Introduction

This is the third Annual Evidence Update on osteoarthritis produced by NHS Evidence - musculoskeletal in conjunction with NHS Evidence - trauma and orthopaedics and includes the results of a search for new national guidance and systematic reviews published since August 2008. To accompany this update there are also commentaries discussing the new evidence. For the first time this year we have also highlighted the known treatment uncertainties.

Acknowledgements

The NHS Evidence - musculoskeletal and NHS Evidence - trauma and orthopaedics project team would like to thank all those involved with this Annual Evidence Update (AEU), in particular Professor Philip Conaghan, Dr Fraser Birrell, Dr Lisa Roberts, Mr Andrew Roberts and Dr Ray Armstrong, the Clinical Lead. Without their contribution this AEU would not have been so informative and comprehensive.

2009 Annual Evidence Update on osteoarthritis - Methodology

The Annual Evidence Update (AEU) on osteoarthritis for 2009 was produced by NHS Evidence - musculoskeletal and NHS Evidence - trauma and orthopaedics. The aim was to identify all systematic reviews published in the past year.

- Total publications: 2798
- RCTs: 146
- Systematic Reviews after appraisal: 50
- Guidance: 6

Search period

The final search was conducted on the 2 September 2009.

NHS Databases

(AMED, BNI, CINAHL, EMBASE, MEDLINE, PsychINFO)

- #1 osteoarth* OR OA (ti/ab)
- #2 systematic review* (ti/ab)
- #3 "meta-analysis" (pt)
- #4 #2 OR #3
- #5 #1 AND #4

Limited to records published from 2008 - present.
76 records retrieved.

PubMed clinical queries systematic review filter. The library searched "osteoarth* OR OA" as a free text search term, limiting the search to records published in the last year, human and English language.
62 records retrieved.

PubMed using the SIGN systematic review filter. The SIGN systematic review filter was selected because it emphasises specificity rather than sensitivity. The filter was combined with a search for "osteoarth* OR OA" (Title / Abstract). The search was limited to records published in the last year, human and English language.
92 records retrieved.
The library searched "osteoarth*" as a free text search term.

The library searched "osteoarth*" as a free text search term

**Systematic review identification criteria**

Our aim was to identify all systematic reviews published on osteoarthritis for the last year. To achieve this we searched 7 databases and 2 libraries listed above. All citations from database searches were imported into Reference Manager and duplicates removed. The search results were then scanned by the information specialist. This involved scanning the titles, abstracts and full texts where available to identify potential systematic reviews.

To identify systematic reviews the definition used by [Glossary of Cochrane Collaboration Terms](#) was used:

“A review of a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review. Statistical methods (meta-analysis) may or may not be used to analyse and summarise the results of the included studies.”

The final decision on whether to include a citation as being a valid systematic review was made by Dr Ray Armstrong FRCP, Clinical Lead for NHS Evidence - musculoskeletal and Lead Consultant Rheumatologist, Southampton General Hospital.

### 2009 Annual Evidence Update on osteoarthritis - Results

The results of the osteoarthritis search have been reviewed and grouped into the following topics:

- Guidelines (6)
- Osteoarthritis risk (9)
- Imaging (4)
- Classification (1)
- Treatment
  - Drugs - NSAID (2)
  - Drugs - Hyaluronic acid (3)
  - Drugs -other (1)
  - Placebo (1)
  - Complementary & Alternative Medicine (10)
  - Physical Interventions (7)
  - Exercise (7)
  - Psychological (1)
  - Surgery (3)

**Please note** that the inclusion of citations in this list does not imply endorsements. NHS Evidence - musculoskeletal and NHS Evidence - trauma and orthopaedics do not accept responsibility for the content or quality of the included or excluded studies.

- Guidelines
  
  
  Shoulder pain. Clinical Knowledge Summaries, 03 Nov 2008. [Link to specialist collection]
  
  
  Total wrist replacement. NICE, 27 Aug 2008. [Link to specialist collection]
  
  
  Misso, M. L., Pitt, V. J., Jones, K. M., Barnes, H. N., Piterman, L., and Green, S. E. Quality and consistency of clinical practice guidelines for diagnosis and management of osteoarthritis of the hip

- **Osteoarthritis risk**
  
  
  
  
  
  
  
  
  

- **Imaging**
  
  
  
  

- **Classification**
  

- **Treatment**
  - **Drugs – NSAID**
  
  Biswal S, Medhi B Pandhi P. Longterm efficacy of topical nonsteroidal antiinflammatory drugs in knee osteoarthritis: metaanalysis of randomized placebo controlled clinical trials. 1-12-2008 [Link to specialist collection]
  
  Chen Y F, Jobanputra P Barton P Bryan S Fry-Smith A Harris G Taylor R S. 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

- **Drugs – Hyaluronic acid**

  Reichenbach S, Blank S Rutjes A W Shang A King E A Dieppe P A Juni P Trelle S. Hylan versus hyaluronic acid for osteoarthritis of the knee: a systematic review and meta-analysis. 23-12-2008;  

- **Drugs – other**


- **Placebo**


- **Complementary & Alternative Medicine**


- **Physical Interventions**


- **Exercise**

Fransen, M. and McConnell, S. Exercise for osteoarthritis of the knee. Cochrane Database Syst.Rev. 8-10-2008;CD004376  


- **Psychological**

**Surgery**


2009 Annual Evidence Update on osteoarthritis - Commentary on the role of exercise and physical therapies in osteoarthritis

This Annual Evidence Update is prepared by Dr Lisa Roberts, Arthritis Research Campaign Senior Lecturer in Physiotherapy. The bibliography below1-14 presents the results of searching systematic reviews relating to exercise and physical therapies in osteoarthritis during the last year, however it is recognised that 4 reviews from the Centre for Reviews and Dissemination1-4 summarise papers published in 200715-17 and January 200818

It has previously been suggested that the most important concept emerging from current research is that joint failure is the problem in osteoarthritis19. In assisting patients to manage the resultant symptoms, a range of non-pharmacological therapies is recommended in clinical guidelines20-22

1. Exercise

Considerable variation exists in the types of exercise interventions and reported outcomes. Furthermore, whilst the magnitude of treatment effects may be small, these are comparable to estimates for non-steroidal anti-inflammatory drugs (NSAIDs)9. From the 7 reviews of exercise interventions identified in this Evidence Update3,5-9,14, the following benefits can be summarised:

**Pain reduction:**
Two reviews of knee OA showed strong evidence of pain reduction5,6. There was small to moderate, short-term benefit reported in knee and/or hip OA17, and a small treatment effect with hip OA14 in populations with a mean age >55 years8. By contrast, McNair PJ et al. reported insufficient evidence of pain reduction from 6 studies for people with hip OA, acknowledging that none of the exercise interventions reached the level of exercise recommended for people with OA by the Physical Activity Guidelines Advisory Committee, of 150 minutes of moderate-intensity or 75 minutes of vigorous-intensity aerobic activity per week plus muscle strengthening of moderate or high intensity on 2 or more days per week9.

**Physical function:**
As before, the evidence for knee OA is more positive than for the hip, and has even been termed ‘platinum level evidence’5. Statistically significant improvements were reported in: physical disability (11/14 studies); sit-to-stand (2/2 studies); stair climb (3/5 studies); maximum gait speed (4/4 studies); habitual gait speed (1/2 studies); walking endurance (1/2 studies); and walk time (1/4 studies)5. In a population with knee and/or hip OA, Pisters MF et al. reported no significant effects in self-report physical function (5/8 studies), but short-term improvements in observed physical treatment (3/4
studies). Specific to hip OA, 3 reviews reported insufficient evidence of improved physical function.

Other measures:
Again, the evidence for knee OA is stronger than for the hip, with statistically significant improvements reported for muscle strength (9/14 studies); stiffness (2/5 studies); range of motion (1/6 studies); self-efficacy (2/2 studies); and quality of life (2/6 studies), although no improvement in depression was noted. There was moderate improvement in a global assessment of effectiveness in knee and/or hip OA, and insufficient evidence of improving quality of life in people with hip OA.

One key finding from this Annual Evidence Update is the importance of booster sessions. In their review of 11 studies in people with OA hip and/or knee, Pisters MF et al. concluded that positive post-treatment effects of exercise therapy were not sustained long term. However, additional booster sessions had a positive effect on maintaining the beneficial effects of treatment (pain reduction, self-reported and observed physical function) reported in 3 studies in the long term. This is important for future trial designs and for clinical practice.

Due to the heterogeneity of exercise type, the optimal exercise regimen has not yet been determined. In this Update, exercise programmes comprised strengthening (isometric and/or isotonic), aerobic activity, machines, free weights, other devices eg. elastic bands, hydrotherapy, mobility and stretching exercises, gait and balance exercises, in isolation, in combination or adjunctive to an alternative treatment, in water or on land, at home, at a gym or pool, under supervision, individually or in a group.

2. Acupuncture / Electroacupuncture

Bjordal JM et al. in a systematic review and meta-analysis concluded from 3 studies of electroacupuncture that clinically-relevant, short-term pain relief could be induced in patients with grade 2-4 OA of the knee, although it is reported that data extraction choosing the largest reported treatment effect may have biased results towards a favourable outcome. There was insufficient evidence in 4 studies of manual acupuncture to support its use in providing rapid pain relief in knee OA.

3. Transcutaneous Electrical Nerve Stimulation (TENS)

From 11 studies of TENS for knee OA, Bjordal JM et al. concluded there was a clinically-relevant, short-term benefit (pain relief) during the first 4 weeks, which was not maintained at 8 weeks. This finding was reported to be undermined by statistical heterogeneity.

4. Low level laser

When reviewing 8 studies of low level laser treatment, Bjordal JM et al. reported clinically relevant, short-term pain relief could be induced in patients with knee OA. This finding was also reported to be undermined by statistical heterogeneity.

5. Pulsed electromagnetic field therapy (pEMF)

In a meta-analysis of 9 studies of pEMF for knee OA, Vavken P et al. reported a significant effect (medium effect size) on activities of daily living, 6 weeks after treatment, however there was equipoise of evidence for an effect on pain at 6-12 weeks. Bjordal JM et al. concluded from 7 studies a small beneficial effect at 4 weeks for knee OA, with inconsistent effects at 6, 8 and 12 weeks. Interestingly, Vavken P et al. question whether pEMF is a discrete therapy or rather an umbrella term, which may account for the wide variation in the interventions described.

6. Ultrasound

Bjordal JM et al. reported no benefit from using ultrasound with knee OA from 1 study.

7. Splinting

In a review of 7 studies of varying design, Egan MY and Broussseau L concluded that splinting may
help relieve pain in carpometacarpal OA. The key findings were reduction in reported pain (5 studies) and reported decreased subluxation on pinch (1 study) in stage 1 and 2 OA. Three studies however, did not reduce the requirement for surgery. From this review, there was no clear evidence on the superiority of one type of splint over another.

8. Foot orthotics

A review of 12 studies on the use of foot pronation orthotics (rearfoot wedges or lateral wedge insoles) in medial knee OA and 1 study on hip OA, concluded that these orthotics have an impact in decreasing the intake of NSAIDs, but found no structural or functional impact on the OA.

9. Patellar taping and bracing

There was one systematic review and meta-analysis of patellar taping and bracing, comprising 13 studies, for the treatment of chronic knee pain. In a subgroup of knee OA, Warden SJ et al. concluded from that patients with medially directed tape showed significantly less pain compared to patients with no tape (2 studies) and sham tape (3 studies). There was no reported difference arising from whether the tape was medially or laterally directed. Furthermore, there was little evidence for the efficacy of patellar bracing and heterogeneity between studies and significant publication bias were identified.

10. Thermal mineral waters

In a systematic review of 9 studies of knee OA (n=8) and lumbar spine, hip or knee OA (n=1), Harzy T et al. reported significant improvement in pain at 8-12 weeks (6 studies) and at 20-24 weeks (2 studies). There were significant improvements in function at 8-12 weeks (7 studies) and 20-24 weeks (2 studies) and reductions in NSAID and/or analgesia intake at 8-12 weeks (3 studies) and 20-24 weeks (1 study). The authors concluded this treatment to be safe and effective for knee OA.

11. Static magnets

Bjordal JM et al. reported a small benefit from using static magnets with knee OA from 2 studies, which was not maintained at 12 weeks.

In any review, the findings are only as good as the constituent studies. Nuances of study design and heterogeneity in the population (age, index joint etc.) and physical intervention (frequency, intensity, duration and content) prevent robust consensus on the effect of non-pharmacological therapies in OA.

There is a need for larger scale clinical trials, with cost-effectiveness analyses, internationally-accepted outcome measures and long-term follow-up, to establish efficacy, mechanisms, optimal treatments and exposure levels in determining the effects of progressive exercise interventions and physical therapies in the management of OA. Furthermore, it should be remembered that attempting to address pain, range of motion, strength, mobility, flexibility and psychosocial factors as well as incorporating advice and educational training is likely to limit improvements in any one area.

Future systematic reviews should use comprehensive search strategies (including unpublished material), include non-English papers to minimise the possibility of language or publication bias, and consistent case definitions. Finally, care needs to be taken in interpreting these reviews that absence of evidence for an effect in a population, is not construed as evidence for the absence of any effect.

Key questions to address

- Which exercise therapy is most effective for people with: i) OA of the knee; ii) OA of the hip? What is the optimal exercise regimen (frequency, intensity, duration and content)?
- Which physical therapy modality is most effective for people with: i) OA of the knee; ii) OA of the hip? What is the optimal treatment regimen (frequency, intensity, duration and content)?
- When is the optimal time to intervene with exercise / physical therapy interventions?
What are the additive effects of exercise and physical therapy interventions?

Do booster session(s) enhance post-treatment effects? What is the optimal timing, frequency, intensity, duration and content of the booster session(s)?

What are the physical and psychosocial mechanisms by which exercise and physical therapies influence the symptoms and progression of OA?

How cost-effective are these exercise and physical therapy interventions?

What are the perceived and actual barriers to people exercising at the level recommended by the Physical Activity Guidelines Advisory Committee?

References


2. **2009 Annual Evidence Update on osteoarthritis - Commentary on complementary & alternative interventions**

3. This commentary for the 2009 Annual Evidence Update on Osteoarthritis (OA) is prepared by Dr Fraser Birrell and the Information Specialists of NHS Evidence - musculoskeletal & trauma and orthopaedics specialist collections. The bibliography below presents the results of a search of the literature relating to complementary and alternative interventions for osteoarthritis published during the last year. In this introductory commentary, we particularly remark upon those publications within the last year which have added to the body of evidence relating to the more common questions facing practitioners in the field. As will be noted many of these questions remain unanswered and this is a particular area of controversy, so further systematic reviews and meta-analyses are very welcome.

6. The commentary is founded on the publication's abstract or other summary.

7. The inclusion of a study in this update does not imply endorsement and the specialist collection does not accept responsibility for the content or quality of included studies.

8. **Plant & Herbal Extracts**

   Two meta-analyses of interest have been undertaken by a Danish group: on avocado-soybean unsaponifiables (ASU) and rosehip (powder of Rosa canina):

9. **Avocado-Soybean Unsaponifiables**
   
   Christensen et al included 4 RCTs (n=664) of 3-12 months duration, showing an overall effect on pain (ES 0.39, 95%CI 0.01-0.76) and function (0.45, 95%CI 0.21-0.70). While there was a significant treatment effect, with NNT of 6 for response, sub-group analyses showed a larger effect for knee osteoarthritis (ES 0.99, 95% CI: 0.54, 1.44) and no significant effect for hip osteoarthritis (ES -0.44, 95% CI: -1.05, 0.17). Although the authors suggest this warrants a 3 months trial of this extract in osteoarthritis patients, a more appropriate conclusion would be that this is justified in knee osteoarthritis.

10. **Rosehip**
    
    In contrast, only three RCTs (n=306) were included in the review of trial of Rosa Canina for a mean duration of only 3.3 months (Christensen et al). A small to moderate effect on pain in favour of rose-hip was found (ES 0.37, 95% CI: 0.13, 0.60), but, as the authors state, both efficacy and safety need further evaluation in a large, long-term trial.

11. **Nutriceuticals**

   Brien et al have produced a meta-analysis and a systematic review on dimethyl sulfoxide and methylsulfonylmethane:

12. The **meta-analysis** included three RCTs: two with dimethyl sulfoxide and one with Methylsulfonylmethane (total n=326 patients) were eligible for inclusion. The overall effect size of 1.82 was neither statistically nor clinically significant.

13. The **systematic review** included 6 RCTs: four dimethyl sulfoxide and two methylsulfonylmethane (total n=681, but only 52 on active MSM treatment) The findings from all the dimethyl sulfoxide studies need to be viewed with caution because of poor methodology including; possible unblinding, and questionable treatment duration and dose. The authors concluded that the two methylsulfonylmethane studies provide ‘positive but not definitive evidence that methylsulfonylmethane is superior to placebo in the treatment of mild to moderate OA of the knee’. However, further efficacy and safety studies are needed before this could be recommended in clinical practice.

14. Hochberg, Zhan & Langenberg have added to the debate about whether oral precursors of the glycosaminoglycan component of cartilage, such as glucosamine sulphate (an amino sugar) or chondroitin sulphate (a sulfated glycosaminoglycan dimer) have a clinically relevant effect on osteoarthritis progression. They included 4 RCTs and concluded that chondroitin sulphate reduced the decline in minimum joint space width by 0.07 mm/year (95% CI 0.03, 0.10): an effect size of 0.26 (95% CI 0.14, 0.38). However, it is not known how clinically relevant this reduction is: studies used different acquisition and scoring methodologies for knee radiographs and these studies were funded by manufacturers (in common with most RCTs of therapeutic agents). As such, this meta-analysis is unlikely to change the opinion of those who already hold strong opinions regarding glucosamine and chondroitin sulphate, although
patients are increasingly likely to request treatment for which there is published evidence of efficacy and no particular toxicity issues yet identified.

16. **Acupuncture**

Another contentious area where there have been a number of partially conflicting meta-analyses and systematic reviews.

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Another contentious area where there have been a number of partially conflicting meta-analyses and systematic reviews.

18. **Madsen, Gotzsche & Hrobjartsson** identified thirteen three-armed RCTs (n = 3,025) with acupuncture, placebo acupuncture and no acupuncture, although only 10 reported attempting to blind subjects and none reported blinding clinicians. There was a small difference between acupuncture and placebo acupuncture, corresponding to 4 mm (95% CI: 2 mm, 6 mm) on a 100 mm visual analogue scale, with a slightly larger benefit for placebo acupuncture over no acupuncture. The authors concluded that the acupuncture effect lacked clinical relevance.

19. Another meta-analysis included studies comparing waiting list or usual care to active treatment (**Manheimer et al**). This included eleven RCTs (n=2,821, with 1,155 receiving acupuncture and 1,660 controls). However, these were unblinded comparators and any clinical relevant effects of acupuncture were lost when adjusting for subject blinding and funding source.

20. **White et al** focused on knee osteoarthritis and included thirteen RCTs (n=2,596) in the review, and eight of these (n=2,340) in their meta-analysis. This review did not include the comparison between sham acupuncture and no acupuncture and did not convince that the statistical improvements with true acupuncture were clinically significant or sustained. In concluding that acupuncture should be considered an alternative to non-steroidals, the authors went beyond the evidence base reviewed and supported by their review.

21. Only one study examined safety, rather than the efficacy of acupuncture. This is important because the safety of complementary therapies is often assumed rather than measured. **Yamashita et al** included seven RCTs (n=1,533), with contusion affecting as many as 21 acupuncture treated subjects in a trial of 91 subjects, but in other outcomes for this trial, and in other trials, adverse events were not different between the interventions studied. The authors recommend using multiple methodologies to further assess the safety of acupuncture.

2009 Annual Evidence Update on osteoarthritis - Commentary on risk factors for osteoarthritis

This editorial was written for the 2009 Annual Evidence Update on osteoarthritis by Mr Andrew Roberts, Consultant Orthopaedic Surgeon at the Robert Jones and Agnes Hunt Orthopaedic and District Hospital NHS Trust in Oswestry.

As prevention is better than cure, an understanding of the causes of osteoarthritis is worthwhile but a complex picture emerges. From the scale of the genome to the environment many factors interact to damage articular cartilage often with a different emphasis in different joints.

Whether as a result of age or injury during sport, the knee is the most commonly affected joint leading to disability. Sports injuries often involve the knee joint with damage to the menisci or anterior cruciate ligament (ACL) predisposing to subsequent osteoarthritis (OA). Andersson et al report no evidence of a reduction in OA after ACL reconstruction however the presence of a meniscal injury greatly increases the rate of OA (from 0-13% to 21-48%) and an early reconstruction reduces the rate of subsequent meniscal tears so a benefit would seem probable although not yet proven. Meanwhile, if you are thinking of saving your knees by buying some expensive running shoes,**Richards et al** concluded that “the prescription of this shoe type to distance runners is not evidence-based”.

The mechanical environment at the knee is examined in a review by Foroughi et al with a meta-analysis of studies into knee adductor moment concluding that a high moment was a result of varus malalignment rather than a predisposing factor. A meta-analysis by Tanamas et al also supported the role of varus and valgus malalignment in the progression of osteoarthritis.

With the advent of arthroscopic assessment and management of hip pathology, an increasing awareness exists of femoro-acetabular impingement as a cause of labral and eventual osteoarthritic problems. **Bedi et al** undertook a review of the literature on the benefits of open or arthroscopic treatment for anterior acetabular pathology and were unable to reach any firm conclusion as to the long term effect of each approach on the incidence of osteoarthritis.
At the level of the genome, Lee at al examined the literature concerning polymorphism of vitamin D receptor in three Asian and seven European studies. No relationship was found even when ethnicity was taken into account. The advent of oligonucleotide 'gene chips' with markers for relevant bone related proteins will enable a thorough investigation of the possible genetic predisposing factors in OA but the search is likely to be complicated by heterogeneity resulting from population differences. Complex inter-linkages with other predisposing factors such as obesity make the picture even more complex. Obesity appears to be a particular risk factor for knee OA whereas heavy physical work is a risk factor for the hip.

References

The following treatment uncertainties were identified:

**Drugs – NSAID**
- How do COX-2 selective NSAIDs compare to non-selective NSAIDs for arthritis?
- How does topical diclofenac compare with eltenac in osteoarthritis?

**Drugs – other**
- Does unopposed oestrogen therapy have a protective effect against osteoarthritis?

**Complementary & Alternative Medicine**
- How safe is acupuncture for knee osteoarthritis?
- Does acupuncture produce analgesia and is any or all of this a placebo effect?
- Is acupuncture effective for peripheral joint osteoarthritis?
- How effective and safe are dimethyl sulfoxide (DMSO) and methylsulfonylmethane (MSM) for osteoarthritis?

**Physical Interventions**
- How effective are patellar taping and bracing for knee osteoarthritis?
- Are natural thermal mineral waters effective in knee osteoarthritis?
- Do foot orthotics have any structural or functional effect on hip and knee osteoarthritis?
- Is one type of splint superior to another for osteoarthritis of the carpometacarpal joint?
- Is physical therapy (electro-acupuncture, TENS and low level laser therapy) effective for osteoarthritic knee pain?

**Exercise**
- Do combined exercise and self-management programmes reduce pain and increase function in community-based patients with knee and hip osteoarthritis?
- What is the effect of resistance training for knee osteoarthritis on arthritis symptoms, physical performance, and psychological function?
- What is the effect of land-based physical exercise on pain and physical function in OA of the hip?

**Psychological**
- Do psychological interventions improve arthritis pain management?

**Surgery**
- How does type of surgery and rehabilitation affect the outcome of anterior cruciate ligament injuries?

**2009 Annual Evidence Update on osteoarthritis - Horizon scanning**
The NHS Evidence - musculoskeletal project team in conjunction with NHS Evidence - trauma and orthopaedics have identified forthcoming guidelines, projects and reviews concerning osteoarthritis. These establish evidence on osteoarthritis which will be published in the future.

**National Institute for Health and Clinical excellence (NICE)**

- **Insertion of individually MRI-designed unicompartmental interpositional implanting of osteoarthritis of the knee** (Summer 2009)

**HTA Projects (recent)**

- Glucosamine and chondroitin for osteoarthritis of the knee
- Effectiveness and cost-effectiveness of arthroscopic lavage in the treatment of osteoarthritis of the knee (the KORAL study)
- The clinical effectiveness of glucosamine and chondroitin supplements in slowing or arresting progression of osteoarthritis of the knee

**Cochrane Library - protocols**

- Chloroquines for the treatment of osteoarthritis
- Oral or transdermal opioids for osteoarthritis of the knee or hip
- Doxycycline for osteoarthritis of the knee or hip
- Chondroitin for osteoarthritis
- S-Adenosylmethionine for osteoarthritis of the knee or hip
- Interventions for treating osteoarthritis of the big toe joint
- Hormone replacement therapy for osteoarthritis in peri-menopausal and post-menopausal women
- Acupuncture for osteoarthritis
- Homeopathy for osteoarthritis
- Arthroscopic lavage for osteoarthritis of the knee
- Cemented versus cementless total hip arthroplasty for osteoarthritis and other non-traumatic diseases
- Computer assisted knee arthroplasty for osteoarthritis and other non-traumatic diseases
- Cryotherapy following total knee replacement
- Effects of different bearing surface materials on aseptic loosening of total hip arthroplasty in patients with osteoarthritis and other non-traumatic diseases of the hip
- Metal versus non-metal backing of the tibial component for total knee replacement for osteoarthritis and/or rheumatoid arthritis
- Minimally invasive surgical approaches for total hip arthroplasty in adults with osteoarthritis
- Patella resurfacing in total knee arthroplasty
- Processed versus fresh frozen bone for impaction bone grafting in revision hip arthroplasty
- Surgical approaches in total knee arthroplasty
- Isokinetic exercise for improving knee flexor and extensor muscles
- Surface neuromuscular electrical stimulation for quadriceps strengthening pre and post total knee replacement
- Traction for hip osteoarthritis
- Post-acute physiotherapy for primary total knee arthroplasty