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## PHYSIOTHERAPY IN RHEUMATOID ARTHRITIS: DEVELOPMENT OF A PRACTICE GUIDELINE

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### Abstract

**Background:** To improve the quality of the physiotherapy management in patients with rheumatoid arthritis (RA) a Dutch practice guideline, based on current scientific evidence and best practice, was developed. This guideline comprised all elements of a structured approach (assessment, treatment and evaluation) and was based on the International Classification of Functioning, disability and Health (ICF) and the ICF core sets for RA.

**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 re-

viewed by 10 experts from different professional backgrounds resulting in the final guideline.

**Results:** In total 7 topics were selected. For the initial assessment, three recommendations were made. Based on the ICF core sets for RA a list of health problems relevant for the physiotherapist was made and completed with red flags and points of attention. Concerning treatment, three recommendations were formulated; both exercise therapy and education on physiotherapy were recommended, whereas passive interventions (delivery of heat or cold, mechanical, electric and electromagnetic energy, massage, passive mobilization/manipulation and balneotherapy) were neither recommended nor discouraged. For treatment evaluation at the level of activities and participation, the Health Assessment Questionnaire was recommended. For evaluating specific body structures and functions the handheld dynamometer, 6-minute walk test or Åstrand bicycle test (including Borg-scale for rating the perceived exertion), Escola Paulista de Medicina Range of Motion Scale and a Visual Analog Scale for pain and morning stiffness were recommended.

**Conclusion:** This physiotherapy practice guideline for RA included seven recommendations on the initial assessment, treatment and evaluation, which were all based on the ICF and the ICF Core Set for RA. The implementation of the guideline in clinical practice needs further evaluation.

**Keywords:** Rheumatoid arthritis; Physiotherapy; Guideline; Clinical practice

### Introduction

Rheumatoid arthritis (RA) is a disease with a considerable impact in many patients, often requiring, apart from medical treatment, the involvement of

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various health care providers<sup>1</sup>. Physiotherapy is a relatively frequently applied treatment, with about 25-40% of patients with RA being treated by a physiotherapist over a period of one year<sup>1,2</sup>. Physiotherapy is recommended in a number of multidisciplinary international<sup>3-7</sup>. In addition to multidisciplinary guidelines, there are two Canadian guidelines on RA management specifically for the physical therapist<sup>8,9</sup>. Although these latter guidelines include detailed information with regard to various physiotherapy interventions, no information with regard to the physiotherapy diagnostic and evaluation processes is provided.

Since no physiotherapy specific guideline including all aspects of the physiotherapy management of RA patients is currently available, the aim of the present study was to develop a set of recommendations including the initial diagnostic process, physiotherapy interventions and their evaluation.

## Methods

The development of the guideline took place between May 2006 and October 2008. The guideline was developed according to current international methods for guideline development and implementation<sup>18</sup>. The guideline was developed by a Guideline Steering Committee comprising 10 expert physical therapists. Two members of the committee (EH and TVV) proposed a preliminary list of

topics to the Guideline Steering Committee based on textbooks, umbrella reviews and systematic reviews, and currently available physiotherapy guidelines. During a consensus meeting, a final list of 7 topics (3 for initial assessment, 3 for treatment, and 1 for evaluation) was selected (Table I).

The various steps for the actual guideline development comprised: literature search (step 1); grading of evidence (step 2); formulation of recommendations (step 3); and external review (step 4).

### Step 1: Literature search

With respect to the initial physiotherapy assessment, the preliminary search of the literature yielded little literature specifically addressing and substantiating individual topics within this dimension. Therefore, to summarize the evidence, we primarily used textbooks, review articles, umbrella review articles, and current guidelines on other, related conditions.

For the therapeutic process an intervention-specific literature search was performed up to June 2007 in the MEDLINE, EMBASE, CINAHL, Pedro, Web of Science and Cochrane databases to identify reviews, meta-analysis, and randomized controlled trials (RCTs). The central search strategy 'Arthritis, Rheumatoid' (MESH) was combined with other MESH-headings and/or free text words such as 'physiotherapy', 'physical therapy' (MESH), 'physical therapy modalities' (MESH), 'exercise therapy', 'physical education and training' (MESH).

**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 scheme<sup>13</sup>, such as the NICE approach**

<b>Grade of evidence</b>	A1	Meta-analyses (systematic reviews), which include at least two RCTs at quality level
	A2	that show consistent results between studies
	A2	RCTs of a good methodological quality (randomized double blind controlled studies) with sufficient power and consistency
	B	RCTs of a moderate methodological quality of with insufficient power, or non-randomized, cohort of patient-control group study involving intergroup comparisons
	C	Patient series
<b>Level of recommendation</b>	D	Expert opinion
	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

RCT: Randomized Controlled Trial

Studies were selected if sufficient data were reported with regard to the physiotherapy treatment of RA patients. In case no RCTs were found controlled clinical trials (CCTs) or other type of studies such as observational studies were identified and selected. A detailed description of this literature search, confined to the intervention dynamic exercise therapy, was published separately<sup>21</sup>.

With respect to evaluation, a search strategy up to June 2007 was applied within the same databases as those used for treatment. The central search strategy was combined with 'sensitivity and specificity' (MESH), 'expertise test', 'physical examination' (MESH), and 'treatment outcome' (MESH).

### 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 (a Dutch acronym for Evidence Based Recommendation Development) criteria (Table I), which is in line with international classification schemes<sup>22</sup>, such as the NICE (National Institute of Clinical Effectiveness) approach. EBRO is an initiative of the Dutch Cochrane Centre and the Dutch Institute for Healthcare Improvement (CBO), a member of the Guidelines International Network (GIN)<sup>23</sup>.

### Step 3: Strength of recommendations

By means of six consensus meetings 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: External Review by Guideline Review Committee

A first draft of the guideline was sent to the members of the Guideline Review Committee. The Guideline Review Committee included a rheumatologist, a clinical nurse specialist, an orthopaedic surgeon, a rehabilitation specialist, a social worker, an occupational therapist and a psychologist. Furthermore, representatives of the Dutch Arthritis Foundation and the Arthritis Patient Organization participated in the Guideline Review Committee. Comments were collected by e-mail, discussed with the Guideline Steering Committee and incorporated in the final draft. After adaptation, the final draft of the guideline was reviewed and pilot tested by 50 physiotherapists. Based on their comments minor comments concerning the feasibility of the measurement instruments, including lack

of time and space to perform are taken into account and the final guideline was finished.

## Results

### Initial assessment process

In the Netherlands, physiotherapy can be accessed with or without a referral from a physician (also called "direct access"). The Guideline Steering Committee considered the following information essential for the physiotherapist: verification of the diagnosis, extent of radiological joint damage, the presence of co-morbidity and current and expected disease activity under the present medical management. This information should be included in the referral. In case of insufficient information or direct access the physiotherapist should contact the patient's rheumatologist.

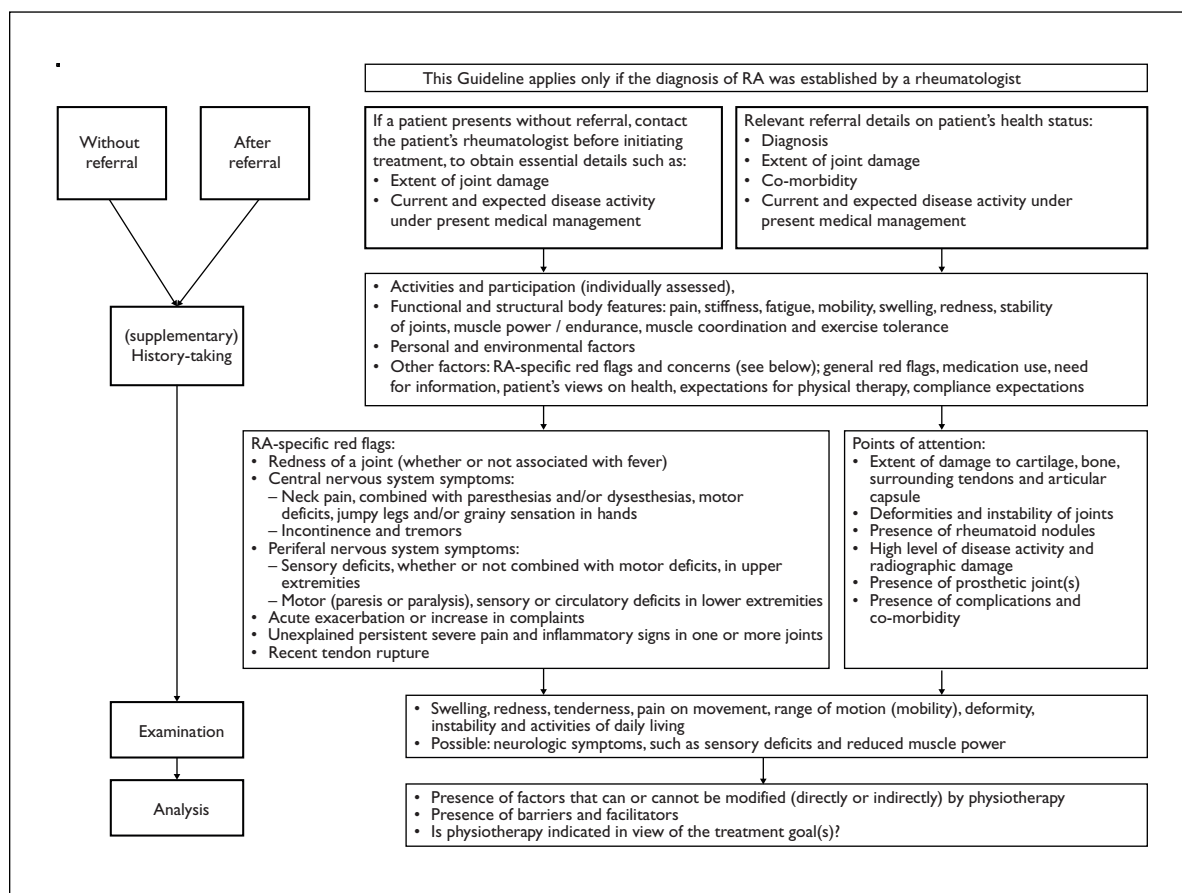
The initial assessment comprises history taking, physical examination and analysis. History taking and physical examination are performed to get a comprehensive overview of the patient's health status. This overview includes screening for red flags and points of attention. With the analysis, the patient's main limitations and impairments are prioritized, and treatment goals and a treatment plan are formulated. 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. In addition, the therapist may also assess impairments of body functions and structures, as well as personal and environmental factors, insofar as these relate to the limitations and restrictions (level 4).**

For the initial assessment, the physiotherapist should use an overview of the most relevant health problems in RA patients, based on the ICF Core Set for Rheumatoid Arthritis (short version)<sup>13-17</sup>, completed with a number of personal factors (Figure 2) This overview facilitates the structuring, organizational and documentation of the rehabilitation process. It enables physiotherapists to coordinate their actions. The key elements of this process are: the initial assessment, treatment and evaluation<sup>12</sup>.



**Figure 1.** Overview initial assessment

**Clinical question 2: Which contraindications for physical therapy should be taken into account in patients with RA?**

**RECOMMENDATION 2:**

**Physiotherapists should evaluate the presence of “red flags” and points of attention (level 4).**

The following specific red flags in RA patients were defined: redness of a joint (whether or not accompanied by fever); symptoms relating to the central nervous system (neck pain, in combination with paraesthesias and/or dysaesthesias, motor deficits, jumpy legs, and/or a grainy sensation in the hands, incontinence and tremors); peripheral neurological symptoms (sensory deficits, whether or not in combination with motor deficits, in the upper extremities, motor deficits (paresis or paralysis), sensory or circulatory deficits in the lower extremities); acute exacerbation or increased complaints; unexplained persistent severe pain and inflammatory signs in one or more joints; recent tendon

rupture (e.g. of the extensor digitorum, extensor pollicis, or biceps brachii muscle).

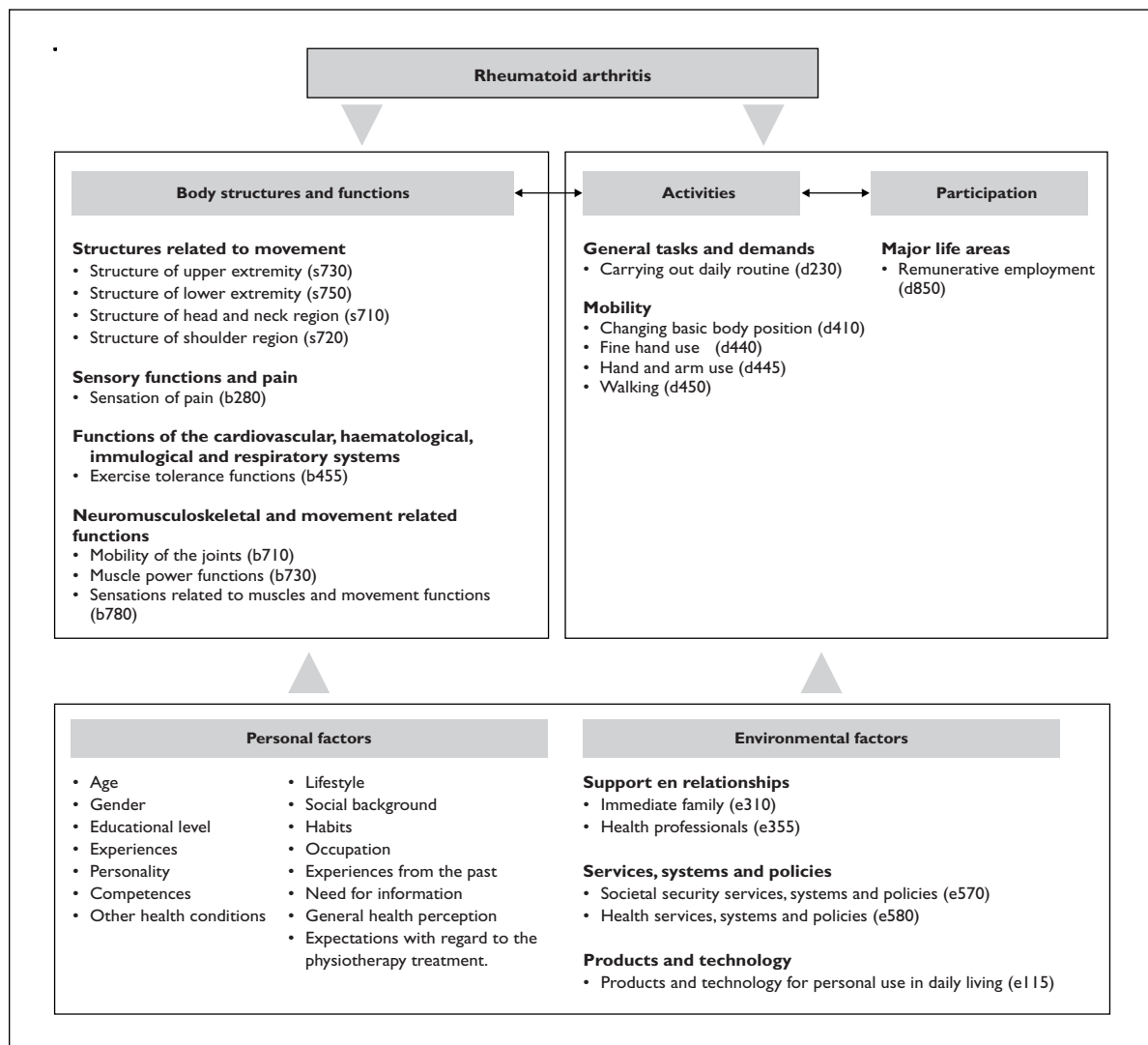
The following specific points of attention in RA patients were defined: extent of damage to cartilage, bone, surrounding tendons and articular capsule; deformities and instability of joints; presence of rheumatoid nodules; high level of disease activity and radiographic damage; presence of joint prostheses; and presence of complications of RA or co-morbidity.

**Clinical Question 3: How does the physical therapist set treatment goals?**

**RECOMMENDATION 3:**

**Based on the information obtained in the initial assessment, the physiotherapist should define the therapeutic goals (level 4).**

Based on of the description of the health status and environmental and personal factors, individual treatment goals should be defined. Goal



**Figure 2.** Overview of the most relevant health problems in RA according to the International Classification of Functioning, Disability and Health (ICF) Core Set for Rheumatoid Arthritis (short version).

setting is a shared process between the physiotherapist and the patient. In terms of the ICF, goals are defined within the components of functioning (activities and participation, and body functions and body structures). Goals should be formulated according to the SMART principles (specific, measurable, achievable, realistic, and timely), for example: being able to walk 300 meters (from home to the supermarket and back) two times a week in six weeks. In the next step, specific treatment modalities should be assigned to the treatment goals.

### Therapeutic process

With respect to the literature search concerning the therapeutic process, 7 systematic reviews (con-

cerning 33 randomized controlled trials (RCTs)), 4 RCTs and 1 clinical controlled trial (CCT) (published after these reviews) were selected<sup>26-44</sup> (Table 2).

### *Clinical question 4: Which physical therapy interventions should or should not be given in patients with RA?*

#### RECOMMENDATION 4:

**Exercise therapy (in particular exercises with sufficient intensity to improve aerobic capacity and/or muscle strength) should be applied in the physiotherapy treatment of RA patients (level 1).**

**Table II. Overview of formulated recommendations for the physiotherapy management of patients with RA**

Table II. Overview of formulated recommendations for the physiotherapy management of patients with RA			
Recommendations Diagnostic Process			
Initial assessment	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 functions and structures, as well as personal and environmental factors, insofar as these relate to the limitations and restrictions.		Level 4
Red flags	Physiotherapists should evaluate the presence of “red flags” and points of attention (see figure 2).		Level 4
Treatment plan	Based on the information obtained in the initial assessment, the physiotherapist should define the overall objective and the therapeutic goals while keeping in mind the patient's motivation and the presence of favorable and unfavorable factors.		Level 4
Recommendations Therapeutic Process			
Exercise therapy	Systematic review (8 RCTs) (A1)	On the basis of currently available evidence and best practice, exercise therapy (in particular high intensive exercises) is recommended in RA patients	Level 1 and 4
Education	2 RCTs (both B)	On the basis of currently available evidence and best practice, the guideline development team recommends providing RA patients with information and advice about physical activity	Level 2
The delivery of electric energy	Electrical stimulation: systematic review (1 RCT) (B) TENS: systematic review (3 RCTs) (all B)	Based on the currently available evidence and best practice, the delivery of heat and cold, electric, mechanical and electromagnetic energy, massage, passive mobilization/manipulation and balneotherapy can neither be recommended nor discouraged. In case of high disease activity, the applications which increase the intra-articular joint temperature are advised against. Manual manipulation of the cervical spine is advised against.	Level 2, 3 and 4
The delivery of electromagnetic energy	Systematic review (6 RCTs) (all B)		
The delivery of mechanical energy	Systematic review (2 RCTs) (all B)		
Thermotherapy	Systematic review (7 RCT's) (all B) Extra RCT (B)		
Massage	1 controlled, non-randomized trial (C)		
Manual therapy	1 RCT (C)		
Balneotherapy	Systematic review (6 RCTs) (all B)		
Recommendation Measurements			
Evaluation measurements	Review (A1)	One general measurement instrument should always be used to evaluate the therapeutic goals. Specific evaluations can be done with the help of instruments developed specifically for the relevant joint or extremity. Measurements should preferably be made at the start of treatment and repeated during treatment and at its termination. The selected measurements: the HAQ for functional ability, the VAS for pain and stiffness, EPR-ROM for joint mobility, 6-minute walk-test or Astrand test (incl. Borg) for aerobic capacity and the Hand Held Dynamometer for muscle strength.	Level 1 and 4

RCT: Randomized Controlled Trial; HAQ: Health Assessment Questionnaire

Supervised exercise therapy, aimed at improving muscle strength and/or aerobic capacity, (dynamic exercise therapy) was found to be effective with respect to functional ability, aerobic capacity and muscle strength, and safe in RA patients<sup>26-33</sup> (level 1). The effectiveness and safety of dynamic exercise therapy has also been established in patients with active disease<sup>45</sup> and in patients with early RA<sup>46-51</sup> (level 1). There is a lack of evidence with regard to low to moderate intensity exercise therapy in RA patients.

In previously published international multidisciplinary guidelines and a Dutch multidisciplinary guideline on RA management, exercise therapy<sup>5,6</sup> or dynamic exercise<sup>3,4,7</sup> is recommended. In the physiotherapy guideline on exercise therapy<sup>9</sup> low intensity exercise therapy was recommended, since it was concluded that dynamic exercise therapy might exacerbate the inflammatory process and the risk of damage to the affected joints<sup>9</sup>. The literature on which this guideline was based did however not include a high quality RCT which was published afterwards, showing that dynamic exercise therapy is safe in RA patients with regard to pain and radiological damage<sup>32</sup>.

In the Netherlands aerobic exercises and muscle strengthening exercises are usually combined with range of motion (ROM) exercises and functional training (the training of specific daily activities). Exercise therapy is mostly provided on an individual basis in private practices, with few well-defined, individual or group exercise programs for RA patients being available.

In addition to the abovementioned recommendation on exercise therapy, there was overall consensus within the Guideline Steering Committee that exercise therapy should be aimed at patient-specific limitations in activities or participation restrictions and/or impairments of body functions or structures (level 4) and consist of exercises to improve aerobic capacity and muscle strength (level 1) which are, according to the patient's individual health status, combined with range of motion (ROM) exercises, exercises to improve coordination/stability and/or functional training (level 4).

As there is no evidence on the optimal mode of delivery, the Guideline Steering committee could not recommend specific forms of exercise therapy (e.g. land-based or water-based, group or individual basis) and concluded that the mode of delivery would be dependent on the available practice facilities or the patient's preferences (level 4).

#### RECOMMENDATION 5:

**Physiotherapists should provide information and advice on a healthy physical activity level in daily life to patients with RA (level 2).**

There is conflicting evidence that in RA patients interventions aimed to become or remain physically active according to the Public Health Recommendations for physical activity (physical activity for 30 minutes in succession on a moderate intensity level on at least 5 days a week) are effective with respect to an increase of the amount of physical activity or improvement of functional ability or quality of life<sup>34,35</sup>.

In the Work Group Recommendations of the 2002 Exercise and Physical Activity conference: Session IV, Exercise in the Presence of Rheumatic Disease<sup>52</sup>, education of RA patients with regard to physical activity is recommended.

There was overall consensus within the Guideline Steering committee that to optimize RA patients' self-management, education with regard to physical activity in daily life should be recommended as an adjunct to supervised exercises (level 2).

The physiotherapist should also educate the patient about ways to maintain the targets they have achieved during the physiotherapy treatment. Such advice may include tips for maintaining healthy physical activity behaviour in everyday life, or may involve helping the patient take up regular exercise or sports activities or enrol in supervised group exercise programs in the community, for example the "people with arthritis can exercise" (PACE) program<sup>53</sup>.

#### RECOMMENDATION 6:

**The provision of heat and cold, electric, mechanical and electromagnetic energy, balneotherapy, massage and manually moving joints can neither be recommended nor discouraged (level 2, 3 and 4).**

*The application of heat and cold:* There is conflicting evidence that the local application of heat or cold is effective in RA patients<sup>36,37</sup> (level 2). Local heat applications have been found to increase the intra-articular temperature of the joint<sup>54</sup> (level 4).

A Dutch multidisciplinary guideline recommends the local application of heat or cold only in individual cases in addition to exercise therapy<sup>7</sup>. The international physiotherapy guideline recommends the use of heat and cold applications<sup>8</sup>. That recommendation is based on two RCTs (one re-



garding cold applications and one regarding the application of heat) whereas in our guideline development we also selected and reviewed five studies with other designs<sup>36</sup>, showing less positive results compared to the RCTs. None of the international multidisciplinary guidelines<sup>3-6</sup> included recommendations on the application of heat or cold.

In the Netherlands, heat or cold applications are sometimes used in daily practice as an adjunct to exercise therapy, with the aim to decrease pain or stiffness.

In addition to the abovementioned recommendation on local heat or cold applications, the Guideline Steering Committee advises against the use of local heat application in case of active joint inflammation (level 4).

*The application of electrical, mechanic and electromagnetic energy:* There is conflicting evidence that ultrasound and TENS are effective in RA patients<sup>39,41</sup> (level 2), whereas there is level 3<sup>38</sup> evidence that the application of electrical energy is effective in RA patients and level 2<sup>40</sup> evidence that low level laser therapy is not effective in RA patients.

In a Dutch multidisciplinary guideline<sup>7</sup> these applications are not recommended. An international physiotherapy guideline<sup>8</sup> recommends the use of therapeutic ultrasound, electrical stimulation, TENS and low-level laser therapy for the management of RA patients.

The Health Council of the Netherlands (Gezondheidsraad) has advised against the use of ultrasound, electrical stimulation, TENS and low-level laser therapy, except for the application of ultrasound in patients with a tennis elbow, TENS in osteoarthritis and low level laser therapy in RA<sup>55</sup>. In the Netherlands, the application of ultrasound, electrical stimulation and low-level laser therapy is not common in the physiotherapy treatment of RA patients. TENS is occasionally used, in case of local joint pain.

In addition to the abovementioned recommendation, the Guideline Steering Committee advises against the use of low-level laser therapy in case of active joint inflammation, as this intervention may increase the intra-articular temperature (level 4).

*Massage:* There is insufficient evidence that massage is effective in RA patients<sup>42</sup> (level 4). In a Dutch multidisciplinary guideline for RA<sup>7</sup> massage was not recommended. In all other international multidisciplinary and monodisciplinary physiotherapy

guidelines<sup>3-6,8,9</sup> massage was not included. In the Netherlands, massage is not commonly applied in the physiotherapy treatment of RA patients (level 4).

*Manually moving joints (mobilization/manipulation):* There is insufficient evidence that passive mobilization is effective in RA patients<sup>43</sup> (level 4). No recommendations with regard to passive mobilization / manipulation have been formulated in currently available multidisciplinary and physiotherapy guidelines<sup>3-9</sup>. According to the Guideline Steering Committee, some RA patients with a limited joint range of motion of peripheral joints may benefit from passive mobilization (level 4).

In addition to the abovementioned recommendation, the Guideline Steering Committee considered short-term passive mobilization useful in individual cases, provided that it is combined with active exercises.

Passive manipulation of the cervical spine in RA patients may have potential adverse effects due to possible cervical spine instability and is therefore advised against<sup>56</sup> (level 4).

*Balneotherapy:* Balneotherapy implies bathing in water, particularly from natural mineral and thermal springs, at the optimal temperature ranges between 34 and 35 Celsius and a duration of about 20 minutes<sup>57</sup>. Balneotherapy is commonly used in Europe, but not in North America. Based on the available evidence it is likely that balneotherapy, in combination with exercises, is effective in RA patients<sup>44</sup> (level 2).

In a multidisciplinary guideline for RA<sup>7</sup> balneotherapy as monotherapy was neither recommended nor discouraged. In all other international multidisciplinary or physiotherapy guidelines<sup>3-6,8,9</sup> balneotherapy was not included.

In daily practice balneotherapy is mostly used in health resorts, and provided in combination with other interventions such as exercise therapy. Balneotherapy is covered by multiple health insurance companies. The Guideline Steering Committee found that individual RA patients may benefit from balneotherapy, although it remains unclear to what extent the perceived benefits are caused by the relaxing environment. It was agreed that in case balneotherapy would be used, it should be combined with exercise therapy (level 4).

## Evaluation process

With respect to the literature search on evaluation

instruments<sup>3</sup> a journal supplement<sup>58</sup> and three systematic reviews<sup>59</sup> were selected. Evaluation instruments were, similar to the description of the patient's health status and treatment goals, classified according to the ICF.

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

**RECOMMENDATION 7:**

**A general measurement instrument on the level of activities and participation should always be used. In addition, measurement instruments on the level of body functions and structures can be included. Measurements should preferably be done at the start of treatment and repeated during treatment and at its termination (level 1 and 4).**

**Activities and participation:**

The *Health Assessment Questionnaire* (HAQ) is a self-reported, disease-specific questionnaire. The questionnaire consists of 20 questions divided over eight dimensions.

For each of these questions there are four possible responses: score 0 "without any difficulty" to score 3 "unable to do". The highest scores of each of the eight dimensions are added up and divided by eight, resulting in a total score ranging between 0 and 3<sup>60</sup>.

**Body functions and structures:**

A Visual Analog Scale (VAS) for pain and morning stiffness<sup>59</sup> is usually a horizontal line of 100 millimeters, without a scale division, with on the left end "no pain or morning stiffness" and on the right end "maximal (unbearable) pain or morning stiffness". By means of a vertical line, the patients express how much pain or morning stiffness they experienced during the last week. The VAS score is determined by measuring the distance in millimeters from the left end of the line to the point that the patient marks.

For measuring *muscle strength*, the Hand Held Dynamometer was recommended<sup>59</sup>. The Hand-Held Dynamometer is suitable for measuring muscle strength of almost all clinically relevant muscles (as well in the upper extremities as in lower extremities).

For measuring *aerobic capacity*, the 6-minutes walk test or the sub maximal bicycle test (including the Borg Scale) were recommended. During the 6-minutes walk test the patients have to walk 6 mi-

nutes 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<sup>59</sup>. In case a walking test is not possible, for example because of severe joint problems, the aerobic capacity can be measured by performing a bicycle test, for example the Åstrand test<sup>61</sup>. The Borg scale is a subjective scale for rating the perceived exertion (RPE) on a scale of 6 to 20<sup>25</sup>.

For measuring joint mobility the *Escola Paulista de Medicina-Range of Motion scale (EPM-ROM)* was recommended. The EPM-ROM measures the mobility of ten different joints at each side of the body (elbows, wrists, thumbs, fingers, hips, knees and ankles) using a goniometer. The joint mobility of every joint is scored from 0 "whole movement is possible" to 3 "severely limited". The scores of the included joints are added up, resulting in a total score ranging from 0 to 30<sup>62</sup>.

## Discussion

This study describes the development of a comprehensive physiotherapy guideline for the management of RA. This guideline is based on recent evidence and expert opinion. It was developed according to standardised procedures for formulating recommendations. All elements were described according to the ICF and the ICF Core Set for RA.

With respect to physiotherapy guidelines in RA, at present only the Ottawa Panel guidelines are available, which were published in 2004<sup>8,9</sup>. Whereas the Ottawa Panel guidelines include only the therapeutic process, the present guideline also comprises recommendations on the diagnostic and evaluation process. Concerning interventions, the Ottawa Panel includes recommendations on exercise therapy, thermotherapy and electrotherapy, whereas the present guideline comprises recommendations on exercise therapy, education with regard to physical activity, the application of electrical, mechanic and electromagnetic energy, thermotherapy, balneotherapy, massage and mobilization/manipulation.

A comparison of the contents of the recommendations on the interventions that the Ottawa Panel guidelines and the present guideline have in common shows some discrepancies. In the Ottawa guideline exercise therapy with low/moderate

intensity was recommended, since dynamic exercise therapy was regarded not to be safe in RA patients, whereas in the present guideline exercise therapy with a high intensity was recommended. This difference is likely to be due to the year of publication. After the publication of the Ottawa Panel guideline, a good quality RCT with sufficient power was published, showing that dynamic exercise therapy does not increase disease activity or radiological damage in RA patients<sup>32</sup>.

In the Ottawa Panel guideline both thermotherapy and electrotherapy were recommended, whereas in the current guideline these interventions were neither recommended nor discouraged. This difference may be related to a number of factors, including the year of publication, differences in the inclusion and exclusion criteria used for the literature review and different outcomes of expert opinion. After the publication of the Ottawa Panel guideline in 2004, a new study with regard to thermotherapy was published<sup>37</sup> and the review with regard to low level laser therapy was updated<sup>40</sup>. In the first study with regard to thermotherapy (specifically cold applications) various adverse effects were found. In the second updated review more trials were included which showed that thermotherapy is not effective. Furthermore, the Ottawa Panel used very strict inclusion and exclusion criteria and therefore included only a small number of RCTs (2 on thermotherapy and 9 on electrotherapy). In the present guideline various study designs, also other than RCTs, were included. Overall, these additional studies showed more negative outcomes. In the process of guideline development, expert opinion is also involved. In the Netherlands various interventions, such as low level laser therapy, are not commonly applied and were not considered effective by the experts. All these differences have lead to different, less positive, recommendations.

Concerning the comparison of the recommendations in the present guideline with those in multidisciplinary guidelines and sets of recommendations on comprehensive RA management<sup>3-7</sup> it appears that the recommendations on exercise therapy are similar, with dynamic exercises being recommended in ACR<sup>3</sup>, EULAR<sup>4</sup> and BSR<sup>5</sup> guidelines. With respect to TENS and thermotherapy, the BSR guidelines recommend their usage<sup>5</sup>, whereas in the present guideline these applications are neither recommended nor advised against. As the conclusions from the literature are similar in both

the BSR guidelines and the present guideline, namely that there is conflicting evidence and/or no evidence for the effectiveness of these interventions, it appears that expert opinion varied.

For all other interventions, there were no recommendations available for comparison in multidisciplinary guidelines.

To facilitate the use of guidelines in daily practice it is important to apply an implementation strategy. So far, it is unclear to what extent the Ottawa Panel physiotherapy guidelines for the management of RA patients have been implemented and if so, which strategy was applied. Implementation studies with regard to other guidelines have shown that didactic education and passive dissemination strategies were ineffective implementation strategies<sup>66</sup>. Multifaceted interventions, interactive education and clinical reminder systems have been shown to be effective implementation strategies for physiotherapy guidelines, including guidelines for low back pain and whiplash<sup>67</sup>. The implementation strategy of this Dutch RA physiotherapy guideline included dissemination through regular mail, publication on a website and regional organized educational sessions.

More research is needed to determine the level of guideline adherence, the extent to which the use of guidelines improves patient outcomes and leads to a more time- and cost-effective physiotherapy management.

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