PHYSIOTHERAPY IN HIP AND KNEE OSTEOARTHRITIS: DEVELOPMENT OF A PRACTICE GUIDELINE CONCERNING INITIAL ASSESSMENT. TREATMENT AND EVALUATION

Peter, W.F.H.; Jansen, M.J.; Hurkmans, E.J.; Bloo, H.; Dekker-Bakker, L.M.M.C.J.; Dilling, R.G.; ... ; Vlieland, T.P.M.V.

PHYSIOTHERAPY IN HIP AND KNEE OSTEOARTHRITIS: DEVELOPMENT OF A PRACTICE GUIDELINE CONCERNING INITIAL ASSESSMENT, TREATMENT AND EVALUATION

W.F.H. Peter[1,2], M.J. Jansen[3], E.J. Hurkmans[4], H. Bloo[5], L.M.M.C.J. Dekker-Bakker[6], R.G. Dilling[7], W.K.H.A. Hilberdink[7], C. Kersten-Smit[8], M. de Rooij[3], C. Veenhof[9], H.M. Vermeulen[10,1], de Vos[11], J.W. Schoones[12], T.P.M. Vliet Vlieland[4,13]

Abstract

Background: An update of a Dutch physiotherapy practice guideline in Hip and Knee Osteoarthritis (HKOA) was made, based on current evidence and best practice.

Methods: A guideline steering committee, comprising 10 expert physiotherapists, selected topics concerning the guideline chapters: initial assessment, treatment and evaluation. With respect to treatment a systematic literature search was performed using various databases, and the evidence was graded (1-4). For the initial assessment and evaluation mainly review papers and textbooks were used. Based on evidence and expert opinion, recommendations were formulated. A first draft of the guideline was reviewed by 17 experts from different professional backgrounds. A second draft was field-tested by 45 physiotherapists.

Results: In total 11 topics were selected. For the initial assessment, three recommendations were formulated, pertaining to history taking, red flags, and formulating treatment goals. Concerning treatment, 7 recommendations were formulated; (supervised) exercise therapy, education and self management interventions, a combination of exercise and manual therapy, postoperative exercise therapy and taping of the patella were recommended. Balneotherapy and hydrotherapy in HKOA, and thermotherapy, TENS, and Continuous Passive Motion in knee OA were neither recommended nor discouraged. Massage therapy, ultrasound, electrotherapy, electromagnetic field, Low Level Laser Therapy, preoperative physiotherapy and education could not be recommended. For the evaluation of treatment goals the following measurement instruments were recommended: Lequesne index, Western Ontario and McMaster Universities osteoarthritis index, Hip disability and Osteoarthritis Outcome Score and Knee injury and Osteoarthritis Outcome Score, 6-minute walktest, Timed Up and Go test, Patient Specific Complaint list, Visual Analoge Scale for pain, Intermittent and Constant OsteoArthritis Pain Questionnaire, goniometry, Medical Research Council for strength, handheld dynamometer.

Conclusions: This update of a Dutch physiotherapy practice guideline on HKOA included 11 recommendations on the initial assessment, treatment and evaluation. The implementation of the guideline in clinical practice needs further evaluation.

Keywords: Guideline; Osteoarthritis; Physiotherapy; ICF.

1. Department of Rheumatology, Leiden University Medical Center (LUMC), Leiden, The Netherlands
2. Reade, center of rehabilitation and rheumatology (formerly Jan van Breemen Institute), Amsterdam, The Netherlands
3. Center for Evidence Based Physiotherapy (CEBP), University of Maastricht, Maastricht, The Netherlands
4. Dept of Rheumatology, LUMC, Leiden, The Netherlands
5. Veenendaal en Roessingh Research & Development, Enschede, The Netherlands
6. Physiotherapy private practice, Amstelveen, The Netherlands
7. Paramedical Center for Rheumatology and Rehabilitation, Groningen, The Netherlands
8. Department of Physiotherapy, St. Maartenskliniek, Nijmegen, The Netherlands
9. Netherlands Institute for Health Services Research, Utrecht, The Netherlands
10. Department of Physiotherapy, LUMC, Leiden, The Netherlands
11. Exercise therapy private practice, Leiden, The Netherlands
12. Walaeus Library, LUMC, Leiden, The Netherlands
13. Dept of Orthopaedics, LUMC, Leiden, The Netherlands

Funding: This study was financially supported by the Royal Dutch Society of Physiotherapy (KNGF), Amersfoort, The Netherlands.

Introduction

The physiotherapist plays an important role in the health care process of the patients with hip and

knee osteoarthritis and could be recommended, based on evidence in literature.

In 2001 the *KNGF Guideline for physiotherapy in patients with Hip and Knee Osteoarthritis (HKOA)* of the *Royal Dutch Society for Physiotherapy* was developed.

A revision was desirable, as since 2001 there has been a substantial increase of publications regarding clinical studies and national[1;2] and international guidelines[3-7] on HKOA. Moreover, the existing Dutch physiotherapy guideline did not include recommendations on outcome measures, and did not provide recommendations on the pre- and postoperative management of patients undergoing hip or knee joint replacement. In addition, the existing Dutch physiotherapy guideline was not using the International Classification of Functioning, Disability and Health (ICF)[8] as a framework to systematically examine a patient's health status and to plan intervention strategies and their evaluation by standardized outcome measures.

The aim of the current revision was to describe evidence-based physiotherapy for HKOA, including initial assessment, interventions, and assessment of outcome, based on the ICF.

Methods

General methodology and Guideline Steering Committee

The revision of the guideline took place between September 2008 and January 2010, following national international methods for guideline development and implementation[9]. The guideline was developed by a Guideline Steering Committee comprising 10 expert physiotherapists. Based on the existing Dutch physiotherapy guideline on HKOA and relevant umbrella reviews, systematic reviews and guidelines published since 2001, two members (WP and TVV) proposed a preliminary list of topics to the Guideline Steering Committee. During a consensus meeting, 11 topics (3 for history taking and examination, 7 for treatment (interventions) and 1 for outcome measures) were selected.

Step 1: Literature search

A literature search was performed up tot June 2009 in the MEDLINE, EMBASE, CINAHL, PEDro, Web of Science and Cochrane Library databases to identify systematic reviews, meta-analysis, and randomized controlled trials (RCTs). The central search strategy 'Osteoarthritis' (MESH) was combined with 'Hip' and "Knee' and other MESH-headings and/or free text words such as 'physiotherapy', 'physical therapy' (MESH), 'physical therapy modalities' (MESH), 'exercise therapy', 'education', and 'self management' (MESH). Studies were selected if sufficient data were reported with regard to the physiotherapy treatment of HKOA patients. In case no systematic review or meta-analysis was found, RCTs were identified and selected for the therapeutic process. The quality of the RCTs was judged by two independent evaluators (WP and MJ) by using Delphi criteria[10]. Textbooks, review articles, umbrella review articles, and current guidelines on other, related conditions.

With respect to the literature on examination and assessment, in addition to the systematic literature search, textbooks, review articles, and current guidelines on other, related conditions were used.

Step 2: Categorizing evidence

The selected literature was critically appraised by assessing the type and quality of the study design. Evidence was graded according to the EBRO (Evidence Based Recommendation Development) (see Table I), which is in line with international classification schemes[11], such as the NICE (National Institute of Clinical Effectiveness) approach. EBRO is an initiative of the Dutch Cochrane Center and the Dutch Institute for Healthcare Improvement (CBO), a member of the Guidelines International Network (GIN)[12].

Step 3: Strength of recommendations

By means of five consensus meetings and eight feedback rounds of the Guideline Steering Committee, recommendations were formulated and their strength graded A–D, based on the category of efficacy evidence (Table I).

Step 4: Guideline review process

The first draft of the guideline was reviewed by a Guideline Review Committee, comprising 17 persons from various professional backgrounds was instituted, including rheumatologists, an orthopedic surgeon, rehabilitation specialists, general practitioners, and representatives of the Dutch Arthritis Foundation and the Arthritis Patient Organization. After adaptation, the second draft of

Table I. From scientific evidence and expert opinion to recommendations according to the EBRO (Evidence Based Recommendation Development), which is in line with international classification schemes, such as the NICE approach.

Level of evidence	1	One A1 study or at least two A2 studies
	2	One A2 study or at least two B studies
	3	One B or multiple C studies
	4	Expert opinion
Grades of recommendation	A1	Meta-analyses (systematic reviews), which include at least two Randomized Controlled Trials at quality level A2 that show consistent results between studies
	A2	Randomized Controlled Trials of a good methodological quality (randomized double blind controlled studies) with sufficient power and consistency
	B	Randomized Controlled Trials of a moderate methodological quality of with insufficient power, or non- randomized, cohort of patient-control group study involving intergroup comparisons
	C	Patient series
	D	Expert opinion

the guideline was reviewed and pilot tested by 45 physiotherapists. Among them 15 were specialized and members of an arthritis network. Almost all of the physiotherapists agree with the content. Some minor comments concerning the feasibility of the measurement instruments, including lack of time and space to perform are taken into account in the implementation process after publication of the guideline.

Results

I. Initial assessment

In the Netherlands, physiotherapy can be accessed with or without a referral from a doctor (also called "direct access").

The initial assessment comprises history taking, physical examination and analysis. History taking and physical examination are performed to get a comprehensive overview of the patient's health status. This assessment includes screening for red flags. The doctor must be consulted in case of a red flag after deliberation with the patient. With the analysis, the patient's main limitations and impairments are prioritized, and treatment goals and a treatment plan are formulated, and in close collaboration with the patient, treatment goals are set, with the focus on limitations of activity and restriction in participation.

The total initial assessment process is described in Figure 1.

Clinical question 1: In which way the patient's health status can be assessed?

RECOMMENDATION 1:

- The physiotherapist should assess the patient's health status primarily in terms of activity limitations and participation restrictions (level 4).
- In addition, the therapist may also assess impairments of body function and structure, as well as personal and environmental factors, insofar as these relate to the limitations and restrictions (level 4).

An overview of the most relevant health problems in HKOA patients was made, based on the short version of the International Classification of Functioning, Disability and Health (ICF) Core Set for Osteoarthritis[8], supplemented with clinical relevant items, best practiced based, and completed with a number of personal factors (Figure 2). This overview is recommended to be used for the setting of treatment goals, the formulation of the treatment plan and the evaluation.

Clinical question 2: Which contraindications for physiotherapy should be taken into account in patients with HKOA?

RECOMMENDATION 2: PHYSIOTHERAPISTS SHOULD EVALUATE THE PRESENCE OF "RED FLAGS" (LEVEL 4).

The following specific red flags in HKOA patients were defined:

- A warm, swollen (red) knee joint
- A swelling in the groin
- Severe blockade of the knee joint

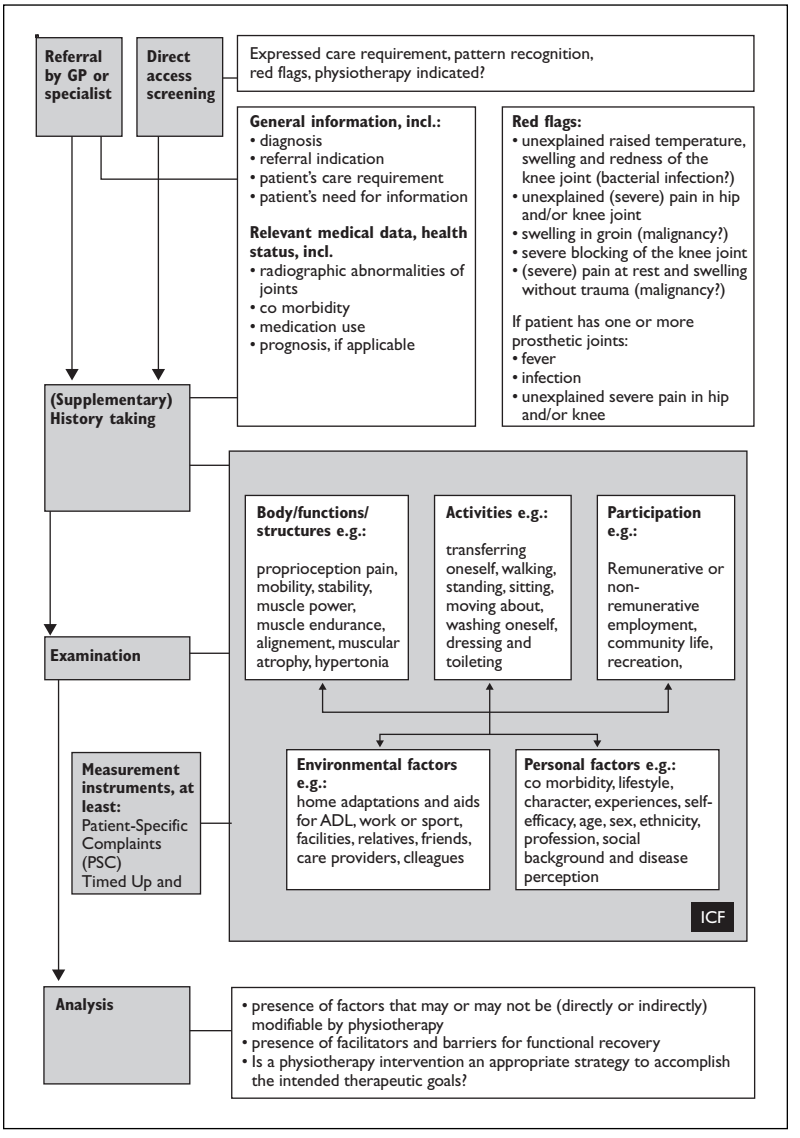

Figure 1. Overview of the initial assessment process.

- (Extreme) pain at rest
- And in the presence of one or more joint replacement prostheses:
- Fever
- Infection
- And inexplicable extreme pain in hip or knee joint.

Clinical Question 3: How does the physiotherapist set treatment goals?

RECOMMENDATION 3: BASED ON THE INFORMATION OBTAINED IN THE INITIAL ASSESSMENT, IN COOPERATION WITH THE PATIENT AND ACCORDING THE ICF, THE PHYSIOTHERAPIST SHOULD DEFINE THE THERAPEUTIC GOALS (LEVEL 4).

Based on of the description of the health status and the presence of barriers and facilitators, individual treatment goals should be defined. Goal setting is a shared process between the physiotherapist and the patient. Treatment goals are set in terms of the ICF, with the focus on limitations of activities and restriction in participation.

Goals should be formulated according to the SMART principles (specific, measurable, achievable, realistic, and timed)[13], for example: being able to walk 800 meters (from home to the supermarket and back) two times a week in six weeks.

II. Interventions

With respect to the literature search concerning the therapeutic process, 22 systematic reviews and 74 RCTs (published after these reviews) were selected.

Clinical question 4: Which physiotherapy intervention should or should not be given in HKOA?

RECOMMENDATION 4: (SUPERVISED) EXERCISE THERAPY AIMED AT REDUCING PAIN AND IMPROVING PHYSICAL FUNCTIONING SHOULD BE APPLIED DURING THE PHYSIOTHERAPY TREATMENT OF HKOA PATIENTS (LEVEL 1).

Based on the literature exercises are recommended[14-18], but no specific intensity of exercises could be defined[19]. However, although there is a lack of evidence concerning the optimal type of exercises and their intensity, most research pertained to programs including aerobic and/or muscle strengthening exercises, and possible combined with ROM and functional exercises.

In previously published international multidisciplinary guidelines and a Dutch multidisciplinary guideline in HKOA management exercise therapy is recommended[1]. There are no recommendations on intensity, specific exercise forms, number of treatment or follow up sessions, and supervision.

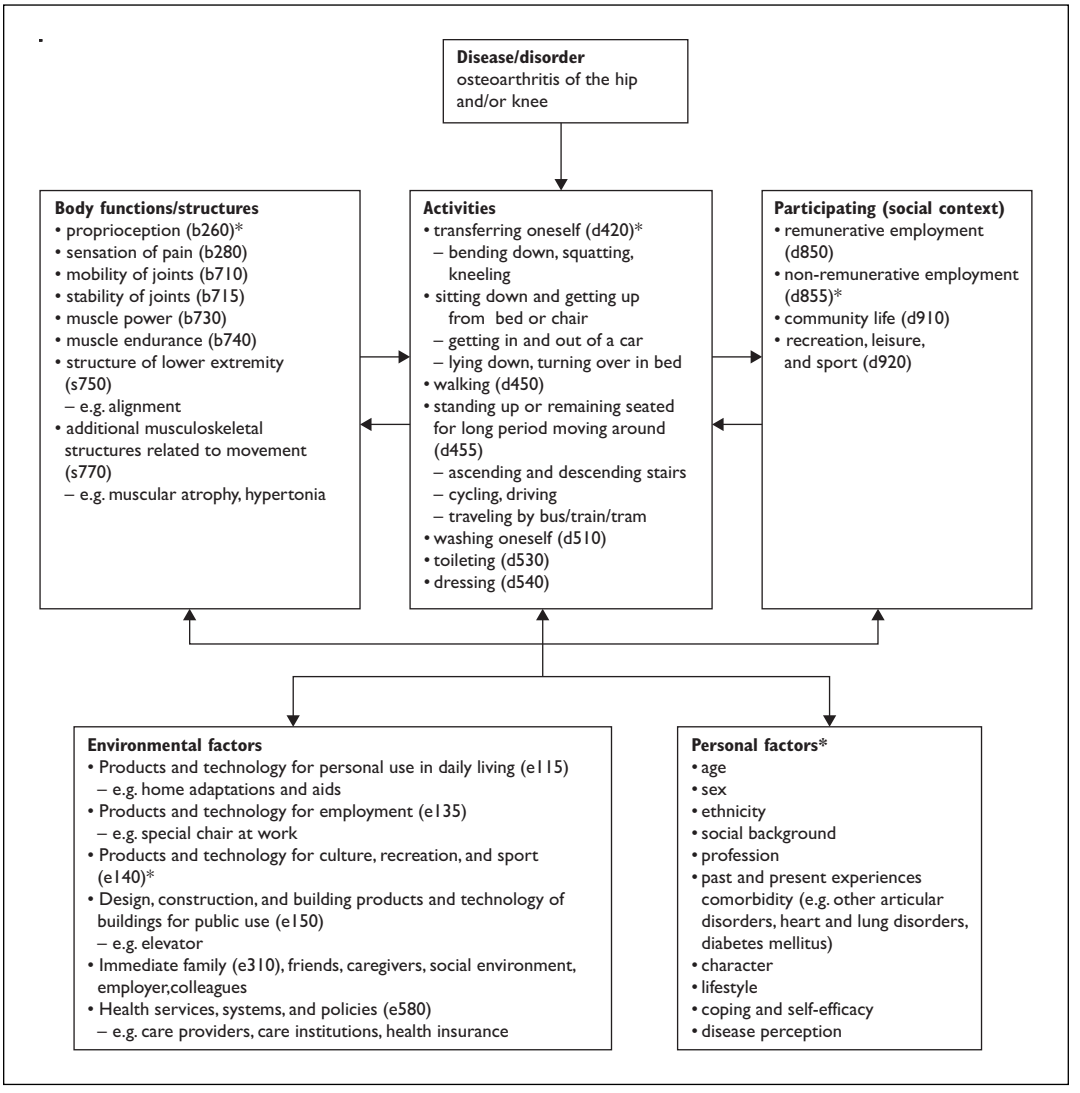

Figure 2. Overview of the most relevant health problems in Hip and Knee Osteoarthritis according to the International Classification of Functioning, Disability and Health (ICF) Core Set for Osteoarthritis (short version supplemented with clinically relevant items (*), based on expert opinion).

In addition to the abovementioned recommendation on exercise therapy, there was overall consensus within the Guideline Steering Committee that exercises should comprise at least muscle strengthening exercises, exercises to improve aerobic capacity, functional exercises, and gait training, either as a single treatment or combined with each other, depending on treatment goals. The exercise program must have a focus on limitations of activities and restrictions in participation. In some cases the exercise therapy could be adjusted to individual treatment goals. For example joint proprioception and balance training[20] or a behavioral graded activity strategy[21]. Decreasing the frequency of treatment sessions at the end of the treatment is needed to help the patient to achieve an independent adequate level of physical activity. To improve the transition to recreational or sport activities the HKOA patient must be guided by the physiotherapist.

RECOMMENDATION 5: PHYSIOTHERAPISTS SHOULD PROVIDE EDUCATION AND PROMOTE ADEQUATE SELF MANAGEMENT IN PATIENTS WITH HKOA (LEVEL 2).

Based on literature education and promotion of adequate self management are recommended, pro-

vided in combination with exercise therapy (level 2)[22-27]. Because of the variety of interventions in the literature, it is unclear which content of education or self management intervention is best in HKOA.

In international multidisciplinary guidelines and a Dutch multidisciplinary guideline in HKOA management education and self management is recommended as an effective intervention as an adjunction to exercise therapy [1,3-5].

The Guideline Steering Committee recommend that the content of the intervention comprise the following items: knowledge and understanding of HKOA; the consequences of HKOA on functions, activities and participation; the relation between the mental and physical load and carrying capacity; the way to deal with complaints caused by HKOA; an active and healthy lifestyle (moving, nurturing, overweight); change in moving behavior; joint protection and the use of (walking) aids (level 4).

The physiotherapist needs to support the patient in remaining a healthy physical activity level.

Recommendation 6: Exercise therapy should be combined with manual therapy in cases of pain and reversible limitation in joint mobility (level 2).
If there is pain in combination with a limitation in joint mobility it is recommended to add manual therapy to exercise therapy (level 2)[28-32]. In international multidisciplinary guidelines and a Dutch multidisciplinary guideline in HKOA management, manual therapy is not mentioned or classified by exercise therapy.

In the Netherlands it is common to use the combination of exercise therapy with manual therapy. Within the Guideline Steering Committee there was consensus that manual therapy could be considered as a preparation for exercise therapy in HKOA in case of pain and a reversible limitation in joint mobility. The manual therapy should comprise manipulation, manual traction, and muscle stretching exercises in Hip OA. In Knee OA anterior/posterior mobilizations of the tibia-femoral joint and the patella, and muscle stretching exercises could be considered.

Recommendation 7: Exercise therapy aimed at improving physical functioning should be applied after hip and knee joint replacement surgery (level 2).
Postoperative exercises are recommended in hip and knee joint replacement surgery and should comprise muscle strengthening exercises and exercises focusing on functional activities (level 2)[33-36].

No recommendations on postoperative exercises are given in international guidelines in HKOA management. In a Dutch multidisciplinary guideline on hip and knee OA, postoperative exercise therapy is recommended[1].

Recommendation 8: Taping the patella should be adjusted to muscle strengthening exercises and exercises focusing on functional activities to increase pain in patello-femoral OA (level 2).
There is evidence to recommend taping in patello-femoral OA[37,38]. In international and Dutch guidelines included no recommendations on taping and patello-femoral OA. In the Netherlands often taping is used as a support to make it more possible to do exercises in patello-femoral OA.

Recommendation 9: The provision of hydrotherapy, balneotherapy, thermotherapy, preoperative physiotherapy in HKOA, and Transcutane Electrical Neuro Stimulation (TENS) in knee OA , and Continuous Passive Motion (CPM) in postoperative knee OA, can neither be recommended nor discouraged (level 1, 4).
There is conflicting evidence that hydrotherapy is effective in HKOA (level 1)[39-44]. An international guideline (OARSI) recommends hydrotherapy in patient with hip OA[5].

In daily practice in the Netherlands hydrotherapy is used and experienced as a pleasant intervention by the patient. There was overall consensus within the Guideline Steering Committee that hydrotherapy could be applied in case of severe pain and no effect of alternative interventions as exercise therapy on land, medication or surgery. Hydrotherapy could also be used as preparation for exercise therapy on land in cases with severe pain.

There is also conflicting evidence that balneotherapy is effective in HKOA (level 1)[45-47]. No recommendations are made in international and Dutch guidelines. In the Netherland it is no common intervention, but in some countries Spa therapy has a benefit in HKOA patient's physical en mental wellbeing.

There is some evidence that ice massage is effective as a cold application in knee OA[48]. An international guideline (OARSI) is mentioning that in some circumstances warmth or could applications could be beneficial in relieving pain[5]. There was overall consensus within the Guideline Steering Committee that an application of cold could be considered if there is severe pain in knee OA. The

application of warmth could be considered as preparation for exercise therapy in patients with severe joint stiffness or difficulty in relaxing the muscles. The Guideline Steering Committee advises against the use of local heat application in case of active joint inflammation which sometimes occurs in knee OA (level 4).

There is conflicting evidence that TENS is effective to relieve pain in knee OA (level 1)[49;50]. An international guideline recommends TENS for the short term (OARSI) and a Dutch multidisciplinary guideline[1,5] recommend TENS to decrease pain and stiffness as a second choice if medication and exercises turned out to be not effective.

The Guideline Steering Committee suggests that TENS could be considered as a support for exercise therapy in individual cases with severe pain but not as a first choice (level 4).

Concerning physiotherapy around joint replacement surgery there is conflicting evidence that CPM is effective after total knee surgery[51-54]. CPM is a common intervention after knee surgery to increase knee joint mobility. There is lack of evidence after knee surgery to recommend CPM according a Dutch multidisciplinary guideline[1].

The Guideline Steering Committee could not recommend or advise against CPM (level 1).

Preoperative exercises could not be recommended based on current evidence (level 3)[55-58]. There are no recommendations mentioned in international guidelines on HKOA management. A Dutch multidisciplinary guideline could not recommend preoperative exercises[1]. But literature indicates that a good functional status before surgery is a important predictor on postoperative recovery. Within the Guideline Steering Committee there was an overall consensus that preoperative exercises could be considered in cases of poor preoperative status in patients with multiple co morbidity and other affected joints (level 4).

Finally preoperative education could be considered according the Guideline Steering Committee if there is much anxiety for the operation (level 4). The education should then be focused on information about the operation and the period the patient stays in the hospital.

RECOMMENDATION 10: THE PROVISION OF MASSAGE, ULTRASOUND, ELECTROTHERAPY, ELECTROMAGNETIC FIELD AND LOW LEVEL LASER THERAPY (LLLT) CAN NOT BE RECOMMENDED IN HKOA (LEVEL 1, 2, 4).

There is little evidence that massage is effective in knee OA (level 2)[59]. In the Netherlands massage was a common physiotherapy intervention. Nowadays there is no place for massage in the active treatment strategy for HKOA.

There is conflicting evidence for the use of ultrasound in knee OA (level 2)[60,61]. The Health Council of the Netherlands (Gezondheidsraad) has advised against the use of ultrasound, except for the application in patients with a tennis elbow. Therefore the Guideline Steering Committee decided not to recommend ultrasound.

For electrotherapy there is conflicting evidence for the effectiveness in knee OA (level 3)[49,50]. Electrotherapy is not common in the Netherlands as treatment for knee OA. Based on the current evidenced and best practice electrotherapy can not be recommended.

No evidence can be found to support the use of electromagnetic field in de treatment of HKOA (level1)[50,62,63].

There is evidence that LLLT is effective in decreasing pain (level 1)[50], but it is a very uncommon intervention in the Netherlands. Further there are other interventions that can be recommended to decrease pain why the Guideline Steering Committee did not recommend LLLT in knee OA (level 4).

In international and Dutch guidelines there are no recommendations for the use of massage, ultrasound, electrotherapy, electromagnetic field en LLLT in the treatment of HKOA[1,3-7].

III. Assessment of outcome

For the evaluation of treatment goals in HKOA patients several measurement instruments are available. Recommended measurement instruments pertained to ICF chapters activities and participation and body functions and structures and were chosen based on their psychometric properties: validity, reproducibility, responsiveness as well as there practical applicability. The latter included the availability of a Dutch version must be available, no special training should be necessary and the measurement should have a good applicability in daily clinical practice. The measurement instruments classified according the ICF are shown in Figure 3.

Clinical question 5: Which measurement instrument should be used to evaluate treatment?

RECOMMENDATION 11: A COMBINATION OF QUESTIONNAIRES (PREFERABLY THE PATIENT SPECIFIC COMPLAINT LIST (PSK)) AND PERFORMANCE TESTING (PREFERABLY THE TIMED UP AND GO TEST (TUG)) IS RECOMMENDED TO USE

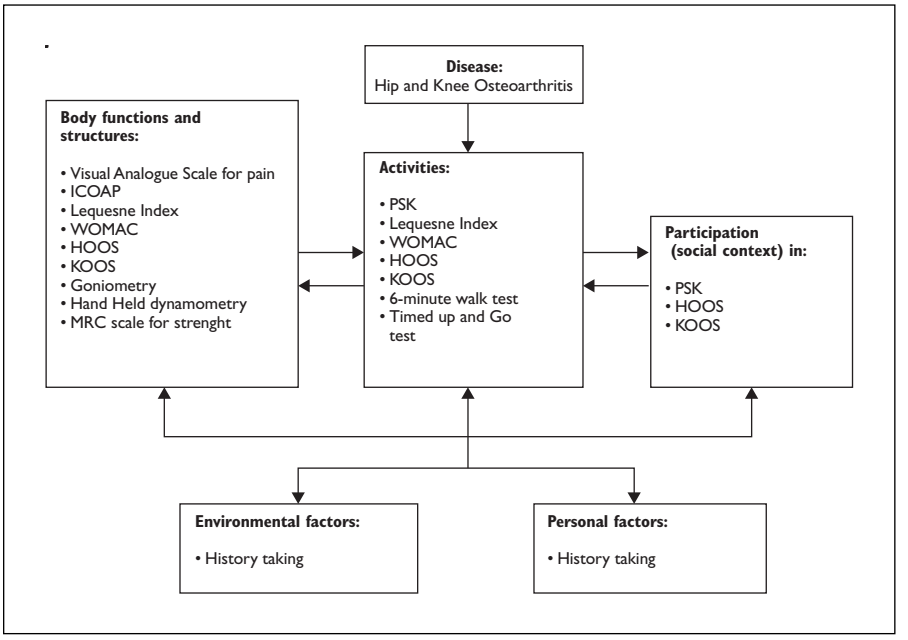

Figure 3. Measurement instruments in Hip and Knee Osteoarthritis according a ICF classification (some measurement instruments are suitable in more than one ICF component).

PSK = Patient Specific Complaint list, ICOAP = Intermittent and Constant OsteoArthrtis Pain, WOMAC = Western Ontario and McMaster Universities Osteoarthritis index, HOOS = Hip disability and Osteoarthritis Outcome Score, KOOS = Knee injury and Osteoarthritis Outcome Score, MRC = Medical Research Council

IN THE INITIAL ASSESSMENT AND EVALUATING TREATMENT GOALS AND SHOULD HAVE THE FOCUS ON THE ICF COMPONENT IN WHICH THE PATIENT PRESENTS HIS COMPLAINTS. The physiotherapists in the field prefer a recommendation for one or two best measurement instruments. Despite more measurement instruments are useful in daily practice depending on treatment goals, the Guideline Steering Committee prefer to recommend one questionnaire and one performance test. They were chosen primarily for their good applicability in daily practice:

Patient Specific Complaint list In the Netherlands the PSK (Patiënt Specifieke Klachten) is developed[64] as an instrument to record patient specific complaints. The patient has to choose the three most limited activities from a list of activities in which patients can be limited because of HKOA. On a 100 mm visual analogue scale the degree of limitation can be outlined by the patient for each activity. With on the left end "no limitation in the activity" and on the right end "the activity is not feasible" the patient express how the degree of limitation of the activity is by means of a vertical line. The score is determined by measuring the distance in millimeters from the left end of the line to the point that the patient marks.

Timed Up and Go (TUG) test The TUG test[65,66] measures the time in seconds in which the patient stand up from a chair, walk three meters, turn around, walk back and sit down on the chair. The test must take place in comfortable speed.

Other measurement instruments that are recommended in HKOA patients are shown in Figure 2. In this figure the connections between the measurement instruments to the different components of the ICF are clarified.

For measuring pain there is a choice to use two different scales: *A Visual Analogue Scale (VAS) for pain*[67] is usually a horizontal line of 100 millimeters. The VAS is filled in by the patient as described at the PSK. If the pain is intermittent, which occur in HKOA patient the *Intermittent and Constant OsteoArthritis Pain (ICOAP)*[68] could be used. This questionnaire is taken into account intermittent pain experience by the patient, for example in using pain medication by the patient.

For measuring strength the use of a *handheld dynamometer*[67] is recommended or if that is not available, the *Medical Research Council (MRC) for strength*[69] is recommended as an alternative.

The Range Of Motion (ROM) should be measured by using *goniometry*[70]. A Measurement instrument to measure walking and aerobic capacity is *the 6 minute walk test*[65,66]. During the 6-minutes walk test the patients have to walk 6 minutes at a self chosen walking speed and they have to try to overcome as much distance as possible, without running. The accomplished distance is the total distance at the end of the 6 minutes.

Finally to measure limitation in activities and restrictions in participation four different questionnaires are recommended. The choice between those four depends on the joint and the treatment goals. *The Western Ontario and McMaster Universities osteoarthritis index (WOMAC)*[71,72] measures limitations in activities as well as pain and stiffness in HKOA patients. *The Lequesne index* [73] has its focus on limitations in walking distance and pain during walking in HKOA. The *HOOS* [74] and the *KOOS* [75] ask besides limitation in activities also for restrictions in participation in sports and recreational activities and quality of life, respectively in Hip OA and Knee OA.

Table II shows an overview of all recommendations.

Discussion

This study describes the development of a physiotherapy (PT) specific guideline for the management of HKOA. This guideline is based on recent research evidence and expert opinion. It was developed according to standardised procedures for formulating recommendations. The guideline describes the process of initial assessment, including

Table II. Summary of recommendations and level of evidence

Initial assessment

1. The physiotherapist should assess the patient's health status primarily in terms of activity limitations and participation restrictions. In addition, the therapist may also assess impairments of body function and structure, as well as personal and environmental factors, insofar as these relate to the limitations and restrictions (level 4).
2. Physiotherapists should evaluate the presence of "red flags" (level 4).
3. Based on the information obtained in the initial assessment, in cooperation with the patient and according the ICF, the physiotherapist should define the therapeutic goals (level 4).

Interventions

4. (Supervised) exercise therapy aimed at reducing pain and improving physical functioning should be applied during the physiotherapy treatment of hip and knee osteoarthritis patients (level 1).
5. Physiotherapists should provide hip and knee osteoarthritis patients education and must promote adequate self management (level 2).
6. Exercise therapy should be combined with manual therapy in cases of pain and reversible limitation in joint mobility (level 2).
7. Exercise therapy aimed at improving physical functioning should be applied after hip and knee joint replacement surgery (level 2).
8. Taping the patella should be adjusted to muscle strengthening exercises and exercises focusing on functional activities to increase pain in patellofemoral OA (level 2).
9. The provision of hydrotherapy, balneotherapy, thermotherapy, preoperative physiotherapy in hip and knee osteoarthritis, and Transcutane Electrical Neuro Stimulation (TENS) in knee OA , and Continuous Passive Motion (CPM) in postoperative knee OA, can neither be recommended nor discouraged (level 1, 4).
10. The provision of massage, ultrasound, electrotherapy, electromagnetic field and low level laser therapy (LLLT) can not be recommended in hip and knee osteoarthritis (level 1, 2, 4).

Assessment of outcome

11. A combination of questionnaires (preferably the Patient Specific Complaint list (PSK)) and performance testing (preferably the Timed Up and Go test (TUG)) is recommended to use in the initial assessment and evaluating treatment goals and should have the focus on the ICF component in which the patient presents his complaints (level 4).

history taking, physical examination, analysis, PT interventions and various measurement instruments that can be used to evaluate treatment.

In contrast with other guidelines, this guideline gives recommendations on initial assessment en evaluation of treatment. The ICF framework[8] has a central place in this guideline. An overview is added concerning the ICF linked health related problems and measurement instruments. This linking on the ICF is also been used in two recently developed PT guidelines on hip osteoarthritis[76] and meniscal and articular cartilage lesions of the knee[77].

Another difference between this guideline and other (multidisciplanairy) guidelines on HKOA is that the recommendations are formulated not only based on literature but also considerations from daily practice are playing an important role in formulating recommendations. For example: although there is evidence that laser therapy could be effective in knee OA, it is not a common intervention in the Netherlands and furthermore the National Health Counsel (Gezondheidsraad) is not recommending the use of laser in knee OA patients. Concerning other interventions (hydrotherapy and thermotherapy ao.) in which the evidence is sometimes weak, the guideline steering committee decided that the intervention only could be considered in specific individual cases after good clinical reasoning.

Among multidisciplinary guidelines ICSI Health Care[78] is giving annotations in the initial assessment. But in treatment they have a more passive approach since recommendations on electrical therapy and massage were given for pain relief, while this guideline has a clearly active approach without recommendations on passive modalities like massage, electrotherapy, laser, ultrasound and electromagnetic field.

Exercise, education and self management interventions are overall recommended in national and international multidisciplinary guidelines on HKOA. For exercises and manual therapy the recommendations are comparable with those from the Ottawa panel[79]. Also TENS in knee OA is overall recommended. But this guideline is more cautious based on recent evidence [49].

In contrast with other national[2] and international multidisciplinary guidelines on HKOA[3-7] this guideline gives recommendations concerning physical therapy treatment before and after total hip or knee replacement in osteoarthritis. Only the Dutch multidisciplinary CBO guideline[1] comprise some individual exceptions for pre-operative exercises based on expert opinion for example in case of worse physical status of the patient before surgery.

The MOVE consensus[7] mentions contra-indicators and barriers for exercise. The Dutch PT guideline pre-empt this by formulating general en specific red flags for HKOA. But these red flags are not only concerning exercises but also PT treatment in general. Besides barriers also facilitators which can influence outcome of treatment, are described.

Guidelines, recommendations and protocols on hip and knee will be available in many different countries, published or not. Discrepancies exist based on date (of publication) or the different national usual method of treatment. International cooperation between PT societies may be a following step in consensus on a guideline for the treatment of HKOA patients.

To facilitate the use of guidelines in daily practice it is important to apply an implementation strategy. Implementation studies with regard to other PT guidelines have shown that didactic education and passive dissemination strategies were ineffective[80]. Multifaceted interventions, interactive education and clinical reminder systems have been shown to be more effective to implement PT guidelines[81]. In a following study a more effective implementation strategy will be researched.

Correspondence to
W.F.H.Peter, PT
Leiden University Medical Center,
Department of Rheumatology (C1-R)
P.O. box 9600, 2300 RC Leiden,
The Netherlands
E-mail: w.f.h.peter@lumc.nl

References

1. CBO. Richtlijn Diagnostiek en Behandeling van heup- en knie artrose. http://www cbo nl/thema/Richtlijnen/Overzicht-richtlijnen/Bewegingsapparaat/ 2007.
2. Belo JN, Bierma-Zeinstra SMA, Raaijmakers AJ, Van der Wissel F, Opstelten W. Huisarts Wet. NHG-Standaard Niet-traumatische knieproblemen bij volwassenen, NHG Standaarden voor de huisarts. 51 ed. Houten: Bohn Stafleu van Loghum; 2008.
3. Jordan KM, Arden NK, Doherty M, Bannwarth B, Bijlsma JW, Dieppe P, 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.
4. Zhang W, Doherty M, Arden N, Bannwarth B, Bijlsma J, Gunther KP, 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.
5. Zhang W, Moskowitz RW, Nuki G, Abramson S, Altman RD, Arden N, et al. OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. Osteoarthritis Cartilage 2008;16:137-162.
6. Roddy E, Doherty M. Guidelines for management of osteoarthritis published by the American College of Rheumatology and the European League Against Rheumatism: why are they so different? Rheum Dis Clin North Am 2003;29:717-731.
7. Roddy E, Zhang W, Doherty M, Arden NK, Barlow J, Birrell F, et al. Evidence-based recommendations for the role of exercise in the management of osteoarthritis of the hip or knee—the MOVE consensus. Rheumatology (Oxford) 2005;44:67-73.
8. Dreinhofer K, Stucki G, Ewert T, Huber E, Ebenbichler G, Gutenbrunner C, et al. ICF Core Sets for osteoarthritis. J Rehabil Med 2004;44 Suppl:75-80.
9. MacDermid JC, Brooks D, Solway S, Switzer-McIntyre S, Brosseau L, Graham ID. Reliability and validity of the AGREE instrument used by physical therapists in assessment of clinical practice guidelines. BMC Health Serv Res 2005;5:18.
10. Verhagen AP, de Vet HC, de Bie RA, Kessels AG, Boers M, Bouter LM, et al. The Delphi list: a criteria list for quality assessment of randomized clinical trials for conducting systematic reviews developed by Delphi consensus. J Clin Epidemiol 1998;51:1235-1241.
11. Shekelle PG, Woolf SH, Eccles M, Grimshaw J. Clinical guidelines: developing guidelines. BMJ 1999;318: 593-596.
12. Burgers JS, van Everdingen JJ. Evidence-based guideline development in the Netherlands: the EBRO platform. Ned Tijdschr Geneeskd. Ned Tijdschr Geneekunde 2004;16:2057-2059.
13. Bovend'Eerdt TJ, Botell RE, Wade DT. Writing SMART rehabilitation goals and achieving goal attainment scaling: a practical guide. Clin Rehabil 2009;23:352--361.
14. Lim BW, Hinman RS, Wrigley TV, Sharma L, Bennell KL. Does knee malalignment mediate the effects of quadriceps strengthening on knee adduction moment, pain, and function in medial knee osteoarthritis? A randomized controlled trial. Arthritis Rheum 2008;59:943-951.
15. Fransen M, McConnell S. Exercise for osteoarthritis of the knee. Cochrane Database Syst Rev 2008;(4): CD004376.
16. Hernandez-Molina G, Reichenbach S, Zhang B, Lavalley M, Felson DT. Effect of therapeutic exercise for hip osteoarthritis pain: results of a meta-analysis. Arthritis Rheum 2008;59:1221-1228.
17. Jan MH, Tang PF, Lin JJ, Tseng SC, Lin YF, Lin DH. Efficacy of a target-matching foot-stepping exercise on proprioception and function in patients with knee osteoarthritis. J Orthop Sports Phys Ther 2008;38:19--25.
18. Jan MH, Lin JJ, Liau JJ, Lin YF, Lin DH. Investigation of clinical effects of high- and low-resistance training for patients with knee osteoarthritis: a randomized controlled trial. Phys Ther 2008;88:427-436.
19. Mangione KK, McCully K, Gloviak A, Lefebvre I, Hofmann M, Craik R. The effects of high-intensity and low-intensity cycle ergometry in older adults with knee osteoarthritis. J Gerontol A Biol Sci Med Sci 1999;54: M184-M190.
20. Diracoglu D, Aydin R, Baskent A, Celik A. Effects of kinesthesia and balance exercises in knee osteoarthritis. J Clin Rheumatol 2005;11:303-310.
21. Veenhof C, Koke AJA, Dekker J, Oostendorp RA, Bijlsma JWJ, van Tulder MW, et al. Effectiveness of behavioral graded activity in patients with osteoarthritis of the hip and/or knee: A randomized clinical trial. Arthritis & Rheumatism-Arthritis Care & Research 2006;55:925-934.
22. Maurer BT, Stern AG, Kinossian B, Cook KD, Schumacher HR, Jr. Osteoarthritis of the knee: isokinetic quadriceps exercise versus an educational intervention. Arch Phys Med Rehabil 1999;80:1293-1299.
23. Devos-Comby L, Cronan T, Roesch SC. Do exercise and self-management interventions benefit patients with osteoarthritis of the knee? A metaanalytic review. J Rheumatol 2006;33:744-756.
24. Tak E, Staats P, Hespen van A, Hopman-Rock M. The Effects of an Exercise Program for Older Adults with Osteoarthritis of the Hip. J Rheumatol 2005;32:1106--1113.
25. Hopman-Rock M, Westhoff MH. The effects of a health educational and exercise program for older adults with osteoarthritis for the hip or knee. J Rheumatol 2000;27:1947-1954.
26. Yip YB, Sit JW, Wong DY, Chong SY, Chung LH. A 1-year follow-up of an experimental study of a self-management arthritis programme with an added exercise component of clients with osteoarthritis of the knee. Psychol Health Med 2008;13:402-414.
27. Heuts PH, de BR, Drietelaar M, Aretz K, Hopman-Rock M, Bastiaenen CH, et al. Self-management in osteoarthritis of hip or knee: a randomized clinical trial in a primary healthcare setting. J Rheumatol 2005;32:543-549.
28. Pollard H, Ward G, Hoskins W, Hardy K. The effect of

a manual therapy knee protocol on osteoarthritic knee pain: a randomised controlled trial. JCCA J Can Chiropr Assoc 2008;52:229-242.
29. Deyle GD, Allison SC, Matekel RL, Ryder MG, Stang JM, Gohdes DD, et al. Physical therapy treatment effectiveness for osteoarthritis of the knee: a randomized comparison of supervised clinical exercise and manual therapy procedures versus a home exercise program. Phys Ther 2005;85:1301-1317.
30. Hoeksma HL, Dekker J, Ronday HK, Heering A, van der LN, Vel C, et al. Comparison of manual therapy and exercise therapy in osteoarthritis of the hip: a randomized clinical trial. Arthritis Rheum 2004; 51:722-729.
31. Moss P, Sluka K, Wright A. The initial effects of knee joint mobilization on osteoarthritic hyperalgesia. Man Ther 2007;12:109-118.
32. Vaarbakken K, Ljunggren AE. Superior effect of forceful compared with standard traction mobilizations in hip disability? Adv Physiother 2007;9:117-128.
33. Minns Lowe CJ, Barker KL, Dewey M, Sackley CM. Effectiveness of physiotherapy exercise after knee arthroplasty for osteoarthritis: Systematic review and meta-analysis of randomised controlled trials. British Medical Journal, 2007;812-815.
34. Minns Lowe CJ, Barker KL, Dewey ME, Sackley CM. Effectiveness of physiotherapy exercise following hip arthroplasty for osteoarthritis: a systematic review of clinical trials. BMC Musculoskelet Disord 2009;10:98.
35. Galea MP, Levinger P, Lythgo N, Cimoli C, Weller R, Tully E, et al. A targeted home- and center-based exercise program for people after total hip replacement: A randomized clinical trial. Archives of Physical Medicine and Rehabilitation 89(8)()(pp 1442-1447), 2008:1442-1447.
36. Gilbey HJ, Ackland TR, Tapper J. Perioperative exercise improves function following total hip arthroplasty: A randomized controlled trial. Journal of Musculoskeletal Research 2003;7:111-123.
37. Warden SJ, Hinman RS, Watson MA, Jr., Avin KG, Bialocerkowski AE, Crossley KM. Patellar taping and bracing for the treatment of chronic knee pain: a systematic review and meta-analysis. Arthritis Rheum 2008;59:73-83.
38. Quilty B, Tucker M, Campbell R, Dieppe P. Physiotherapy, including quadriceps exercises and patellar taping, for knee osteoarthritis with predominant patello-femoral joint involvement: randomized controlled trial. J Rheumatol 2003 ;30:1311-1317.
39. Hinman RS, Heywood SE, Day AR. Aquatic physical therapy for hip and knee osteoarthritis: results of a single-blind randomized controlled trial. Phys Ther 2007;87:32-43.
40. Silva LE, Valim V, Pessanha AP, Oliveira LM, Myamoto S, Jones A, et al. Hydrotherapy versus conventional land-based exercise for the management of patients with osteoarthritis of the knee: a randomized clinical trial. Phys Ther 2008;88:12-21.
41. Bartels EM, Lund H, Hagen KB, Dagfinrud H, Christensen R, nneskiold-Samsoe B. Aquatic exercise for the treatment of knee and hip osteoarthritis. Cochrane Database Syst Rev 2007;(4):CD005523.
42. Lund H, Weile U, Christensen R, Rostock B, Downey A, Bartels EM, et al. A randomized controlled trial of aquatic and land-based exercise in patients with knee osteoarthritis. J Rehabil Med 2008;40:137-144.
43. Tsae-Jyy Wang, Basia Belza, F.Elaine Thompson, Joanne D.Whitney, Kim Bennett. Effects of aquatic exercise on flexibility, strength and aerobic fitness in adults with osteoarthritis of the hip or knee. Journal of Advanced Nursing 2006;57:141-152.
44. Fransen M, Nairn L, Winstanley J, Lam P, Edmonds J. Physical activity for osteoarthritis management: a randomized controlled clinical trial evaluating hydrotherapy or Tai Chi classes. Arthritis Rheum 2007; 57:407-414.
45. Verhagen A, Bierma-Zeinstra S, Lambeck J, Cardoso JR, de BR, Boers M, et al. Balneotherapy for osteoarthritis. A cochrane review. J Rheumatol 2008;35: 1118-1123.
46. Cantarini L, Leo G, Giannitti C, Cevenini G, Barberini P, Fioravanti A. Therapeutic effect of spa therapy and short wave therapy in knee osteoarthritis: A randomized, single blind, controlled trial. Rheumatology International 27(6)()(pp 523-529), 2007;6:523-529.
47. Balint GP, Buchanan WW, Adam A, Ratko I, Poor L, Balint PV, et al. The effect of the thermal mineral water of Nagybaracska on patients with knee joint osteoarthritis—a double blind study. Clin Rheumatol 2007;26:890-894.
48. Brosseau L, Yonge KA, Robinson V, Marchand S, Judd M, Wells G, et al. Thermotherapy for treatment of osteoarthritis. Cochrane Database Syst Rev 2003;(4): CD004522.
49. Rutjes AW, Nuesch E, Sterchi R, Kalichman L, Hendriks E, Osiri M, et al. Transcutaneous electrostimulation for osteoarthritis of the knee. Cochrane Database Syst Rev 2009;(4):CD002823.
50. Bjordal JM, Johnson MI, Lopes-Martins RA, Bogen B, Chow R, Ljunggren AE. Short-term efficacy of physical interventions in osteoarthritic knee pain. A systematic review and meta-analysis of randomised placebo-controlled trials. BMC Musculoskelet Disord 2007;8:51.
51. Milne S, Brosseau L, Robinson V, Noel MJ, Davis J, Drouin H, et al. Continuous passive motion following total knee arthroplasty. Cochrane Database Syst Rev 2003;(2):CD004260.
52. Lenssen TA, van Steyn MJ, Crijns YH, Waltje EM, Roox GM, Geesink RJ, et al. Effectiveness of prolonged use of continuous passive motion (CPM), as an adjunct to physiotherapy, after total knee arthroplasty. BMC

Musculoskelet Disord 2008;9:60.
53. Bruun-Olsen V, Heiberg KE, Mengshoel AM. Continuous passive motion as an adjunct to active exercises in early rehabilitation following total knee arthroplasty - a randomized controlled trial. Disabil Rehabil 2009;31:277-283.
54. Denis M, Moffet H, Caron F, Ouellet D, Paquet J, Nolet L. Effectiveness of continuous passive motion and conventional physical therapy after total knee arthroplasty: a randomized clinical trial. Phys Ther 2006;86:174-185.
55. Beaupre LA, Lier D, Davies DM, Johnston DB. The effect of a preoperative exercise and education program on functional recovery, health related quality of life, and health service utilization following primary total knee arthroplasty. J Rheumatol 2004;31:1166--1173.
56. Ackerman IN, Bennell KL. Does pre-operative physiotherapy improve outcomes from lower limb joint replacement surgery? A systematic review. Aust J Physiother 2004;50:25-30.
57. Rooks DS, Huang J, Bierbaum BE, Bolus SA, Rubano J, Connolly CE, et al. Effect of preoperative exercise on measures of functional status in men and women undergoing total hip and knee arthroplasty. Arthritis Rheum 2006;55:700-708.
58. Topp R, Swank AM, Quesada PM, Nyland J, Malkani A. The effect of prehabilitation exercise on strength and functioning after total knee arthroplasty. PM R 2009;1:729-735.
59. Perlman AI, Sabina A, Williams AL, Njike VY, Katz DL. Massage therapy for osteoarthritis of the knee: a randomized controlled trial. Arch Intern Med 2006;166: 2533-2538.
60. Welch V, Brosseau L, Peterson J, Shea B, Tugwell P, Wells G. Therapeutic ultrasound for osteoarthritis of the knee. Cochrane Database Syst Rev 2001;(3): CD003132.
61. Ozgonenel L, Aytekin E, Durmusoglu G. A double-blind trial of clinical effects of therapeutic ultrasound in knee osteoarthritis. Ultrasound Med Biol 2009; 35:44-49.
62. Ay S, Evcik D. The effects of pulsed electromagnetic fields in the treatment of knee osteoarthritis: a randomized, placebo-controlled trial. Rheumatol Int 2008.
63. Rattanachaiyanont M, Kuptniratsaikul V. No additional benefit of shortwave diathermy over exercise program for knee osteoarthritis in peri-/postmenopausal women: an equivalence trial. Osteoarthritis Cartilage 2008;16:823-828.
64. Beurskens AJ, de Vet HC, Koke AJ, Lindeman E, van der Heijden GJ, Regtop W, et al. A patient-specific approach for measuring functional status in low back pain. J Manipulative Physiol Ther 1999;22:144-148.
65. Steffen TM, Hacker TA, Mollinger L. Age- and gender-related test performance in community-dwelling elderly people: Six-Minute Walk Test, Berg Balance Scale, Timed Up & Go Test, and gait speeds. Phys Ther 2002;82:128-137.
66. Stratford PW, Kennedy DM, Woodhouse LJ. Performance measures provide assessments of pain and function in people with advanced osteoarthritis of the hip or knee. Phys Ther 2006;86:1489-1496.
67. Swinkels RAHM. Measurement instruments for patients with rheumatic disorders: a clinimatric appraisal. Datawyse boekprodukties Amsterdam, Vrije Universiteit; 2005.
68. Maillefert JF, Kloppenburg M, Fernandes L, Punzi L, Gunther KP, Martin ME, et al. Multi-language translation and cross-cultural adaptation of the OARSI/ /OMERACT measure of intermittent and constant osteoarthritis pain (ICOAP). Osteoarthritis Cartilage 2009;17:1293-1296.
69. van der Ploeg RJ, Oosterhuis HJ. [Physical examination—measurement of muscle strength]. Ned Tijdschr Geneeskd 2001;145:19-23.
70. Steultjens MP, Dekker J, van Baar ME, Oostendorp RA, Bijlsma JW. Range of joint motion and disability in patients with osteoarthritis of the knee or hip. Rheumatology (Oxford) 2000;39:955-961.
71. Veenhof C, Bijlsma JW, van den Ende CH, van Dijk GM, Pisters MF, Dekker J. Psychometric evaluation of osteoarthritis questionnaires: a systematic review of the literature. Arthritis Rheum 2006;55:480-492.
72. Roorda LD, Jones CA, Waltz M, Lankhorst GJ, Bouter LM, van der Eijken JW, et al. Satisfactory cross cultural equivalence of the Dutch WOMAC in patients with hip osteoarthritis waiting for arthroplasty. Ann Rheum Dis 2004;63:36-42.
73. Lequesne MG. The algofunctional indices for hip and knee osteoarthritis. J Rheumatol 1997;24:779-781.
74. de Groot I, Reijman M, Terwee CB, Bierma-Zeinstra SM, Favejee M, Roos EM, et al. Validation of the Dutch version of the Hip disability and Osteoarthritis Outcome Score. Osteoarthritis Cartilage 2007;15:104-109.
75. de Groot I, Favejee MM, Reijman M, Verhaar JA, Terwee CB. The Dutch version of the Knee Injury and Osteoarthritis Outcome Score: a validation study. Health Qual Life Outcomes 2008;6:16.
76. Cibulka MT, White DM, Woehrle J, Harris-Hayes M, Enseki K, Fagerson TL, et al. Hip pain and mobility deficits—hip osteoarthritis: clinical practice guidelines linked to the international classification of functioning, disability, and health from the orthopaedic section of the American Physical Therapy Association. J Orthop Sports Phys Ther 2009;39:A1-A25.
77. Logerstedt DS, Snyder-Mackler L, Ritter RC, Axe MJ. Knee pain and mobility impairments: meniscal and articular cartilage lesions. J Orthop Sports Phys Ther 2010;40:A1-A35.
78. Lee J, Thorson D, Jurisson M, Hunt A, Yokan N,

Ackerman S, et al. Health Care Guideline: Diagnosis and Treatment of Adult Degenerative Joint Disease (DJD)/Osteoarthritis (OA) of the Knee. 2007.
79. Ottawa panel memmbers et al. Ottawa panel evidence-based clinical practice guidelines for therapeutic exercises and manual therapy in the management of osteoarthritis. Phys Ther 2005;85:907-971.
80. Prior M, Guerin M, Grimmer-Somers K. The effectiveness of clinical guideline implementation strategies—a synthesis of systematic review findings. J Eval Clin Pract 2008;14:888-897.
81. van der Wees PJ, Jamtvedt G, Rebbeck T, de Bie RA, Dekker J, Hendriks EJ. Multifaceted strategies may increase implementation of physiotherapy clinical guidelines: a systematic review. Aust J Physiother 2008; 54:233-241.

2nd Systemic Sclerosis World Congress

Madrid, Espanha
2 a 4 Fevereiro 2012

PANLAR

Punta Cana, República Dominicana
18 a 21 Abril 2012