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Aspects of physical activity in  
Rheumatoid Arthritis  
Associations with inflammation and  
cardiovascular risk factors

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### Abstract

**Background** Rheumatoid Arthritis (RA) is associated with an increased risk for cardiovascular disease (CVD), partially attributable to systemic inflammation and traditional risk factors for CVD. Since physical activity (PA) is strongly related to CVD in the general population, the aim of this thesis was to describe aspects of PA in patients with RA, and further to analyse associations with disease activity, traditional risk factors for CVD and subclinical atherosclerosis.

**Methods** In papers I and II, newly diagnosed RA patients were followed for two (n=66) and mean (SD) 16 (2) (n=25) years respectively. Disease activity and aerobic capacity were measured in both groups. In paper II, the 25 patients were also examined for traditional risk factors for CVD, body composition, with pulse wave analysis and carotid ultrasound. Self-efficacy was assessed using a questionnaire. In paper III, a combined heart rate and movement monitor was used to measure PA in 84 patients with early (< 2 years) and 37 patients with long-standing (mean [SD] 16 [2] years) RA. Data were analysed for associations with disease activity, traditional risk factors for CVD and subclinical atherosclerosis, as above. Finally, in paper IV, a pilot study including 13 patients, median (Q1-Q3) age 57 (44-64) years, was conducted to analyse the feasibility as well as the effects of ten weeks of spinning exercise, on aerobic capacity, traditional risk factors for CVD and inflammation.

**Results** In papers I and II, aerobic capacity was maintained at follow-up. In paper I, median (Q1-Q3) aerobic capacity was 31 (27-39) ml/kg x min at baseline and 33 (25-38) ml/kg x min after two years. In paper II, median (Q1-Q3) aerobic capacity was 32 (28-42) ml/kg x min at baseline and 33 (28-39) ml/kg x min after 16 years. In multiple linear regression analysis, adjusted for baseline aerobic capacity, disease activity during the first two years after diagnosis explained 53 % of the aerobic capacity level after 16 years [ $\beta = -0.14$ ,  $p = 0.004$ ]. Higher aerobic capacity was associated with more favourable measures of risk factors for CVD and self-efficacy over time and at follow-up. In paper III, 37 % of the patients with early and 43 % of the patients with long-standing RA, did not reach the national recommendations of PA. Total PA as well as more time spent in moderate to vigorous PA were associated with more favourable risk factors for CVD. Patients with higher disease activity and functional disability were less physically active. In paper IV, intensive spinning exercise proved to be a feasible method, that significantly improved aerobic capacity, systolic blood pressure and the number of tender joints.

**Conclusions** Aerobic capacity, which could be maintained despite several years of disease, was related to risk factors for CVD and to self-efficacy. Higher disease activity in early disease predicted lower aerobic capacity after 16 years. Higher PA level was associated with a more beneficial cardiovascular profile, however, an insufficient level of PA was found in a substantial proportion of patients. Furthermore, we found, that intensive spinning exercise was a feasible method for the group included, to improve aerobic capacity and blood pressure without detrimental effects on disease activity. Physical activity and aerobic capacity have roles to play in the cardio protective management and are, as other modifiable risk factors, suggested to be estimated regularly. Higher disease activity is known to increase the risk of CVD in RA, and as disease activity also seems to negatively impact future aerobic capacity, interventions and support for health enhancing PA should have high priority in these patients.

### Keywords

Physiotherapy, rheumatoid arthritis, cardiovascular disease, aerobic capacity, physical activity, exercise, primary prevention.

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