Effectiveness of Nonpharmacological and Nonsurgical Interventions for Hip Osteoarthritis: An Umbrella Review of High-Quality Systematic Reviews

Rikke H Moe, Espen A Haavardsholm, Anne Christie, Gro Jamtvedt, Kristin Thuve Dahm, Kåre Birger Hagen

An increasing number of systematic reviews are available regarding nonpharmacological and nonsurgical interventions for hip osteoarthritis (OA). The objectives of this article are to identify high-quality systematic reviews on the effect of nonpharmacological and nonsurgical interventions for hip OA and to summarize available high-quality evidence for these treatment approaches. The authors identified and screened 204 reviews. Two independent reviewers using a previously pilot-tested quality assessment form assessed the full text of 58 reviews. Six reviews were of sufficient high quality and could be included for further analyses. There was moderate-quality evidence that acupuncture and diacerein have no effect on pain and function. There was low-quality evidence that strengthening exercises and avocado/soybean unsaponifiables reduce pain and that diacerein decreases radiographic OA progression. There was insufficient high-quality evidence regarding nonpharmacological and nonsurgical interventions for hip OA, and further primary studies and reviews are needed.

RH Moe, PT, is Research Fellow, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital, PO Box 23 Vindern, 0319 Oslo, Norway. Address all correspondence to Dr Moe at: rikke.moe@nrk.no.

EA Haavardsholm, MD, is Research Fellow, Department of Rheumatology, Diakonhjemmet Hospital.

A Christie, PT, MSc, is Research Fellow, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital.

G Jamtvedt, PT, MPH, is Researcher, Norwegian Knowledge Centre for the Health Services, St Olavs Plass, 0103 Oslo, Norway.

KT Dahm, PT, MSc, is Research Assistant, Norwegian Knowledge Centre for the Health Services.

KB Hagen, PT, PhD, is Researcher, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital.

[Moe RH, Haavardsholm EA, Christie A, et al. Effectiveness of nonpharmacological and nonsurgical interventions for hip osteoarthritis: an umbrella review of high-quality systematic reviews. Phys Ther. 2007;87:1716–1727.]
Osteoarthritis (OA) is a chronic joint condition, characterized by pain, disability, and impairment. The prevalence of hip OA in Western populations over 35 years of age ranges from 3% to 11%.\(^1\) The hip is considered one of the most common weight-bearing joints affected by OA.\(^2\)\(^{-}\)\(^4\) Main treatment goals are improved function, symptomatic relief, slowing disease progression, and improving quality of life.\(^5\) Treatment for OA may vary depending on various factors,\(^1\) and guidelines on the management of OA recommend both pharmacological and nonpharmacological approaches.\(^1\) There is limited availability of disease-modifying drugs, and many patients use complementary and alternative medicines and therapies. An increasing number of systematic reviews are available regarding nonpharmacological and nonsurgical interventions, and in this umbrella review we summarize and grade the quality of the available evidence for these treatment approaches.

Decisions on the provision of health care are increasingly based on the available evidence. Patients, health care professionals, and researchers need information about the effectiveness of interventions in order to improve self-management strategies, to improve clinical practice, and to set priorities for research, respectively. Decisions on the reimbursement of health care are increasingly evidence-based. Thus, purchasing organizations and policymakers in health care are in need of reliable information on the effectiveness of interventions.

Summarizing systematic reviews can facilitate decision making about appropriate health care, promote evidence-based treatment, and identify areas for future research in health care. Conclusions based on a systematic review of randomized controlled trials are considered to provide the highest level of evidence about the effectiveness of an intervention.

Based on a review of literature before 2001, Chard and Dieppe concluded, “Nonpharmaceutical therapies for OA have not been researched enough for us to understand their potential benefit.”\(^6\)\(^{[250]}\) There is, to our knowledge, no updated overview available on the effectiveness of nonpharmacological and nonsurgical interventions for hip OA. The aim of this overview is to summarize the available evidence from systematic reviews on the effectiveness of nonpharmacological and nonsurgical interventions for patients with hip OA.

**Method**

**Criteria for Including Reviews**

We included systematic reviews with the primary aim of investigating the effects of nonpharmacological and nonsurgical interventions for hip OA published in the English, Dutch, or Scandinavian language. More specifically, the following inclusion criteria were used:

- **People with OA**: Diagnosis according to the American College of Rheumatology criteria\(^7\) or other acceptable criteria.\(^8\) Reviews including people with various rheumatic diagnoses were accepted only if results for OA could be extracted separately.
- **Interventions**: All types of nonpharmacological and nonsurgical interventions. Excluded were interventions such as gene therapy, all types of invasive interventions (ie, injections or arthroscopy), therapeutic apheresis or interventions related to pharmacological or surgical interventions (eg, therapeutic exercises after total joint replacement).
- **Outcomes**: For the purposes of this overview, the primary outcome measures were function, pain, and stiffness. The concept of “function” is based on the *International Classification of Functioning, Disability and Health*\(^9\) (ICF) definition, where “function” is an umbrella term for body function, body structure, activities, and participation.

**Search Strategy**

We searched the Cochrane Library (Cochrane Database of Systematic Reviews and DARE), MEDLINE, EMBASE, PEDro, PsychINFO, and CINAHL from 2000 to January 2007 for “hip osteoarthritis/arthrosis or OA.” A broad computerized search strategy was developed (Appendix 1). Reference lists from retrieved reviews were examined.

Retrieved hits were assessed by 2 of the authors (EAH, RHM), who screened the titles and abstracts to identify relevant studies. If doubt occurred, one of the other authors (KBH) was consulted. Potential relevant full-text articles were read by 2 authors (EAH, RHM).

**Assessment of Methodological Quality**

Two authors (EAH, RHM) independently assessed the methodological quality of the reviews. Disagreement was resolved by discussion. Nine criteria were rated as “met,” “unclear/partly met,” or “not met” according to a criteria list modified from the Effective Practice and Organisation of Care (EPOC) group within the Cochrane Collaboration (Appendix 2).\(^10\) Based on a summary of these 9 criteria, an overall scientific quality was applied to each review, as follows: “minor limitations” (at least 7 of the criteria were met), “moderate limitations” (4 - 6 of the criteria were met), and “major limitations” (fewer than 4 of the criteria were met). Reviews with major limitations were excluded. The quality assessments of primary studies included in the original reviews are reported in Table 1.

Principles from Grading of Recommendations Assessment, Develop-
## Table 1.
Findings From Included Reviews

| Reference | QR/QPS | Included Primary Studies | Intervention/Control | Outcome | Data Analyses/Pooling | Findings |
|-----------|--------|--------------------------|----------------------|---------|-----------------------|----------|
| Acupuncture for peripheral joint osteoarthritic (Kwon et al) | QR: minor limitations (7/9) | 1 study (N=67) | Acupuncture/sham treatment | VAS pain score (WOMAC) | Meta-analysis, 1 study | Mean pain reduction: intervention group, 14.43 (SD=25.07); sham treatment group, 15.31 (SD=25.03); CI = -0.52-0.45. Point estimate of effect size: SMD=0.03. No intergroup difference; there is no evidence that acupuncture is beneficial for hip OA. Authors' conclusion: “Further studies are required.” |
| 1 study (N=67) | Acupuncture/sham treatment | Functional impairment | Based on 1 study | No intergroup difference |
| 1 study (N=45) | A. acupuncture B. hydrotherapy C. education | VAS pain score | Open study, not included in meta-analysis | Descriptive summary—authors' conclusion: no intergroup differences |
| 1 study (N=45) | A. acupuncture B. hydrotherapy C. education | Daytime VAS pain score | Based on 1 study | Descriptive summary—authors’ conclusion: change in A and B compared with baseline (P<.05) |
| 1 study (N=45) | A. acupuncture B. hydrotherapy C. education | Nighttime VAS pain score | Based on 1 study | Descriptive summary—authors’ conclusion: change in A and B compared with baseline (P=.01) |
| 1 study (N=52) | A. acupuncture B. hydrotherapy C. education | WOMAC score Pain Stiffness Physical function | Open study, not included in meta-analysis | Our interpretation: low-quality primary study, open study design, no sham treatment. Intergroup difference: P=.02. Authors’ conclusion: “One of 3 studies showed results on...” |
Table 1. Continued

| Reference | QR/QPS | Included Primary Studies | Intervention/Control | Outcome | Data Analyses/Pooling | Findings |
|-----------|--------|--------------------------|----------------------|---------|-----------------------|----------|
| **ASU**   |        |                          |                      |         |                       |          |
| Herbal therapy for treating osteoarthritis (Little et al)\(^{14}\) | QR: minor limitations (9/9) QPS: mean Jadad scale score=4.5 | 1 study on hip OA (N=62) | ASU/placebo | VAS pain score | Based on 1 study | Current available data on ASU suggests that it may provide possible beneficial effects on chronic but stable OA of the hip Evidence is based on 1 study Authors write that evidence for beneficial effects of ASU on OA is convincing Point estimate of effect size: WMD=−13.80 (CI=−25.22–2.38, \(P=.02\)) |
| **Diacerein** |        |                          |                      |         |                       |          |
| Diacerein for osteoarthritis (Fidelix et al)\(^{15}\) | QR: minor limitations (9/9) QPS: mean Jadad scale score=4.5 | 1 study on hip OA (N=446) | Diacerein/placebo | Radiographic OA progression | Meta-analysis | In hip OA, there was a statistically significant slowing of radiographic OA progression on diacerein vs placebo (>0.50 mm during 3 y) Point estimate of effect size: relative risk=0.84 (CI=0.71–0.99), NNT=11 (CI=6–167) |
| | | | | | | |
| 1 study on hip OA (N=521) | Diacerein/placebo | Total hip replacement | Meta-analysis | Not statistically significant Point estimate of effect size: relative risk=0.73 (CI=0.5–1.08) |
| | | | | | | |
| 2 studies on hip OA (N=653) | Diacerein/placebo | VAS pain score | Meta-analysis | Not statistically significant Point estimate of effect size: WMD=−3.37 (CI=−11.12–4.37) |
| | | | | | | |
| 2 studies on hip OA (N=795) | Diacerein/placebo | Lequesne Functional Index | Meta-analysis | Not statistically significant Point estimate of effect size: WMD=−0.21 (CI=−0.82–0.40) |
| | | | | | | |
| 1 study on hip OA (N=150) | Diacerein/NSAIDs | VAS pain score | Meta-analysis | Favors NSAIDs, not statistically significant Point estimate of effect size: WMD=2.0 (CI=−6.48–10.48) |
| **A meta-analysis of controlled clinical studies with diacerein in the treatment of osteoarthritis (Rintelen et al)\(^{16}\)** | QR: minor limitations (8/9) QPS: mean Jadad scale score=4.5 | 2 studies on hip OA (N=795) | Diacerein/placebo | VAS pain score, Lequesne Functional Index | Meta-analysis | Effect on pain and function No separate quantitative pooling for hip OA |

(Continued)
The GRADE concept is based on an assessment of the following criteria: quality of primary studies, design of primary studies, consistency, and directness. An overall assessment of the quality of evidence was based on a summary of these 4 criteria, as presented in Table 2.

**Data Extraction and Synthesis**

Data on effectiveness were extracted from the identified high-quality reviews by 2 of the authors (EAH, RHM); if doubt occurred, one of the other authors (KBH) was consulted. The following criteria were applied when data on effects were extracted:

- Adequate quantitative pooling of data in reviews was regarded as
more valid than a qualitative data synthesis approach.

- If no direct comparisons between treatments were undertaken or no quantitative pooling of data was done, the results are reported as “no quantitative pooling,” and the authors’ statements were reported.
- When we found that the results were reported inconsistently in different sections of the review, the effects were extracted from the main result section.

Results

Study Selection

The literature search identified 204 reviews on hip OA. One hundred sixty-four articles were clearly not relevant based on information from the abstract. For 58 reviews, the full text was retrieved (Tab. 3) and assessed, and 52 reviews were excluded for various reasons (Figure). In the end, we included 6 high-quality systematic reviews, which formed the basis of this umbrella review (Tab. 1). Generally, the methodological quality of the primary studies was low to moderate, often presenting conflicting results (Tab. 4).

Quality of Findings

Acupuncture. One high-quality systematic review13 assessed the effect of acupuncture on peripheral joint OA. The conclusions were based on 3 primary studies. On the basis of the meta-analysis, there were no statistically significant results, and thus there was no evidence that acupuncture is beneficial for reducing OA pain. Mean pain reduction was 14.43 (on a 0–100 visual analog scale [VAS]) for the intervention group and 15.31 for the sham treatment group (mean difference of −0.03, 95% confidence interval [CI]=−0.52–0.45).

Avocado/soybean unsaponifiables (ASU). Avocado/soybean unsaponifiables may reduce pain in people with chronic hip OA. The authors’ conclusion is that the evidence for the beneficial effects of ASU on OA is convincing.14 Evidence extracted from the review was based on one primary study that compared ASU with a placebo on VAS pain scores. The mean difference was −13.80 (95% CI=−25.2 to −2.38, P=0.02) (on a 0–100 scale) in favor of ASU. In our opinion, current available data on ASU suggest that it may provide possible beneficial effects on OA of the hip, but there is still insufficient evidence to draw firm conclusions. These data suggest that there is low-quality evidence that ASU reduces pain (based on VAS scores) in hip OA.

Diacerein. Diacerein is a symptomatic, slow-acting herbal therapy for OA. It is a registered medication in the United States, but it is considered a herbal therapy in most other countries; therefore, it was included in this umbrella review. We included 2 reviews on the effect of diacerein.15,16 The conclusions from these reviews on the effect of diacerein on hip OA were based on 7 primary studies; however, evidence on radiographic OA progression was based on the results of one primary study. There was a statistically significant slowing of radiographic OA progression on diacerein versus a placebo (>0.50 mm during 3 years, relative risk=0.84 [95% CI=0.71–0.99], number needed to treat=11 [95% CI=6–167]). However, the adverse effect of diarrhea (42%) was quite common13 and, in our opinion, should not be ignored in clinical practice and further research. There is low-quality evidence that treatment with diacerein reduces radiographic OA progression and moderate-quality evidence that it has no effect on pain, impairment, or incidence of total hip replacement.15

Exercises. Two high-quality reviews reported on the effects of exercise on hip OA.17,18 Fransen et al17 concluded that no optimal exercise type or dosage could be extrapolated from the review due to little available scientific evidence. Roddy et al18 concluded that there is some evidence that strengthening exercise may be beneficial in reducing pain in people with hip OA, but that there is not enough evidence to make conclusions on the effect on disability. There also is not enough evidence to make conclusions about the effect of aerobic exercise on pain, disability, or health status.18

Other interventions. It was not possible to extract data on hip OA
Table 3.
Overview of Full-Text Reviews Assessed (Status Included/Excluded)

| Review                                                                 | Status                                      |
|-----------------------------------------------------------------------|---------------------------------------------|
| Adebajo AO. Osteoarthritis. *Baillieres Clin Rheumatol.* 1995;9: 65–74. | Excluded due to publication date            |
| Angermann P. [Avocado/soybean unsaponifiables in the treatment of knee and hip osteoarthritis.] *Ugeskr Laeger.* 2005;167:3023–3025. | Excluded, methodologically major limitations |
| Barthels EM, Lund H, Hagen KB, et al. Aquatic exercise for the treatment of knee and hip osteoarthritis. *Cochrane Database Syst Rev.* Protocol stage. | Excluded, not yet published, still in protocol |
| Bennell K, Hinman R. Exercise as a treatment for osteoarthritis. *Curr Opin Rheumatol.* 2005;17:634–640. | Excluded, methodologically major limitations |
| Bland JH. The reversibility of osteoarthritis: a review. *Am J Med.* 1983;74:16-26. | Excluded due to publication date            |
| Bischoff HA, Roos EM. Effectiveness and safety of strengthening, aerobic, and coordination exercises for patients with osteoarthritis. *Curr Opin Rheumatol.* 2003;15:141–144. | Excluded, methodologically major limitations |
| Brosseau L, Gam A, Harman K, et al. Low level laser therapy (classes I, II and III) for treating osteoarthritis. *Cochrane Database Syst Rev.* 2004;(5):CD002046. | Excluded, no studies on hip OA included in the review |
| Brosseau L, MacLeay L, Robinson V, et al. Intensity of exercise for the treatment of osteoarthritis. *Cochrane Database Syst Rev.* 2003;(2):CD004259. | Excluded, no studies on hip OA included in the review |
| Brosseau L, Yonge KA, Marchand S, et al. Thermotherapy for treatment of osteoarthritis. *Cochrane Database Syst Rev.* 2003;(4):CD004525. | Excluded, no studies on hip OA included in the review |
| Chard J, Dieppe P. The case for nonpharmacologic therapy of osteoarthritis. *Curr Rheumatol Rep.* 2001;3:251–257. | Excluded, methodologically major limitations |
| Chodosh J, Morton SC, Mojica W, et al. Chronic disease self-management programs for older adults. *Ann Intern Med.* 2005;143:427–438. | Excluded, impossible to extract data on hip OA |
| Ernst E. Complimentary medicine. *Curr Opin Rheumatol.* 2003;15:151–155. | Excluded, methodologically major limitations |
| Felson DT, Chaisson CE. Understanding the relationship between body weight and osteoarthritis. *Baillieres Clin Rheumatol.* 1997;11:671–681. | Excluded due to publication date            |
| Felson DT. Does excess weight cause osteoarthritis and, if so, why? *Ann Rheum Dis.* 1996;55:668–670. | Excluded, methodologically major limitations |
| Felson DT. Preventing knee and hip osteoarthritis. *Bull Rheum Dis.* 1998;47:1–4. | Excluded due to publication date            |
| Felson DT. Weight and osteoarthritis. *Am J Clin Nutr.* 1996;63(suppl):430S–432S. | Excluded due to publication date            |
| Fransen M, Crosbie J, Edmonds J. Exercise for osteoarthritis of the hip or knee. *J Rheumatol.* 2001;28:156–164. | Excluded, included in Cochrane review below |
| Fransen M, McConnell S, Bell M. Exercise for osteoarthritis of the hip or knee. *Cochrane Database Syst Rev.* 2001;(2):CD004376. | Included, methodologically minor limitations |
| Fransen M, McConnell S, Bell M. Therapeutic exercise for people with osteoarthritis of the hip or knee: a systematic review. *J Rheumatol.* 2002;29:1737–1745. | Excluded, no separate analyses for hip OA |
| Fidelix TS, Soares BG, Trevisani VF. Diacerein for osteoarthritis. *Cochrane Database Syst Rev.* 2006;(1):CD005117. | Included, methodologically minor limitations |
| Grassi W, Filipucci E, Farina A. Ultrasonography in osteoarthritis. *Semin Arthritis Rheum.* 2004;34(2 suppl):9–23. | Excluded, not a systematic review            |
| Hochberg MC, Berman B, Birch S, et al. Acupuncture for osteoarthritis. *Cochrane Database Syst Rev.* Protocol stage. | Excluded, not yet published, still in protocol |
| Hoving JL, van der Heijden GJ. Fysiotherapie bij heupklachten: systematische review van klinisch effectonderzoek. *Ned Tijdschr Fysioter.* 1997;107:2–7. | Excluded, searched primary studies only up to 1994 |
| Hulme JM, Delie R, Robinson VA, et al. Electromagnetic fields for the treatment of osteoarthritis. *Cochrane Database Syst Rev.* 2002;(1):CD003523. | Excluded, no studies on hip OA included in review |
| Review                                                                 | Status                                                                 |
|-----------------------------------------------------------------------|------------------------------------------------------------------------|
| Hunter DJ, Felson DT. Clinical review: Osteoarthritis. *BMJ*. 2006;332:639–642. | Excluded, no studies on hip OA included in review                       |
| Kalb RL. Evaluation and treatment of hip pain. *Hosp Pract (Minneap)*. 1998;33:131–132. | Excluded due to publication date                                        |
| Kettunen JA, Kujala UM. Exercise therapy for people with rheumatoid arthritis and osteoarthritis. *Scand J Med Sci Sports*. 2004;14:138–142. | Excluded, methodologically major limitations                            |
| Kwon YD, Pittler MH, Ernst E. Acupuncture for pheripheral joint osteoarthritis. *Rheumatology (Oxford)*. 2006;27:1551–1557. | Included, methodologically minor limitations                            |
| Lane NE, Buckwalter JA. Exercise and osteoarthritis. *Curr Opin. Rheumatol*. 1999;11:413–416. | Excluded due to publication date                                        |
| Latham N, Anderson C, Bennett D, Stretton C. Progressive resistance strength training for physical disability in older people. *Cochrane Database Syst Rev*. 2003;(2):CD002759. | Excluded, no studies on hip OA included in review                       |
| Little CV, Parsons TJ, Logan S. Herbal therapy for treating osteoarthritis. *Cochrane Database Syst Rev*. 2000;(4):CD002947. | Included, methodologically minor limitations                            |
| Livense AM, Bierna-Zeinstra SMA, Verhagen AP, et al. Influence of obesity on the development of osteoarthritis of the hip: a systematic review. *Rheumatology (Oxford)*. 2002;41:1155–1162. | Excluded, risk factors                                                  |
| Long L, Soeken K, Ernst E. Herbal medicines for the treatment of osteoarthritis: a systematic review. *Rheumatology (Oxford)*. 2001;40:779–793. | Excluded, impossible to extract data on hip OA                          |
| McAlindon TE, LaValley MP, Gulin JP, Felson DT. Glucosamine and chondroitin for treatment of osteoarthritis: a systematic quality assessment and meta-analysis *JAMA*. 2000;283:1469–1475. | Excluded, impossible to extract data on hip OA                          |
| McGuire JB. Arthritis and related diseases of the foot and ankle: rehabilitation and biomechanical considerations. *Clin Podiatr Med Surg*. 2003;20:469–485. | Excluded, impossible to extract data on hip OA                          |
| Marks R, Allegrante JP. Effectiveness of psychoeducational interventions in osteoarthritis. *Clin Rev Phys Rehabil Med*. 2002;14:173–195. | Excluded, methodologically major limitations                            |
| Mazieres B, Jamard B, Verrouil E, et al. The therapeutic approach to osteoarthritis. *Aging Clin Exp Res*. 2003;15:405–412. | Excluded, methodologically major limitations                            |
| Minor MA. Exercise in the treatment of osteoarthritis. *Rheum Dis Clin North Am*. 1999;25:397–433. | Excluded due to publication date                                        |
| Neame RL, Doherty M. Managing hip osteoarthritis. *Practitioner*. 2000;244(1616):964–968, 971–972. | Excluded, methodologically major limitations                            |
| O’Reilly S, Doherty M. Lifestyle changes in the management of osteoarthritis. *Best Pract Res Clin Rheumatol*. 2001;15:559–568. | Excluded, methodologically major limitations                            |
| Pelland L, Brosseau L, Wells G, et al. Efficacy of strengthening exercises on osteoarthritis: a meta-analysis. *Phys Ther Rev*. 2004;9:77–108. | Excluded, impossible to extract data on hip OA                          |
| Pencharz JN, Grigoriadis E, Jansz GF, Bombardier C. A critical appraisal of clinical practice guidelines for the treatment of lower-limb osteoarthritis. *Arthritis Res*. 2002;4:36–44. | Excluded, review of guidelines                                          |
| Perkins PJ, Doherty M. Nonpharmacologic therapy of osteoarthritis. *Curr Rheumatol Rep*. 1999;1:48–53. | Excluded due to publication date                                        |
| Pham T, Van Der Heijde D, Lassere M, et al. OMERACT-OARSI outcome variables for osteoarthritis clinical trials: the OMERACT-OARSI set of responder criteria. *J Rheumatol*. 2003;30:1648–1654. | Excluded, includes only medication as treatment                        |
| Puett DW, Griffin M. Published trials of nonmedicinal and noninvasive therapies for hip and knee osteoarthritis. *Ann Intern Med*. 1994;121:133–140. | Excluded due to publication date                                        |
| Riemsma RP, Kirwan JA, Taal E, Rasker JJ. Patient education for osteoarthritis. *Cochrane Database Syst Rev*. Protocol stage. | Excluded, not yet published, still in protocol                         |
for chondroitin, glucosamine, or herbal therapies such as Reumalex,* capsaicin, and tipi tea. No relevant high-quality reviews were located on weight loss, thermotherapy, patient education, lifestyle changes, electrotherapy, manual therapy, or joint traction or distraction.

**Discussion**

This overview (umbrella review) of systematic reviews examining the effectiveness of nonpharmacological and nonsurgical interventions for hip OA is based on an extensive literature search, combined with assessment of study quality and synthesis of findings. We identified 204 potentially relevant manuscripts, but in the end were able to include only 6 high-quality reviews. We found that there is moderate-quality evidence that acupuncture and diacerein have no effect on pain and function. There is low-quality evidence that strengthening exercises and ASU reduce pain and that diacerein decreases radiographic OA progression. Several primary studies might have been published after the reviews included in this overview, and thus their results were not captured. Further updating of reviews and more primary research might confirm our findings and upgrade the evidence. For other interventions and outcomes, the quality of evidence was assessed as low or very low, and new primary studies are needed. For several interventions for hip OA (ie, aquatic exercise; electrotherapy; glucosamine; herbal therapies such as Reumalex, capsaicin, and tipi tea; joint traction and distraction; lifestyle changes; manual therapy; patient education; thermotherapy; and weight loss), no systematic review was identified. Our conclusions were made on basis of statistically significant changes and not clinically relevant differences. Clinical evidence-based advice perhaps instead should be founded on clinically relevant change (eg, pain reduction).

To our knowledge, no such overview has been published on hip OA until now. Umbrella reviews present a synthesis of the highest-

---

* Gerard House Ltd, 375 Capability Green, Luton, United Kingdom.
quality research evidence available in a condensed format, simply accessible for clinicians and policymakers. There are important limitations in summarizing evidence from systematic reviews only. For every review, primary studies will be missed. Even though reviews should be updated regularly, new studies are published all the time, and most reviews are seldom or never updated. Another issue is that all types of interventions may not be covered by a review, and thus important high-quality primary studies might be overlooked. As the number of published systematic reviews increases, a common finding is that more than one systematic review addresses the same interventions, and conflicts among reviews are emerging.19 Such discordance might cause difficulties

Table 4.
Summary of Findings From Included Reviews

| Quality of Evidence | Intervention                          | Comparison | Results                                      |
|---------------------|--------------------------------------|------------|---------------------------------------------|
| High                | N/A                                  | N/A        | None identified                             |
| Moderate            | Acupuncture                          | Sham       | No difference on pain and function          |
|                     | Diacerein                            | Placebo    | No difference on pain and function          |
| Low                 | Aerobic exercise                     | ROM        | No difference on pain, disability, and health status |
|                     | Avocado/soybean unsaponifiables     | Placebo    | Reduces pain                                |
|                     | Diacerein                            | Placebo    | Reduces radiographic OA progression         |
|                     | Strengthening exercises              | Control    | Reduces pain                                |
| Very low            | Aquatic exercise                     | N/A        | No high-quality reviews identified          |
|                     | Electrotherapy                       | N/A        |                                             |
|                     | Chondroitin                          | N/A        |                                             |
|                     | Glucosamine                          | N/A        |                                             |
|                     | Joint traction                       | N/A        |                                             |
|                     | Lifestyle changes                    | N/A        |                                             |
|                     | Manual therapy                       | N/A        |                                             |
|                     | Patient education                    | N/A        |                                             |
|                     | Reumalex, capsaicin, tipi tea (herbal therapies) | N/A      |                                             |
|                     | Thermotherapy                        | N/A        |                                             |
|                     | Weight loss                          | N/A        |                                             |

N/A—not available; ROM—range of motion, OA—osteoarthritis.
for decision makers (including clinicians, policymakers, researchers, and patients) who rely on reviews to help them make choices among different health care interventions.

Grading quality on nonpharmacological treatment approaches for OA is challenging. Nonpharmacological evidence is systematically graded significantly lower methodologically than pharmacological evidence.20 This suggests that it is even more difficult to include nonpharmacological studies and reviews when applying high standards for quality assessments. The type of methodological quality assessment applied determines which studies are included in the review. The number of good primary studies available at the time of the review influences the methodological quality rating, and high-quality primary studies not included in the reviews are not a part of our results.

Depending on the total quality score, we included or excluded reviews for this umbrella review. Total quality scores are presented as a result of summing all 9 quality score items. The cutoff point of 4 out of a total of 9 satisfactory items9 might be considered strict and is debatable. High-quality primary studies are warranted in order to draw substantive conclusions regarding the effectiveness of interventions. The studies should be randomized, double-blind (or at least assessor blinded), and placebo controlled. The duration of the intervention should be of adequate length, and examinations should be frequent enough to detect a difference in outcome measures. The follow-up period should be of sufficient length to assess long-term effects. Outcome measures also should be standardized, feasible, valid, reliable, and sensitive to change.

The major finding of this umbrella review is that there is insufficient high-quality evidence regarding nonpharmacological and nonsurgical interventions for hip OA. For knee OA, this seems to be a completely different issue, as there is substantially more available evidence for different treatment approaches for this joint. Many reviews include both knee and hip OA and merge the results. It is beyond the scope of this article to address interventions that have some evidence of effectiveness for knee OA but that have not been tested to date for hip OA. We found it difficult to extract data for hip OA only in most reviews. One may not directly apply findings and evidence from studies of knee OA and extrapolate them to hip OA, as the effectiveness of different therapies may be different for these joints. Thus, our lack of findings for hip OA warrants further primary studies and reviews regarding nonpharmacological and nonsurgical interventions in this area.

Conclusion

There is insufficient high-quality evidence regarding nonpharmacological and nonsurgical interventions for hip OA, and further primary studies and reviews are needed.

Ms Moe and Dr Hagen provided concept/idea/project design. All authors provided writing. Ms Moe, Dr Haavardsholm, Ms Christie, and Ms Dahm provided data collection. Ms Moe, Dr Haavardsholm, Ms Christie, and Ms Dahm provided data analysis. Ms Moe and Dr Haavardsholm provided project management. Ms Jamtvedt and Dr Hagen provided consultation (including review of manuscript before submission).

This work was inspired and facilitated by the CARE III and CARE IV International Conferences.

This article was submitted February 1, 2007, and was accepted July 5, 2007.

DOI: 10.2522/ptj.20070042

References

1. Zhang W, Doherty M, Arden N, et al. Eular recommendations for hip osteoarthritis: report of a task force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). Ann Rheum Dis. 2005;64:669–681.

2. Ingvarsson T, Hagglund G, Jonsson H Jr, Lohmander LS. Incidence of total hip replacement for primary osteoarthritis in Iceland 1982–1996. Acta Orthop Scand. 1999;70:229–233.

3. Lanyon P, Muir K, Doherty S, Doherty M. Assessment of a genetic contribution to osteoarthritis of the hip: sibling study. BMJ. 2000;321(7270):1179–1183.

4. Tepper S, Hochberg MG. Factors associated with hip osteoarthritis: data from the First National Health and Nutrition Examination Survey (NHANES-I). Am J Epidemiol. 1993;137:1081–1088.

5. Hinton R, Moody RL, Davis AW, Thomas SF. Osteoarthritis: diagnosis and therapeutic considerations. Am J Physicain. 2002;65:841–848.

6. Chard J, Dieppe P. The case for nonpharmacological therapy of osteoarthritis. Curr Rheumatol Rep. 2001;3:251–257.

7. Altman R, Alarcon G, Appelrouth D, et al. The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hip. Arthritis Rheum. 1991;34:505–514.

8. Dequeker J, Dieppe PA, Disorders of bone cartilage and connective tissue. In: Klippel JH, Dieppe PA, eds. Rheumatology. 2nd ed. London, United Kingdom: Mosby; 1998.

9. International Classification of Functioning, Disability and Health: ICF. Geneva, Switzerland: World Health Organization; 2001.

10. Oxman AD, Guyatt GH. Validation of an index of the quality of review articles. J Clin Epidemiol. 1991;44:1271–1278.

11. Atkins D, Best D, Briss PA, et al. Grading quality of evidence and strength of recommendations. BMJ. 2004;328(7454):1490.

12. Taylor NF, Dodd KJ, Damiano DL. Progressive resistance exercise in physical therapy: a summary of systematic reviews. Phys Ther. 2005;85:1208–1225.

13. Kwon YD, Pittler MH, Ernst E. Acupuncture for peripheral joint osteoarthritis. Rheumatol Ind. 2006;27:1–7.

14. Little CV, Parsons TJ, Logan S. Herbal therapy for treating osteoarthritis. Cochrane Database Syst Rev. 2000;(4):CD002947.

15. Fideli TS, Soares BG, Trevisani VF. Diacerein for osteoarthritis. Cochrane Database Syst Rev. 2006;(1):CD005117.

16. Rintelen B, Neumann K, Leeb BF. A meta-analysis of controlled clinical studies with diacerein in the treatment of osteoarthritis. Arch Intern Med. 2006;166:1899–1906.

17. Fransen M, McConnell S, Bell M. Exercise for osteoarthritis of the hip or knee. Cochrane Database Syst Rev. 2003;(3):CD004286.
Appendix 1.
Search Strategy

The following databases were searched:
- MEDLINE, 1996–2007, week 2;
- CINAHL, 1982–2007, week 2;
- AMED, 1985–2007, week 2;
- EMBASE, 1996–2007, week 2;
- PsycINFO, 1996–2007, week 2;
- The Cochrane Library and PEDro, 2000–2007, week 2.

The search strategy has been formulated in Ovid (MEDLINE, CINAHL, EMBASE, and AMED). A broad computerized search strategy was developed to identify the following components:

(A) Study type: systematic reviews

Search strategy: (1) controlled.ab. (ab.= all searchable words from the abstract); (2) design.ab.; (3) evidence.ab.; (4) extraction.ab.; (5) randomized controlled trials/[MESH]; (6) meta-analysis.pt. (pt.= publication type); (7) review.pt.; (8) sources.ab.; (9) studies.ab.; (10) OR/1–9; (11) letter.pt.; (12) comment.pt.; (13) editorial.pt.; (14) OR/11–13; and (15) 10 NOT 14

(B) Participants: Hip[MeSH], osteoarthritis[MeSH], OR osteoarthritis[MeSH]

(C) Interventions: nonpharmacological and nonsurgical exp “behavior and behavior mechanisms”/OR exp “psychological phenomena and processes”/OR exp “mental disorders”/OR exp “behavioral disorders and activities”/

In addition, the following free-text words were used: hip osteoarthritis OR osteoarthrosis AND modalities/OR heat/OR cold/OR cryotherapy/OR TENS/OR thermotherapy/OR acupuncture/OR copper/OR brace/OR magnet/OR exercise/OR flexibility/OR strengthening/OR aerobic/OR Feldenkrais/OR aquatic/OR hydrotherapy/OR pool exercise/OR glucosamine/OR herbal/OR laser/OR ultrasound/OR ultrasonography/OR nonmedical/OR nonmedicinal/OR noninvasive/OR braces/OR orthoses/OR physiotherapy/OR physical therapy/OR education/OR school/OR management/OR treatment/OR recommendations/OR distraction/OR traction/OR conservative/OR NOT surgery NOT pharmacological NOT physiotherapy

The following MESH terms and floating subheadings were excluded from the search result with NOT: exp “specialties, surgical”/OR su.fs (Surgery as floating subheading to a MESH term) exp “inorganic chemicals”/OR exp “organic chemicals”/OR exp “heterocyclic compounds”/OR exp “polycyclic compounds”/OR exp macromolecular substances/OR exp “hormones, hormone substitutes, and hormone antagonists”/OR exp “enzymes and coenzymes”/OR exp “carbohydrates”/OR exp “lipids”/OR exp “amino acids, peptides, and proteins”/OR exp “nucleic acids, nucleotides, and nucleosides”/OR exp “complex mixtures”/OR exp “biological factors”/OR exp “biomedical and dental materials”/OR exp “pharmaceutical preparations”/OR exp “chemical actions and uses”/

(D) Language restrictions: English, Dutch, or Scandinavian language

(E) Publication year from 2000 to week 2 of January 2007

Additionally, The Cochrane Library was manually explored by title for possible relevant reviews.

Appendix 2.
Criteria for the Assessment of the Quality of the Systematic Reviews

The following 9 criteria were rated as “met,” “unclear/partly met,” or “not met” according to a criteria list modified from the Effective Practice and Organisation of Care (EPOC) group within the Cochrane Collaboration:

1. Is the search strategy described in enough detail for the search to be reproducible?
2. Was the search for evidence reasonably comprehensive?
3. Were the criteria used for deciding which studies to include in the review reported?
4. Was bias in the selection of articles avoided?
5. Were the criteria used for assessing the validity of the studies that were reviewed reported?
6. Was the validity of all of the studies referred to in the text assessed using appropriate criteria in analyzing the studies that are cited?
7. Were the methods used to combine the findings of the relevant studies (to reach a conclusion) reported?
8. Were the findings of the relevant studies combined (or not combined) and analyzed appropriately relative to the primary question the review addresses and the available data?
9. Were the conclusions made by the author(s) supported by the data or the analysis reported in the review?