There Is Inadequate Evidence to Determine the Effectiveness of Nonpharmacological and Nonsurgical Interventions for Hand Osteoarthritis: An Overview of High-Quality Systematic Reviews

Rikke H. Moe, Ingvild Kjeken, Till Uhlig and Kåre Birger Hagen

PHYS THER. 2009; 89:1363-1370.
Originally published online October 22, 2009
doi: 10.2522/ptj.20080398

There Is Inadequate Evidence to Determine the Effectiveness of Nonpharmacological and Nonsurgical Interventions for Hand Osteoarthritis: An Overview of High-Quality Systematic Reviews

Rikke H. Moe, Ingvild Kjeken, Till Uhlig, Kåre Birger Hagen

Background. Patients with hand osteoarthritis are commonly treated by health care professionals (allied to medicine). Practice should be informed by updated evidence from systematic reviews of randomized controlled trials.

Purpose. The purpose of this overview is to summarize the evidence from systematic reviews of the effectiveness of nonpharmacological and nonsurgical interventions for patients with hand osteoarthritis.

Data Sources and Study Selection. Systematic reviews published between January 2000 and October 2008 were identified by a comprehensive literature search.

Data Extraction and Synthesis. Two reviewers independently selected reviews for inclusion, assessed their methodological quality, and extracted and synthesized data according to predefined criteria. Four systematic reviews finally were included. Based on single randomized controlled trials, there is some evidence of the effect of pain relief from topical capsaicin compared with placebo and for favorable functional outcomes for exercise and education compared with osteoarthritis information alone.

Limitations. In overviews, results are dependent on available systematic reviews. They are important tools to guide choice of interventions and locate areas where more research is needed, but they might not be useful for deciding specifically how interventions should be carried out.

Conclusions. There currently is insufficient high-quality evidence regarding nonpharmacological and nonsurgical interventions for hand osteoarthritis. Considering the limited research evidence and the prevalence and impact of the disease, there is an urgent need for more trials of nonpharmacological and nonsurgical interventions for hand osteoarthritis.

R.H. Moe, PT, MSc, is Research Fellow, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital, PO Box 23 Vinderen, 0319 Oslo, Norway. Address all correspondence to Ms Moe at: Rikke.Moe@nrrk.no.

I. Kjeken, OT, PhD, is Researcher, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital.

T. Uhlig, MD, PhD, is Leading Consultant, National Resource Centre for Rehabilitation in Rheumatology, Diakonhjemmet Hospital.

K.B. Hagen, PT, PhD, is Professor, Institute of Nursing and Health Sciences, Faculty of Medicine, University of Oslo, Oslo, Norway.

[Moe RH, Kjeken I, Uhlig T, Hagen KB. There is inadequate evidence to determine the effectiveness of nonpharmacological and nonsurgical interventions for hand osteoarthritis: an overview of high-quality systematic reviews. *Phys Ther*. 2009;89:1363–1370.]

Osteoarthritis (OA) is a chronic joint condition characterized by loss of articular cartilage and new bone formation and is associated with pain, functional disability, and impaired quality of life.[1] Most people with OA are female, and the condition increases in prevalence with age. Symptomatic OA in at least one hand joint occurs in about 20% of the population, and the majority of people over 55 years of age show radiographic hand OA.[2,3] The occurrence of OA may vary depending upon the population studied and the diagnostic methods used.[4] In a recent population-based study in Norway, the prevalence of self-reported hand OA in women between 24 and 76 years of age was 5.8%, whereas the corresponding estimate for men was 2.5%.[5]

Despite its growing burden on society, OA remains a poorly understood disease. At present, no disease-modifying interventions are available,[6] and current treatment of OA, therefore, is aimed mainly at alleviating symptoms and includes pharmacological approaches, physical therapy, exercises, braces and orthoses, weight reduction, and surgery.[4] The European League Against Rheumatism (EULAR) endorses recommendations of a combination of pharmacological and nonpharmacological care in treating people with hand OA.[7] However, although evidence of the effectiveness of education and exercise for reducing pain and improving physical functioning is convincing regarding knee OA,[1] such evidence still is very uncertain for hand OA[7] and hip OA.[8]

Decisions regarding the provision of health care increasingly are based on the available evidence from high-quality clinical research. Patients, health care professionals, and researchers need information about the effectiveness of interventions so that they can improve self-management strategies and clinical practice and set research priorities. Decisions regarding health care reimbursement also are increasingly evidence based. Thus, purchasing organizations and policy makers in health care will demand reliable information on the effectiveness of interventions.

Conclusions based on a systematic review of randomized controlled trials (RCTs) are considered to provide the highest level of evidence about the effectiveness of an intervention. Based on a review of literature up to 2001, Chard and Dieppe concluded that nonpharmaceutical therapies for OA have not been researched enough for us to understand their potential benefit.[9] The aim of this overview is to summarize currently available evidence from systematic reviews on the effectiveness of nonpharmacological and nonsurgical interventions for patients with hand OA.

Method

Criteria for Including Reviews

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

- *People with hand OA:* Diagnosis according to the American College of Rheumatology criteria[10] or other acceptable criteria. Reviews including people with OA in other joints or various rheumatic diagnoses were accepted only if results for hand 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 (eg, injections, arthroscopy), therapeutic apheresis, and interventions related to pharmacological or surgical interventions.
- *Outcomes:* For the purpose of this overview, the primary outcome measures were pain, stiffness, and function. The concept of "function" is based on the *International Classification of Functioning, Disability and Health* (ICF)[11] definition, where "function" is an umbrella term for body functions, body structures, activities, and participation.[1,9]

We searched the Cochrane Library (Cochrane Database of Systematic Reviews and DARE), MEDLINE, EMBASE, PEDro, PsychINFO, and CINAHL from 2000 up to week 40 of 2008 for "hand 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 (R.H.M., K.B.H.), who screened the titles and abstracts to identify relevant studies. If doubt occurred, one of the other authors was consulted. The full text of potential relevant articles was read by 2 authors (R.H.M., K.B.H.).

Assessment of Methodological Quality

Two authors (R.H.M., K.B.H.) independently assessed the methodological quality of the reviews. Disagreement was resolved by discussion. Eleven criteria were rated as "met," "unclear/partly met," or "not met"

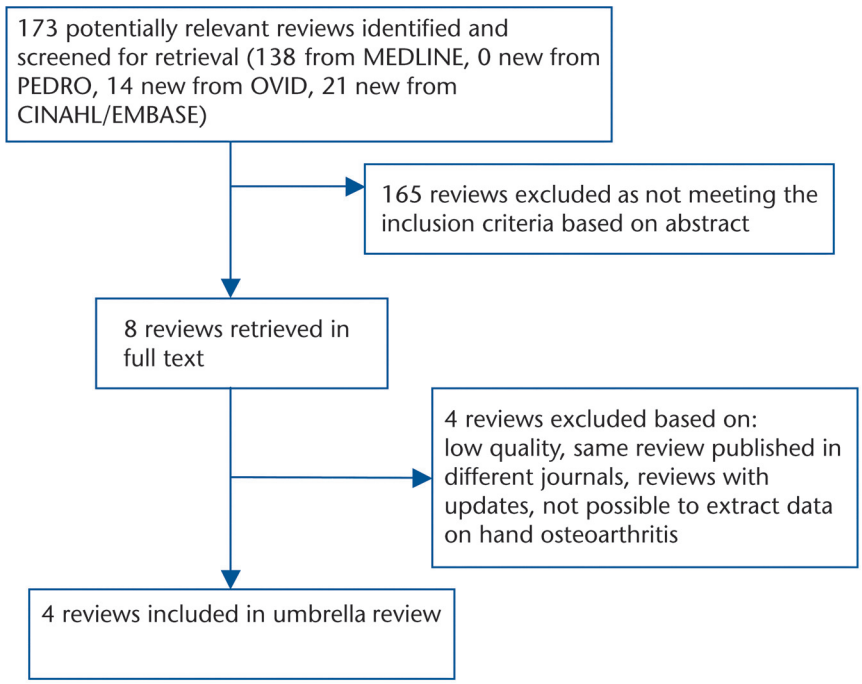

Figure.
Flowchart.

according to a criteria list from the Measurement Tool to Assess Systematic Reviews (AMSTAR) for assessing quality of evidence for each review. AMSTAR is a reliable and valid measurement tool for assessing systematic reviews based on assessments of quality of primary studies, design of primary studies, consistency, and directness, with overall scores ranging from 0 to 10 (out of a maximum of 11 criteria)[12,13] (Appendix 2).

Data Extraction and Synthesis

Data on effectiveness were extracted from the identified high-quality reviews by 2 of the authors (R.H.M., K.B.H.). 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 performed, the results were reported as "no quantitative pooling," and the statement by the authors was reported.
- When we found that the results were reported inconsistently in different sections of one review or inconsistently between 2 different reviews, the effects were extracted from the referenced primary studies.

Results

Selection Procedure

The literature search identified 173 reviews on hand OA. One hundred sixty-five articles were clearly not relevant based on information from the title and abstract. The full text of 8 articles was retrieved and assessed, and 3 articles were excluded for various reasons (Figure). Based on the assessment of the methodological quality of the remaining 5 systematic reviews, one review[14] was excluded because it met none of the AMSTAR quality criteria for systematic reviews. Thus, 4 systematic reviews[7,15–17] were included and served as the basis of this umbrella review (Tab. 1). One of these reports is not strictly a systematic review, but offers recommendations for treatment.[7] As it includes all of the core elements of a systematic review, we decided to include it in the present overview. The characteristics and methodological assessment of the 4 included reviews are presented in Table 1.

Effects

Generally, few reviews provided results by quantitative pooling. For one of the included reviews, results in terms of effects were not extracted because outcomes for the comparisons (ie, pain or function) were not specified.[16]

Pain. As shown in Table 2, topical capsaicin, the active principal of hot chili pepper, was more effective than a placebo in reducing pain. Zhang et al[7] reported that the number needed to treat to obtain moderate to excellent (more than 50%) pain relief or symptomatic improve-

Table 1.
Characteristics of Included Reviews[a]

Review	Population Included	Intervention and Control (Duration)	No. of Primary Studies (No. of Patients)	Outcomes Reported	Methodological Assessment (AMSTAR)[10,11]
Towheed,[16] 2005	Hand OA defined by any method or no method	Capsaicin cream vs placebo (NR)	2 RCTs (73)	NR	Met=4 (criteria 1, 3, 7, and 11) Not met=6 (criteria 2, 4, 5, 6, 8, and 10) Cannot answer=1 (criterion 9)
		Low-energy neon laser therapy vs placebo (NR)	1 RCT (67)	NR	
		Yoga vs no therapy (NR)	1 RCT (45)	NR	
		Pressure gloves vs controls, no glove (NR)	1 RCT (45)	NR	
		Berthollet spa vs topical ibuprofen (NR)	1 RCT (116)	NR	
		Splinting (NR)	3 RCTs (69)	NR	
		Stinging nettle (*Urtica dioica*)	1 RCT (27)	NR	
		Exercise and education vs OA information (NR)	1 RCT (40)	NR	
Zhang et al,[7] 2007	Hand OA (not specified)	Exercise and education vs OA information (12 wk)	1 RCT (40)	Pain, function	Met=2 (criteria 1 and 3) Not met=6 (criteria 4, 5, 6, 7, 8, and 10) Cannot answer=3 (criteria 2, 9, and 11)
		Full splint vs half splint (1 wk)	2 RCTs (47)	Pain	
		Topical capsaicin vs placebo (4 wk)	2 RCTs (318)	Pain, function	
Egan and Brousseau,[17] 2007	OA in thumb CMC joint	Splint vs no treatment (7 mo)	1 RCT (33)	Desire for surgery	Met=4 (criteria 1, 3, 6, and 7) Not met=4 (criteria 2, 4, 5, and 10) Cannot answer=3 (criteria 8, 9, and 11)
		Comparison of different types of splints (1–4 wk)	3 RCTs (61)	Pain, function, strength	
Forestier and Francon,[15] 2008	Hand OA (not specified)	Thermal vapor at 44°C vs topical ibuprofen (3 weeks)	1 RCT (116)	Pain, function	Met=3 (criteria 3, 7, and 11) Not met=5 (criteria 1, 4, 5, 6, and 10) Cannot answer=3 (criteria 2, 8, and 9)
		Berthollet spa, old mud vs new mud (NR)	1 RCT (159)	NR	

[a] AMSTAR=Measurement Tool to Assess Systematic Reviews, OA=osteoarthritis, NR=not reported, RCT=randomized controlled trial, CMC=carpometacarpal.

ment was 3 (95% confidence interval=2–5).

For splinting of the thumb, there were conflicting results between 2 of the reviews on both the quantification of effect sizes and the direction of effect.[7,17] Zhang et al presented a quantitative pooling of 2 RCTs[18,19] and concluded that there was "more pain relief from the full splint compared to the half splint (ES [effect size]=0.64 [0.02–1.26])."[7] Egan and Brousseau did not provide any quantitative pooling, but reported that "there was fair evidence for the effectiveness of splinting to relieve pain and improve function."[17] However, they acknowledged that "this evidence came exclusively from pretest-posttest types of studies or from the pretest-posttest phase of RCTs."[17] Based on 3 RCTs comparing different kinds of splinting,[18–20] Egan and Brousseau further stated, "There was no clear evidence of the superiority of one type of splint over another for pain relief, comfort or function."[17]

Egan and Brousseau included one trial (Buurke et al[20]) that was not included by Zhang et al.[7] However, this trial included only 10 women who wore 3 different splints in random order, and it was not possible to calculate effect sizes "due to unreliability in data."[17] Weiss et al[19] (N=26) compared a custom-made

Table 2.
Results Compiled From 4 Systematic Reviews on Nonpharmacological and Nonsurgical Intervention for Hand Osteoarthritis (OA)[a]

Outcome	Intervention and Control Intervention	No. of Studies (No. of Patients)	Effect (95% Confidence Interval)	Comments
Pain	Thermal vapor at 44°C vs topical ibuprofen	1 RCT (116)	No quantitative pooling presented. Authors' conclusion: "No significant difference."	
	Long splint vs short splint	2 RCTs (47)	ES=0.64 (95% CI=0.02–1.26) in favor of long splint	OA in thumb CMC joint. Conflicting results in 2 reviews.[7,17]
	Topical capsaicin vs placebo	2 RCTs (318)	NNT=3 (95% CI=2–5) in favor of topical capsaicin	Conflicting information between 2 reviews[7,17] regarding number of included patients (73 vs 31)
Function	Exercise and education vs OA information	1 RCT (40)	NNT=2 (95% CI=1–6) in favor of exercise and education (patient global function)	
	Thermal vapor at 44°C vs topical ibuprofen	1 RCT (116)	No quantitative pooling presented. Authors' conclusion: "Significant vs control."	Authors state that "Berthollet was superior over topical ibuprofen at treatment completion."
Desire for surgery	Splint vs no treatment	1 RCT (33)	No quantitative pooling. Authors' conclusion: "Approximately one third of each group desired surgery, indicating that splinting did not have an effect on this outcome."	

[a] NNT=number needed to treat to obtain moderate to excellent (more than 50%) pain relief or symptomatic or functional improvement, ES=effect size (mean difference between treatment and control divided by the standard deviation of the difference), RCT=randomized controlled trial, CMC=carpometacarpal, CI=confidence interval.

short opponens splint (which crosses only the carpometacarpal [CMC] joint) with a large opponens splint (which crosses the CMC joint, the wrist, and the metacarpophalangeal joint) and found that both splints reduced CMC joint pain significantly (pretest-posttest), but there was no significant difference between the splints in their effect on thumb pain. Although Egan and Brousseau presented no data for statistical recalculation, they concluded that "our calculations based on their graphs demonstrated the superiority of the short opponens splint."[17] Weiss et al[18] (N=25) compared a custom-made short opponens thermoplastic splint (which crosses only the CMC joint) with a prefabricated neoprene splint (which crosses both the CMC joint and the metacarpophalangeal joint). They found that thumb pain was significantly less (P=.019) when wearing the neoprene splint compared with the thermoplastic splint. Considering that these trials had relatively small sample sizes, with unclear and somewhat conflicting effect estimates, it may be reasonable to conclude that there is limited evidence that splints for the CMC joint in people with OA have a pain-reducing effect, but there is not enough evidence to give any recommendations regarding design or material.

For the effect of thermal vapor treatment at 44°C versus topical ibuprofen on pain (1 RCT, N=116), no quantitative pooling was presented. The authors' conclusion was presented as: "No significant difference."[15]

Function. For the comparison between exercise and education versus OA information only, the effects based on 1 RCT (N=40) was in favor of exercise and education. The number needed to treat to obtain moderate to excellent (more than 50%) improvement in "patient global function" on a visual analog scale was 2 (95% confidence interval=1–6).[7]

For the effect of thermal vapor treatment at 44°C versus topical ibuprofen on function (1 RCT, N=116), no quantitative pooling was presented. The authors' conclusion was presented as: "Significant vs control."[15] The authors further stated that "Berthollet was superior over topical ibuprofen at treatment completion."[15(p145)]

Other outcomes. On the question of whether patients' desire for surgery changed after splinting, the comparisons were splinting versus no treatment.[17] This review was based on a single RCT (N=33), and no quantitative pooling was presented. The authors' conclusion was: "Approximately one third of each group desired surgery, indicating that splinting did not have an effect on this outcome."[17(p74)]

Discussion

Based on an overview of systematic reviews, we found that there is some evidence for the pain-relieving effect of topical capsaicin compared with a placebo and favorable functional outcomes for exercise and education compared with OA information alone. There also is limited evidence that splinting of the thumb CMC joint reduces pain. However, the most striking finding of the present overview was the paucity of available systematic reviews. Thus, there currently is a very limited body of evidence for the effects of nonpharmacological and nonsurgical interventions for hand OA.

The present overview may have several limitations. A major limitation applies to summarizing evidence based on systematic reviews, as new, relevant primary studies may have been published but were not captured in the included systematic reviews. The review of Zhang et al[7] is the most recent of the included reviews and addresses all nonpharmacological treatments. Zhang et al included studies published up to January 2006 and could identify only a few relevant primary studies (RCTs and controlled clinical trials). For example, they identified only 1 study on education, 2 studies on exercises and yoga, 1 study on transcutaneous electrical nerve stimulation, 1 study on laser treatment, and 3 studies on splints and gloves. It is unlikely that a substantial number of new studies that could alter our findings have been published since then. Other limitations of overviews are that important information from primary studies is not reported and that overviews are too broad to be useful for clinicians. We would argue that overviews are important tools to guide directions in choice of interventions, but they might not be useful for deciding how interventions specifically should be carried out.

Furthermore, the results of an umbrella review could be limited by the presence of publication bias at the level of primary studies. Although "publication bias" was assessed, according to AMSTAR, we cannot exclude that publication bias at the level of primary studies might have biased the findings in the present overview. In an umbrella review, it is very important to include all systematic reviews that meet the inclusion criteria. A broad computerized search strategy was performed (Appendix 1) in addition to hand searches, but we still might have missed eligible systematic reviews. We excluded reviews providing anecdotal evidence for clinically relevant (and potentially effective) interventions, but will argue that the main aims of such an overview are to provide clinicians, patients, and policy makers with unbiased information about the effectiveness of nonpharmacological interventions for hand OA and to provide the research community with unbiased information about research gaps on this topic.

One of the reviews identified through the electronic searches was excluded based on the assessment of the methodological quality.[14] It was published in a journal supplement and originally presented as a critical review, not a systematic review. The primary studies included were all covered by the other 4 reviews included in the present overview. Thus, including this review would not have significantly influenced the results. One of the reviews[7] was published as a treatment recommendation, but we included it because it contained a systematic review of available treatments for hand OA. The other components of the article leading to treatment recommendations were not considered in this study.

All reviews, regardless of whether they are systematic reviews or umbrella reviews, rely on the availability of high-quality studies of the effects of different interventions. Although the paucity of systematic reviews for the purpose of this study was striking, it also indicates a lack of high-quality primary studies for the treatment of people with hand OA—which in itself is an incentive for systematic reviews. Thus, in this overview, in addition to summarizing the evidence on treatment of people with hand OA that does not include drugs or surgery, we identify a demand for primary studies on exercise, education, and splints, which could alleviate the burden of the disease to patients.

Conclusion

Based on an overview of available systematic reviews, there currently is insufficient high-quality evidence regarding nonpharmacological and nonsurgical interventions for hand OA. Considering the limited literature in this area and the prevalence and impact of the disease, more primary studies and updated systematic reviews are warranted.

Ms Moe, Dr Kjeken, and Dr Hagen provided concept/idea/project design and data analysis. All authors provided writing and project management. Dr Hagen provided data collection. Dr Uhlig provided facilities/equipment. Dr Kjeken and Dr Uhlig provided consultation (including review of manuscript before submission). The authors thank librarian Hilde Iren Flaaten at Diakonhjemmet Hospital, Oslo, Norway, for performing the literature search.

This work was inspired and facilitated by the CARE V International Conference.

A presentation of this work was given at the European League Against Rheumatism (EULAR) Congress; June 10–13, 2009; Copenhagen, Denmark.

This article was received December 15, 2008, and was accepted May 6, 2009.

DOI: 10.2522/ptj.20080398

References

1 Jordan KM, Arden NK, Doherty M, 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;62:1145–1155.

2 Dahaghin S, Bierma-Zeinstra SM, Reijman M, et al. Prevalence and determinants of one month hand pain and hand related disability in the elderly (the Rotterdam study). *Ann Rheum Dis.* 2005;64:99–104.

3 Dahaghin S, Bierma-Zeinstra SM, Ginai AZ, et al Prevalence and pattern of radiographic hand osteoarthritis and association with pain and disability (the Rotterdam study). *Ann Rheum Dis.* 2005;64:682–687.

4 March LM, Bagga H. Epidemiology of osteoarthritis in Australia. *Med J Aust.* 2004;180(5 suppl):S6–S10.

5 Grotle M, Hagen KB, Natvig B, et al. Prevalence and burden of osteoarthritis: results from a population survey in Norway. *J Rheumatol.* 2008;35:677–684.

6 Altman RD. Structure-/disease-modifying agents for osteoarthritis. *Semin Arthritis Rheum.* 2005;34(6 suppl 2):3–5.

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

8 Zhang W, Doherty M, Arden N, et al. EULAR evidence based recommendations for the management of 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.

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

10 Altman R, Alarcon G, Appelrouth D, et al. The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hand. *Arthritis Rheum.* 1990;33:1601–1610.

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

12 Shea BJ, Grimshaw JM, Wells GA, et al. Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC Med Res Methodol.* 2007;7:10.

13 Shea BJ, Bouter LM, Peterson J, et al. External validation of a measurement tool to assess systematic reviews (AMSTAR). *PLoS ONE.* 2007;2(12):e1350.

14 Mejjad O, Maheu E. Therapeutic trials in hand osteoarthritis: a critical review. *Osteoarthritis Cartilage.* 2000;8(suppl A):S57–S63.

15 Forestier R, Francon A. Crenobalneotherapy for limb osteoarthritis: systematic literature review and methodological analysis. *Joint Bone Spine.* 2008;75:138–148.

16 Towheed TE. Systematic review of therapies for osteoarthritis of the hand. *Osteoarthritis Cartilage.* 2005;13:455–462.

17 Egan MY, Brousseau L. Splinting for osteoarthritis of the carpometacarpal joint: a review of the evidence. *Am J Occup Ther.* 2007;61:70–78.

18 Weiss S, LaStayo P, Mills A, Bramlet D. Splinting the degenerative basal joint: custom-made or prefabricated neoprene? *J Hand Ther.* 2004;17:401–406.

19 Weiss S, LaStayo P, Mills A, Bramlet D. Prospective analysis of splinting the first carpometacarpal joint: an objective, subjective, and radiographic assessment. *J Hand Ther.* 2000;13:218–226.

20 Buurke JH, Grady JH, de VJ, Baten CT. Usability of thenar eminence orthoses: report of a comparative study. *Clin Rehabil.* 1999;13:288–294.

Appendix 1.
Search Strategy

The following databases were searched:

MEDLINE 1996–2008, week 40; CINAHL 1982–2008, week 40; AMED 1985–2008, week 40; EMBASE 1996–2008, week 40; PsychINFO 1996–2008, week 40; The Cochrane Library and PEDro 2000–2008, week 40.

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

(a) Study type: Systematic reviews

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

(b) Participants: Hand[MeSH], osteoarthritis[MeSH] OR osteoarthrosis[MeSH]

(c) Interventions: Nonpharmacological and nonsurgical exp "behaviour and behaviour mechanisms"/ OR exp "psychological phenomena and processes"/ OR exp "mental disorders"/ OR exp "behavioural disciplines and activities"/

In addition, the following free-text words were used: hand osteoathritis OR osteoarthrosis AND modalities/ OR heat/ OR cold/ OR cryo/ OR TENS/ OR thermotherapy/ OR acupuncture/ OR copper/ OR bracelet/ 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 pharmacotherapy

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]/ OR 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 to 2000 to 2008, week 40

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

Appendix 2.

Criteria for Assessment of the Quality of the Systematic Reviews

The following criteria were rated as "met," "unclear/partly met," or "not met" according to the Measurement Tool to Assess Systematic Reviews (AMSTAR) criteria list[12,13]:

1. Was an "a priori" design provided?
2. Was there duplicate study selection and data extraction?
3. Was a comprehensive literature search performed?
4. Was the status of publication (ie, gray literature) used as an inclusion criterion?
5. Was a list of studies (included and excluded) provided?
6. Were the characteristics of the included studies provided?
7. Was the scientific quality of the included studies assessed and documented?
8. Was the scientific quality of the included studies used appropriately in formulating conclusions?
9. Were the methods used to combine the findings of studies appropriate?
10. Was the likelihood of publication bias assessed?
11. Were potential conflicts of interest included?

There Is Inadequate Evidence to Determine the Effectiveness of Nonpharmacological and Nonsurgical Interventions for Hand Osteoarthritis: An Overview of High-Quality Systematic Reviews

Rikke H. Moe, Ingvild Kjeken, Till Uhlig and Kåre Birger Hagen

PHYS THER. 2009; 89:1363-1370.
Originally published online October 22, 2009
doi: 10.2522/ptj.20080398