tg.com.au) and the National Prescribing Service (www.nps.org.au) for detailed prescribing information, including adverse effects.

Useful electronic sources

URL addresses were accurate at the time of publication.

Arthritis Australia	www.arthritisaustralia.com.au
Australian Rheumatology Association	www.rheumatology.org.au
Carers Australia	www.carersaustralia.com.au
The Royal Australian College of General Practitioners (RACGP)	www.racgp.org.au
National Health and Medical Research Council (NHMRC)	www.nhmrc.gov.au
National Prescribing Service	www.nps.org.au
Therapeutic Guidelines	www.tg.com.au

Related evidence published following the development of the guideline

At the end of October 2008 a search was conducted in Cochrane Library and MEDLINE for additional Level 1 evidence that was published in 2007 and 2008 after the development of the guideline. Systematic reviews that may include new evidence on interventions for OA of the hip and/or knee were identified (see below), but not retrieved or appraised.

Intervention	Reference
Aquatic exercise	Bartels EM, Lund H, Hagen KB, Dagfinrud H, Christensen R, Danneskiold-Samsøe B. Aquatic exercise for the treatment of knee and hip osteoarthritis. Cochrane Database of Systematic Reviews, 2007; Issue 4.
Land based exercise	Pisters M, Veenhof C, van Meeteren N, Ostelo R, de Bakker D, Schellevis F, Dekker J. Long-term effectiveness of exercise therapy in patients with osteoarthritis of the hip or knee: a systematic review. Arthritis Rheumatism 2007;57(7)1245–53.
Land based exercise (tai chi)	Lee M, Pittler M, Ernst E. Tai chi for osteoarthritis: a systematic review. Clinical Rheumatology 2008;27(2)211–18.
Physical therapy including exercise, weight reduction, TENS, acupuncture, LLLT and SEMP	Jamtvedt G, Dahm K, Christie A, Rikke H, Haavardsholm E, Holm I, Hagen K. Physical therapy interventions for patients with osteoarthritis of the knee: an overview of systematic reviews. Physical Therapy 2008;88(1)123–36.
Physical therapies including acupuncture, TENS, LLLT, magnetic therapy and ultrasound	Bjordal J, Johnson M, Lopes-Martins R, Bogen B, Chow R, Ljunggren A. Short-term efficacy of physical interventions in osteoarthritic knee pain. A systematic review and meta-analysis of randomised placebo-controlled trials. BMC Musculoskeletal Disorders 2007;8:51.
Acupuncture	White A, Foster N, Cummings M, Barlas P. Acupuncture treatment for chronic knee pain: a systematic review. Rheumatology 2007;46(3):384–90.
Balneotherapy	Verhagen AP, Bierma-Zeinstra SM, Boers M, et al. Balneotherapy for osteoarthritis. Cochrane Database of Systematic Reviews 2007; Issue 4.
Pharmacological interventions	Bjordal J, Klovning A, Ljunggren A, Slordal L. Short-term efficacy of pharmacotherapeutic interventions in osteoarthritic knee pain: A meta-analysis of randomised placebo-controlled trials. European Journal of Pain 2007;11(2):125–38.
NSAIDs	Chen YF, Jobanputra P, Barton P, Bryan S, Fry-Smith A, Harris G, Taylor RS. Cyclooxygenase-2 selective non-steroidal anti-inflammatory drugs (etodolac, meloxicam, celecoxib, rofecoxib, etoricoxib, valdecoxib and lumiracoxib) for osteoarthritis and rheumatoid arthritis: a systematic review and economic evaluation. Health Technol Assess 2008;12(11):1–278.
Chondroitin sulphate	Monfort J, Martel-Pelletier J, Pelletier JP. Chondroitin sulphate for symptomatic osteoarthritis: critical appraisal of meta-analyses. Current Medical Research and Opinion 2008;24(5):1303–08.
Vitamin, herbal and other dietary therapies	Brien S, Prescott P, Coghlan B, Bashir N, Lewith G. Systematic review of the nutritional supplement Perna Canaliculus (green-lipped mussel) in the treatment of osteoarthritis. QJM 2008;101(3):167–79.
Hyaluronic acid and hylan	Campbell J, Bellamy N, Gee T. Differences between systematic reviews/meta-analyses of hyaluronic acid/hyaluronan/hylan in osteoarthritis of the knee. Osteoarthritis and Cartilage 2007;15(12):1424–36.
Hyaluronic acid and hylan	Reichenbach S, Blank S, Rutjes A, et al. Hylan versus hyaluronic acid for osteoarthritis of the knee: a systematic review and meta-analysis. Arthritis & Rheumatism 2007;57(8):1410–18.
Hyaluronic acid and hylan	Samson D, Grant M, Ratko T, Bonnell C, Ziegler K, Aronson N. Treatment of primary and secondary osteoarthritis of the knee. Evidence Report/Technology Assessment 2007;(157):1–157.
Hyaluronic acid and hylan	Divine J, Zazulak B, Hewett T. Viscosupplementation for knee osteoarthritis: a systematic review. Clinical Orthopaedics & Related Research 2007;455:113–22 (erratum appears in Clin Orthop Relat Res 2007;459:283).

Note:
Refer to the Medicare Benefits Schedule items/ notes for details of fees and requirements

Check that no EPC item numbers have been claimed in the past 12 months

Chronic disease management
Musculoskeletal flow chart

Preparation of patient goal setting

GP Management Plan (GPMP) MBS Item 721

Team Care Arrangements (TCA) MBS Item 723

Home Medication Review (HMR) MBS Item 900 and Residential Medication Management Review (RMMR)

Consider for HMR/RMMR if:

- currently taking five or more regular medications
- taking more than 12 doses of medication per day
- recently (past 4 weeks) admitted to medical facility/hospital
- significant changes to medication regimen in past 3 months
- on medication with narrow therapeutic index or requiring therapeutic monitoring
- have symptoms suggestive of an adverse drug reaction
- have a subtherapeutic response to medication treatment
- suspected noncompliance or not managing medication related therapeutic devices
- manage own medications and/or at risk due to language difficulties, dexterity problems, impaired sight, confusion dementia or other diagnosis
- resident in residential aged care facility (RACF)

Review of GPMP MBS Item 725

(within 3–6 months)

Review progress to date and agreed goals

Consider involvement of community health service providers

Review of TCA MBS Item 727

Ongoing reviews and reassessment of patient

Role of practice nurse and/or allied health professional

Assists with:

- assessment of patient and documentation
- identification of patient needs
- provision of self management information and other patient education or exercise (eg BHSM or 'Active Scripts')
- preparation of GPMP
- contacting services outlined in GPMP
- GP needs to confirm and assess with patient present
- review and reassessment of patient
- referral to community health or community rehabilitation programs
- inform patient of any expenses likely to be incurred as a result of involving other providers (note: patients eligible for Medicare rebates for up to five allied health consultations per year)
- facilitation of communication between GP and allied heath professional to discuss their contribution to the TCAs – the treatment and services they will provide
- provision of copy of TCA to allied health professional, with patient's agreement

Assessment and management of osteoarthritis

Has the diagnosis of osteoarthritis hip/knee been confirmed?

Document site – confirmation of hip OA with X-ray; use of weight bearing X-ray for OA knee assessment

Document X-ray date and severity (normal, mild OA, moderate OA, severe OA)

Does the patient have comorbidities or medication risks relevant to management of OA?

Document

Girth circumference and BMI

NSAID/analgesic risks available at www.nps.org.au/site.php?content=/html/ppr.php&ppr=/resources/Prescribing_Practice_Reviews/ppr35

Number of falls in previous year, cognitive impairment

Psychosexual issues (includes emotional and sexual dysfunction)

General education/medication management issues

Medication allergies

Consider

Annual Health Assessment MBS Item 700 (clinic); MBS Item 702 (home) if patient aged ≤ 75 years

45 year old Health Check MBS Item 717 if patient aged 45–49 years and at risk of developing chronic OA

Document the clinical status of the patient

Document

Pain, stiffness, function, disability

Consider

Formal measurement tool such as the 'hip and knee questionnaire' available at www.health.vic.gov.au/electivesurgery/pubs/owlsumrep.pdf

Has the patient previously used effective conservative therapies?

Document

Previous treatment (see treatment flow chart)

Effectiveness

Adverse effects and barriers

Refer to joint replacement surgery flow chart for patients with severe disease

Develop a patient centred goal setting care plan with the patient and prescribe medication

Refer

Treatment flow chart, General Practice Management Plan (GPMP) MBS Item 721

Consider

Medication Review for patients with polypharmacy and chronic comorbidities MBS Item 900 or 903

Comprehensive or Annual Health Check MBS Item 730

Provide patient education and information materials

Refer

Educational material available at www.racgp.org.au/guidelines/osteoarthritis

Consider

Team Care Arrangements (TCA) MBS Item 723

Coordinate community service plan

Consider

Team Care Arrangements (TCA) MBS Item 723

Establish processes for monitoring and for planned and urgent review

For severe OA, unresponsive to conservative therapy, consider referral for joint replacement surgery

(See JRS guide)

GP MANAGEMENT PLAN – MBS ITEM 721 (OSTEOARTHRITIS)

Patient's name:	Date of birth:

Contact details:	Medicare or private health insurance details:
[Full address]	[Medicare number] [Health insurance details]

Details of patient's usual GP:	Details of patient's carer (if applicable):
[Doctor name] [Doctor full address]	

Date of last Care Plan/GP Management Plan (if done):

Other notes or comments relevant to the patient's care planning:

Date of weight bearing X-ray: [date]
X-ray site: [site]
X-ray severity [no changes, mild, moderate, severe]
Body mass index (BMI): [ ]
Girth circumference: [cm]
Number of falls in last 12 months: [ ]

PAST MEDICAL HISTORY
[Clinical details: History list]

FAMILY HISTORY
[Clinical details: Family history]

MEDICATIONS
[Clinical details: Medication list]

Medication self management issues ☐ Yes ☐ No

ALLERGIES

Original template compiled by Monash Division of General Practice, March 2006

Patient's name:

What are the things that concern me?	What I need to do:	How important is this goal for me? *** Most important ** Important * Less important	How will I go about reaching this goal?	Who will support me to reach this goal?	How am I going? [review date]
1. Education/self management					
	I want to learn more about my OA.		I have been given information to help me locate an arthritis self management course in my local area.	My GP/practice nurse My partner/family Physio Arthritis Foundation	
	I want to know more about how to manage my OA.		I have been given information about OA. I have been given information about how to join an arthritis support group.	GP, library, physio	
2. Assessed problems					
Pain	I need to know more about what I can do to manage my pain.		With my GP, I have developed a plan to help me manage my pain better.	GP, practice nurse, pain management expert, psychologist, physio, OT, pharmacist, rheumatologist	
Joint stiffness	I want to know more about how to manage the stiffness in my joints.		I have been given information about how to become involved in local activity programs. I have been given information about how to join an arthritis support group.	GP Physio CHC	
Weight	I need to know more about healthy eating and exercise so that I can manage my weight better.		I have been referred to a dietician to help me work out a healthy eating plan that will suit me. I have been referred to a physiotherapist to help me work out a physical activity program that will suit me.	GP Dietician Physiotherapist Ex-physiologist	
Mood	I need to understand how my OA problem affects my mood and how to manage this.		I have been given information about how OA problems can affect my mood/ emotional state. With the support of my GP and other health care professionals, I have developed a plan to help me manage my pain better. I have been referred to a physiotherapist to help me work out a physical activity program that will suit me.	GP Practice nurse Psychologist	
Impact on daily activities	I need to learn ways of making every day activities easier for me to do.		I have been referred to an occupational therapist to help me work out ways of making everyday activities easier for me to do.	GP (referral) OT	

Original template compiled by Monash Division of General Practice, March 2006

Patient's name:

What are the things that concern me?	What I need to do:	How important is this goal for me? *** Most important ** Important * Less important	How will I go about reaching this goal?	Who will support me to reach this goal?	How am I going? [review date]
3. Medication management					
	I need to have a better understanding of my medications, why I am taking them and how to use them.		I have discussed the importance of taking medication and why with my GP. I have been given the address for the consumer section of the NPS website.	GP HMR Pharmacist	
	I need to understand the side effects my medications may cause. I need to understand what information I can provide that will help my GP and pharmacist choose the best medication for me.		I have discussed possible medication problems with my GP and been given written information on the medication I take. I have been given the address for the consumer section of the NPS website. My doctor has advised me on what tests and physical checks are needed to detect and prevent side effects.	GP Pharmacist HMR	
.	I need to have a better understanding of what my medicines are for (including any alternative medicines) and check that I am using them all correctly.		I have had all my medications checked by my doctor OR I have been referred to my pharmacist for a home medication review (HMR). My doctor has advised me on how to correctly use my medicines and what side effects I need to look out for.	GP Pharmacist (home medication review)	
4. What do I do if my OA flares up?					
	I need to learn what to do if my OA gets bad ('flares up').		I will Try rest, local ice packs, anti-inflammatory creams Increase my pain relief medicines Make sure I am taking my medication as recommended Arrange to see my GP	GP Practice nurse Physiotherapist Rheumatologist Orthopaedic surgeon	
Other					

Original template compiled by Monash Division of General Practice, March 2006

Copy of GP Management Plan offered to patient? ☐ Yes ☐ No

Copy/relevant parts of the GP Management Plan supplied to other providers? ☐ Yes ☐ No

Date service was completed: _____ [date]	Proposed review date: _____ [recommended >3–6 months]
My GP has explained the steps and any costs involved, and I agree to proceed with the plan. Yes No Patient's signature: _____ Date: _____ GP's signature: _____ Date: _____	

When will I need to see my GP again?

As required, for ongoing management of my OA and other conditions, AND on _____

[Proposed review date] to review this plan.

Original template compiled by Monash Division of General Practice, March 2006

APPENDIX C. MEMBERSHIP OF THE RACGP OSTEOARTHRITIS WORKING GROUP

Aim of the RACGP Osteoarthritis Working Group

The aim of the Working Group was to undertake activities required to fulfill the aims of the project as outlined in the funding agreement, including:

- to carry out a review of literature as per the NHMRC requirements, and
- to develop clinical practice guidelines based on the evidence obtained within the literature review.

Establishment of the Working Group

In accordance with the project contract, membership of the Working Group endeavoured to include:

- three or more experts in each field – medical (including one general practitioner) and allied health
- one expert NAMSCAG member
- one consumer representative
- one departmental representative, and
- a consultant appointed by the NHMRC.

In addition, the following groups were represented in accordance with the project contract:

- a nominee of the Australian Rheumatology Association or the Australian and New Zealand Bone and Mineral Society, and
- a nominee of the Endocrine Society of Australia and of the Faculty of Rehabilitation Medicine.

Membership of The RACGP Osteoarthritis Working Group

Member	Representation	Qualifications
Assoc Prof Caroline Brand (Chair)	Rheumatologist	MBBS, BA, MPH, FRACP
Prof Rachelle Buchbinder	Rheumatologist/clinical epidemiologist	MBBS(Hons), MSc, PhD, FRACP
Dr Anita Wluka	Rheumatologist/epidemiologist	MBBS, PhD, GradCertHealthEc, FRACP
Dr Kay Jones	Department of General Practice, Monash University, Victoria	BSW, MT&D, PhD
Dr Denise Ruth	GP	MBBS, MPH, FAFPHM, FRACGP
Dr Suzanne McKenzie	GP	MBBS, MMedSci (ClinEpid), GCertULT, FRACGP
Prof Tracey Bucknall	Academic nurse	RN, BN, ICUCert, PGradDipAdvNsg, PhD, MRCNA
Dr Lerma Ung	Arthritis Victoria	PhD, BS, DipAppSc(Educ), MHlthSc, RN
Assoc Prof Geoff McColl	Rheumatologist	MBBS, BMedSc, PhD, FRACP
Dr Rana Hinman	Physiotherapist	BPhysio(Hons), PhD
Prof Karen Grimmer-Somers	NHMRC advisor	PhD, MMedSc, BPhty, LMusA, CertHlthE
Amy Jasper	RACGP Education Evaluation Manager	MBA, GDipHumServRes, BAppSci(AdvNsg)
Emily Haesler	RACGP project officer	BN, PGradDipAdvNsg
Dr Jiri Rada	RACGP project officer	PhD, FRSH, MSc, BPHE, BA

NHMRC Evidence Translation Section project management staff

Vesna Cvjeticanin, Director

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