Physical therapy and physical activity in patients with rheumatoid arthritis

Hurkmans, E.J.

••• Chapter 1
General Introduction

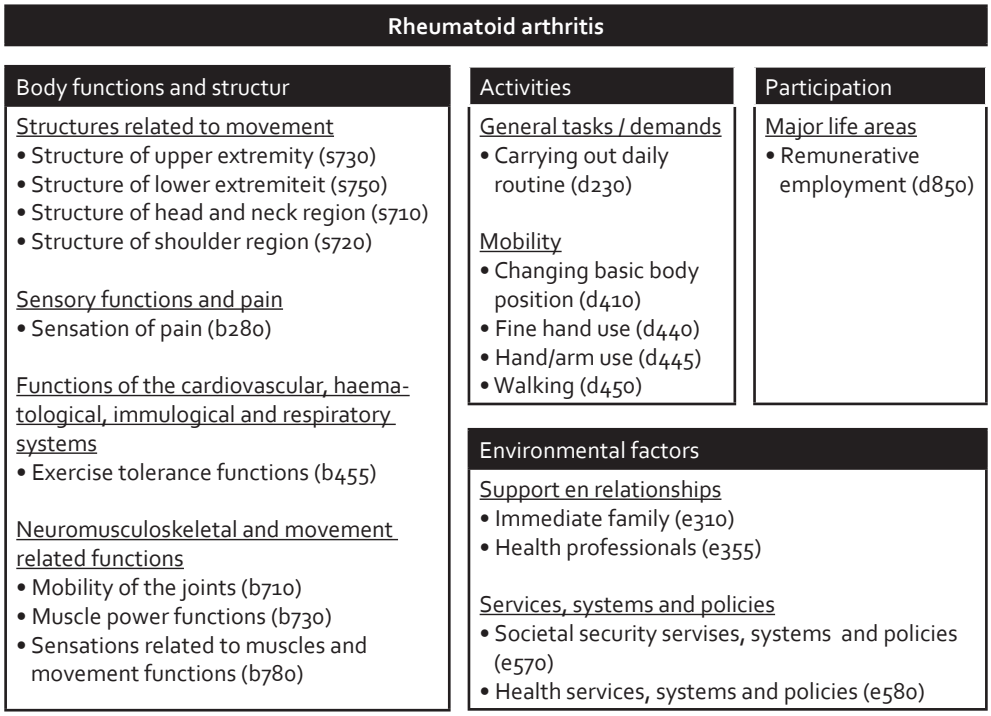
• • • General Introduction

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disease which predominantly affects the joints. Worldwide the prevalence rates of RA range from 0.5 to 1.0 percent [1]. The incidence in the Netherlands is estimated to be 0.3 to 1.8/1000/year [2]. RA is two to three times more common among women than among men. In view of current demographic trends, the absolute number of people with RA in the Netherlands is expected to increase by 22 percent between 2000 and 2025 [3]. Dutch general practitioners annually see about 7,500 patients with new complaints of RA and about 147,500 patients with RA-related complaints [3].

Over the past decades, the pharmacological treatment of RA has improved markedly. Nowadays, a growing body of evidence substantiates the consistent clinical and radiological benefits of early disease detection, early introduction of 'aggressive' drug treatment and 'tight control' of follow-up, driven by regular measurement of disease activity parameters. Early drug treatment includes the use of traditional disease-modifying anti-rheumatic drugs (DMARDs) and prompt advent of biologic based interventions in appropriate patients. Nowadays, low disease state and remission with prevention of joint damage and irreversible disability are achievable therapeutic goals [4]. On the other hand, it should be acknowledged that 75-80% of patients with RA does not achieve full remission [5, 6]. The impact of RA on patients' physical, emotional and social functioning may therefore still be considerable.

Possible health problems resulting from RA can be described according to the "International Classification of Functioning, Disability and Health" (ICF), developed by the World Health Organization (WHO) [7]. This classification distinguishes consequences relating to "body functions", "body structure", and "activities and participation". In addition, it includes "environmental factors" and "personal factors" that may influence the consequences of a disease. The most frequently reported and most relevant impairments and limitations in patients with RA have been summarized in the "International Classification of Functioning, Disability and Health (ICF) Core Sets for rheumatoid arthritis" (see Figure 1) [8-11].

Figure 1. Health problems in RA according to the International Classification of Functioning, Disability and Health (ICF) Core Set for Rheumatoid Arthritis (short version).



• • • Physical therapy in rheumatoid arthritis: current practice and guidelines

As a substantial proportion of patients with RA will have a relatively low, but persistent level of disease activity affecting their daily functioning, there is a need for interventions in addition to drug treatment. Non-drug treatment includes a variety of modalities, including self-management interventions, exercise therapy, orthoses and assistive devices, physical modalities and dietary interventions. Health care providers who are, apart from the rheumatologist and nursing staff, often involved in the treatment of patients with RA include physical therapists, occupational therapists, social workers, dieticians, podiatrists, psychologists or orthopaedic surgeons [12].

Interventions which are applied by physical therapists in patients with RA are mainly exercise therapy and education [16]. Other physical therapy interventions are physical modalities (e.g. ultrasound, low level laser therapy and transcutaneous electrical nerve stimulation (TENS)), massage, manual

therapy (e.g. passive mobilizations) and balneotherapy [16, 17]. So far, the literature on which interventions are actually used by physical therapists in patients with RA is sparse. Previous studies on the use of physical therapy interventions were performed among patients with RA rather than physical therapists, and included only few treatment modalities [18, 19]. Insight into current physical therapy practice may facilitate the development of targeted strategies for the implementation of evidence based physical therapy interventions.

Regarding the implementation of evidence, a number of clinical practice guidelines for the management of patients with RA have been developed, with the ultimate aim to improve the quality of care [20-24]. Some of these guidelines are multidisciplinary guidelines which included specific recommendations for physical therapy [20-22], whereas other have been specifically developed for physical therapists [23, 24]. In contrast with guidelines on osteoarthritis [25], the quality and the content of guidelines including recommendations on physical therapy in RA have not been analyzed.

• • • Exercise therapy and physical activity in patients with RA

Exercise therapy

Exercise is a subset of physical activity that pertains to planned, structured and repetitive bodily movements, aimed at improving or maintaining physical fitness. Exercises can be aimed at improving aerobic capacity, muscle strength and flexibility [26]. To accomplish this improvement it is necessary to perform the exercises at least twice a week for 20 minutes during at least six weeks [26]. The intensity of the aerobic capacity exercises should be at least 55% of the maximum health rate (HR max); or 40% to 50% of the maximum oxygen uptake reserve (Vo_2R) of HR max reserve (HRR). The intensity should be increased up to 85% during the training. With regard to the intensity of muscle strength exercises, they should start with 30% to 50% and increase to 80% of the maximum (defined as the percentage of either one repetition maximum, one maximum voluntary contraction, maximum speed, or as maximal subjective exertion [26].

So far, a number of reviews on the effectiveness of exercise in RA has been published [27-30]. Overall, it is concluded that exercise therapy in RA is effective

with regard to aerobic capacity, muscle strength and safe with respect to disease activity. Some of these reviews applied no explicit inclusion criteria regarding the characteristics of the exercise programs, such as their intensity, duration, frequency, and supervision, the methodological quality of the studies was not taken into account, no systematic quantitative or qualitative data analysis was applied, and the heterogeneity of the interventions was not addressed in the analyses.

Physical activity

It is generally known that in the general population regular physical activity, defined as any bodily movement resulting in energy expenditure, has various health benefits such as a reduced risk of coronary heart disease, diabetes, hypertension, cardiovascular disease and colon cancer [31, 32]. The scientific evidence linking physical activity to a multitude of health benefits has contributed to various public health efforts to increase physical activity among sedentary persons. Despite these efforts, between 40-50% of the adult population in Western nations do not meet general physical activity recommendations [33, 34]: being physically active 5 times a week for 30 minutes at a moderate intensity level or 3 times a week for 20 minutes at a high intensity level.

The American College of Sports Medicine has issued a separate set of guidelines for older adults and adults with clinically significant chronic conditions [35, 36]. These recommendations include that every adult > 65 years or age 50 to 64 years with a chronic condition and/or functional limitation should accumulate at least 30 minutes of moderate-intensity activity on most days of the week or vigorous-intensity aerobic physical activity for a minimum of 20 minutes on three days each week, taking into account the individual patient's aerobic fitness level [35, 36]. In addition, muscle strengthening activities and activities that maintain or increase flexibility, as well as exercises that maintain or improve balance for patients with risk of falls are recommended. An individual activity plan for achieving recommended physical activity that integrates preventive and specific therapeutic activities is also included in the recommendations. Patients with RA may, apart from the benefits described for the general population, have a number of additional, disease-specific effects from physical activity such as

improved functional ability, aerobic capacity and muscle strength, and reduction of pain [37, 38]. Furthermore, regular physical activity might decrease the higher risk for vascular diseases that patients with RA have due to the inflammation [39]. Despite the proven health benefits, patients with RA have been found to be less physically active than the general population in a number of studies [34, 40].

The percentages of healthy people and patients with RA meeting the public health recommendations for moderate physical activity are similar, however the total amount of time spent on physical activity is lower in patients with RA compared to healthy people [34]. Therefore, the promotion of physical activity in patients with RA by health care providers is encouraged. Until now, little is known about physical activity promotion in patients with RA. A study from the United States found that only 42% of patients with arthritis report to have received an advice on physical activity [41]. The health care providers' perspectives on the promotion of physical activity is still an under researched area.

Until now, a number of studies evaluating interventions to promote physical activity in patients with arthritis have been published [37, 38]. These studies have shown positive results with regard to physical activity behavior [37], perceived health status and muscle strength [38]. To maintain the effects obtained during a physical activity intervention patients have to stay physically active in daily life. With respect to the maintenance of physical activity only a few studies are available and the results are conflicting [42-47].

As it seems that only certain subgroups of patients successfully reach and maintain a sufficient level of physical activity, various studies have explored the association between patient characteristics and physical activity in healthy subjects, patients with type 2 diabetes mellitus and obese individuals [48-50]. One frequently reported determinant is the patient's motivation. A lack of motivation is associated with a lower physical activity level [48-50]. Until now, the association between motivation and physical activity has not been studied in patients with RA.

Patient motivation has been found to be closely linked to 'goal ownership' or, in other words, the degree to which patients consider the target health behavior as their own, self-chosen, personal goal [51, 52]. The self-determination theory (all human behavior is directed by goals) indeed states that goals can be internal or set

by the patients themselves (autonomous regulation), or external, which implies that the goal is coerced or set by others (coerced regulation) [51, 52]. According to self-determination theory, autonomous regulation can be increased by others, e.g. autonomy supportiveness. Autonomy supportiveness can be offered by the patient's family, friends, medical specialists or other health professionals and is characterized by supporting or increasing the patients' feelings of competence and own responsibility for goal attainment [53]. Autonomous supportiveness with regard to physical activity could also be an important item in the treatment of patients with RA.

• • • Aims of this thesis

The aims of the present thesis were to describe:

1. Current guidelines for the physical therapy management of patients with RA and the development of a Dutch physical therapy guideline (chapters 2 and 3).
2. Current physical therapy management of patients with RA (chapters 4 and 5).
3. The effectiveness and safety of supervised dynamic exercise therapy and home based exercise programs in patients with RA (chapters 6 and 7).
4. The maintenance of physical activity after two one-year internet-based physical activity interventions in RA patients (chapter 8)
5. The role of motivation and health care providers' practice regarding the level of physical activity of patients with RA (chapter 9 and 10).

In line with these aims, the following topics are addressed in the respective chapters:

Chapter 2 evaluates the content and quality of currently available guidelines on RA management which include recommendations on physical therapy interventions.

Chapter 3 describes the development and content of a Dutch physical therapy guideline on RA.

Chapter 4 describes the diagnostic assessments and therapeutic interventions employed by physical therapists in patients with RA and to what extent their practice is influenced by additional arthritis training.

Chapter 5 reports on the impact of additional arthritis training on physical therapists' roles in the management of RA.

Chapter 6 is a systematic review of the literature on the effectiveness and safety of supervised aerobic capacity and/or muscle strength training in patients with RA.

Chapter 7 is a systematic review on the effectiveness and safety of home-based exercise programs in patients with RA.

Chapter 8 evaluates the maintenance of physical activity after two internet-based physical activity programs in patients with RA.

Chapter 9 describes the association of autonomous regulation (e.g. internal and external motivation) and the level of physical activity in patients with RA.

Chapter 10 describes the attitudes of rheumatologists, clinical nurse specialists and physical therapists with regard to physical activity promotion in patients with RA.

Finally, a summary of the results and conclusions and a general discussion are presented in **Chapter 11.**

• • • References

[1] Scott DL, Wolfe F, Huizinga TW. Rheumatoid arthritis. Lancet. 2010 Sep 25;376(9746):1094-108.

[2] Gommer AM (RIVM), Poos MJJC (RIVM). Cijfers reumatoïde artritis (prevalentie, incidentie en sterfte) uit de VTV 2010. In: Volksgezondheid Toekomst Verkenning, Nationaal Kompas Volksgezondheid. Bilthoven: RIVM, <http://www.nationaalkompas.nl> Nationaal Kompas Volksgezondheid\Gezondheid en ziekte\Ziekten en aandoeningen\Bewegingsstelsel en bindweefsel\ Reumatoïde artritis (RA), 17 mei 2010.

[3] Linden SJ van der (AZM), Poos MJJC (RIVM). Neemt het aantal mensen met RA toe of af? In: Volksgezondheid Toekomst Verkenning, Nationaal Kompas Volksgezondheid. Bilthoven: RIVM, <http://www.nationaalkompas.nl> Nationaal Kompas Volksgezondheid\Gezondheid en ziekte\ Ziekten en aandoeningen\Bewegingsstelsel en bindweefsel\Reumatoïde artritis (RA), 5 november 2007.

[4] Woodburn J, Henessy K, Steultjens MPM, et al. Looking through the 'window of opportunity': is there a new paradigm of podiatry care on the horizon in early rheumatoid arthritis? J Foot Ankle Res 2010;3:8.

[5] Mierau M, Schoels M, Gonda G, et al. Assessing remission in clinical practice. Rheumatology (Oxford) 2007;46:975–9.

[6] Sokka T, Hetland ML, Mäkinen H, et al. Questionnaires in Standard Monitoring of Patients With Rheumatoid Arthritis Group. Remission and rheumatoid arthritis: Data on patients receiving usual care in twenty-four countries. Arthritis Rheum 2008;58:2642–51.

[7] International Classification of Functioning Disability, and Health (ICF). ICF full version. Geneva, Switzerland: World Health Organization; 2001.

[8] Kirchberger I, Glaessel A, Stucki G, et al. Validation of the comprehensive international classification of functioning, disability and health core set for rheumatoid arthritis: the perspective of physical therapists. Phys Ther. 2007 Apr;87:368-84.

[9] Coenen M, Cieza A, Stamm TA, et al. Validation of the International Classification of Functioning, Disability and Health (ICF) Core Set for rheumatoid arthritis from the patient perspective using focus groups. Arthritis Res Ther 2006;8:R84.

[10] Stamm TA, Cieza A, Coenen M, et al. Validating the International Classification of Functioning, Disability and Health Comprehensive Core Set for Rheumatoid Arthritis from the patient perspective: a qualitative study. Arthritis Rheum 2005;53:431-9.

[11] Stucki G, Cieza A, Geyh S, et al. ICF Core Sets for rheumatoid arthritis. J Rehabil Med 2004;(44

Suppl):87-93.

[12] Kennedy T, McCabe C, Struthers G, et al. BSR guidelines on standards of care for persons with rheumatoid arthritis. Rheumatology (Oxford) 2005;44:553-6.

[13] Iversen MD, Fossel AH, Ayers K, et al. Predictors of exercise behavior in patients with rheumatoid arthritis 6 months following a visit with their rheumatologist. Phys Ther 2004;84:706-16.

[14] Hagglund KJ, Clark MJ, Hilton SA, et al. Access to healthcare services among persons with osteoarthritis and rheumatoid arthritis. Am J Phys Med Rehabil 2005;84:702-11.

[15] Li L, Bombardier C. Ulilization of physiotherapy and occupational therapy by Ontario rheumatologists in managing rheumatoid arthritis: a survey. Physiother Can 2003;55:23-30.

[16] Christie A, Jamtvedt G, Dahm KT, Moe RH, Haavardsholm EA, Hagen KB. Effectiveness of nonpharmacological and nonsurgical interventions for patients with rheumatoid arthritis: an overview of systematic reviews. Phys Ther 2007;87:1697-715.

[17] Forestier R, André-Vert J, Guillez P, et al. Non-drug treatment (excluding surgery) in rheumatoid arthritis: clinical practice guidelines. Joint Bone Spine 2009;76:691-8.

[18] Li LC, Maetzel A, Pencharz JN, et al. Community Hypertension and Arthritis Project (CHAP) Team. Use of mainstream nonpharmacologic treatment by patients with arthritis. Arthritis Rheum 2004;51:203-9.

[19] Zink A, Listing J, Ziemer S, et al. German Collaborative Arthritis Centres. Practice variation in the treatment of rheumatoid arthritis among German rheumatologists. J Rheumatol 2001;28:2201-8.

[20] American College of Rheumatology Subcommittee on Rheumatoid Arthritis Guidelines. Guidelines for the management of rheumatoid arthritis: 2002 update. Arthritis Rheum 2002;46: 328–34.

[21] Combe B, Landewe R, Lukas C, et al. EULAR recommendations for the management of early arthritis: report of a task force of the European Standing Committee for International Clinical Studies Including Therapeutics (ESCISIT). Ann Rheum Dis 2007;66:34–45.

[22] Ottawa panel. Ottawa panel evidence-based clinical practice guidelines for electrotherapy and thermotherapy interventions in the management of rheumatoid arthritis in adults. Phys Ther 2004;84:1016-43.

[23] Luqmani R, Hennell S, Estrach C, et al. British Society for Rheumatology and British Health Professionals in Rheumatology guideline for the management of rheumatoid arthritis (the first two years). Rheumatology (Oxford) 2006;45:1167–9.

[24] Ottawa panel. Ottawa panel evidence-based clinical practice guidelines for therapeutic exercises

in the management of rheumatoid arthritis in adults. Phys Ther 2004;84:934-72.

[25] Poitras S, Avouac J, Rossignol M, et al. A critical appraisal of guidelines for the management of knee osteoarthritis using Appraisal of Guidelines Research and Evaluation criteria. Arthritis Res Ther 2007;9:R126.

[26] Pollock ML, Gaesser GA, Butcher JD, et al. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscular fitness, and flexibility in healthy adults. Med Sci Sports Exercise 1998;30:975-99.

[27] Van den Ende CHM, Vliet Vlieland TPM, Munneke M, et al. Dynamic exercise therapy for treating rheumatoid arthritis (review). The Cochrane Database of Systematic Reviews 1998, Issue 4.

[28] Stenström CH, Minor MA. Evidence for the benefit of aerobic and strengthening exercise in rheumatoid arthritis. Arthritis Rheum 2003;49:428-34.

[29] Häkkinen A. Effectiveness and safety of strength training in rheumatoid arthritis. Curr Opin Rheum 2004;16:132-7.

[30] Gaudin P, Leguen-Guegan S, Allenet B, et al. Is dynamic exercise beneficial in patients with rheumatoid arthritis? Joint Bone Spine 2007;75:11-7.

[31] Pate RR, Pratt M, Blair SN, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. JAMA 1995;273:402-7.

[32] Macera CA, Hootman JM, Sniezek JE. Major public health benefits of physical activity. Arthritis Rheum 2003;49:122-8.

[33] Sokka T, Häkkinen A, Kautiainen H, et al. Physical inactivity in patients with rheumatoid arthritis: data from twenty-one countries in a cross-sectional, international study. Arthritis Rheum 2008;59:42-50.

[34] van den Berg MH, de Boer IG, le Cessie S, et al. Are patients with rheumatoid arthritis less physically active than the general population? J Clin Rheumatol 2007;13:181-6.

[35] Haskell WL, Lee IM, Pate RR, et al.; American College of Sports Medicine; American Heart Association. Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Circulation. 2007;116:1081-93.

[36] Nelson ME, Rejeski WJ, Blair SN, et al. Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. Med Sci Sports Exerc. 2007;39:1435-45.

[37] van den Berg MH, Ronday HK, Peeters AJ, et al. Using internet technology to deliver a home-based physical activity intervention for patients with rheumatoid arthritis: A randomized controlled trial. Arthritis Rheum 2006;55:935-45.

[38] Brodin N, Eurenius E, Jensen I, et al. Coaching patients with early rheumatoid arthritis to healthy physical activity: a multicenter, randomized, controlled study. Arthritis Rheum 2008;59:325-31.

[39] Metsios GS, Stavropoulos-Kalinoglou A, Sandoo A, et al. Vascular function and inflammation in rheumatoid arthritis: the role of physical activity. Open Cardiovasc Med J 2010;4:89-96.

[40] Sokka T, Häkkinen A, Kautiainen H, et al. Physical inactivity in patients with rheumatoid arthritis: data from twenty-one countries in a cross-sectional, international study. Arthritis Rheum 2008;59:42-50.

[41] Fontaine KR, Bartlett SJ, Heo M. Are health care professionals advising adults with arthritis to become more physically active? Arthritis Rheum 2005;53:279-83.

[42] Scholten C, Brodowicz T, Graninger W, et al. Persistent functional and social benefit 5 years after a multidisciplinary arthritis training program. Arch Phys Med Rehabil 1999;80:1282-7.

[43] Barlow JH, Turner AP, Wright CC. A randomized controlled study of the Arthritis Self-Management Programme in the UK. Health Educ Res 2000;15:665-80.

[44] Häkkinen A, Sokka T, Kautiainen H, et al. Sustained maintenance of exercise induced muscle strength gains and normal bone mineral density in patients with early rheumatoid arthritis: a 5 year follow up. Ann Rheum Dis 2004;63:910-6.

[45] Brus HL, van de Laar MA, Taal E, et al. Effects of patient education on compliance with basic treatment regimens and health in recent onset active rheumatoid arthritis. Ann Rheum Dis 1998;57:146-51.

[46] Lindroth Y, Bauman A, Brooks PM, et al. A 5-year follow-up of a controlled trial of an arthritis education programme. Br J Rheumatol 1995;34:647-52.

[47] van den Ende CH, Hazes JM, le Cessie S, et al. Comparison of high and low intensity training in well controlled rheumatoid arthritis. Results of a randomised clinical trial. Ann Rheum Dis 1996;55:798-805.

[48] Seneval C, Nouwen A. Motivation and dietary self-care in adults with diabetes: are self-efficacy and autonomous self-regulation complementary or competing constructs? Health Psychol 2000;19:452-7.

[49] Williams GC, Grow VM, Freedman Z, et al. Motivational predictors of weight low and weight loss maintenance. J Pers Soc Psychol 1996;70:115-26.

[50] Wilson PM, Rodgers WM, Fraser SN. Examining the psychometric properties of the Behavioral Regulation in Exercise Questionnaire. Phys Educ Exerc Sci 2002;6:1-21.

[51] Johnson JE. Self-regulation theory and coping with physical illness. Res Nurs Health 1999;22:435-48.

[52] Deci EL, Ryan RM. Tho "what" and "why" of goal pursuits: human needs and the self-determination of behavior. Psychol Ing 2000;11:227-68.

[53] Deci EL, Ryan RM. The support of autonomy and the control of behavior. J Pers Soc Psychol 1987;53:1024-37.