

Supplementary Table S1 Description of the exercise interventions

Trial	Participants*	Intervention
Alemo-Munters et al.⁵² 2013 Sweden	21 patients PM and DM, mean age 62 (EG) and 60 (CG). 76% women.	Exercise modality: Cardiorespiratory Exercise period: 12 weeks Duration/frequency: 1 hour 3/week. Description: <u>Cardiorespiratory:</u> Cycling for 30 minutes. Intensity: 70% of VO ₂ max. 20 min of muscular endurance exercise of knee extensors at 30-40% of 1RM. Guidance: Supervised twice a week and one session at home. Adherence: One patient was not able to perform the exercise program and was excluded. Control group: Instructed not to change their exercise or physical activity level.
Alexanderson et al.²⁶ 2014 Sweden	13 patients with recent- onset PM/DM, median age 60 years. 77% women.	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 24 weeks Duration/Frequency: 5 days/week (duration not given) Description: <u>Strength:</u> Resistive exercise program of 7 exercises. 5 days/week for 12 weeks, 2/week from week 12-24. Intensity: Prescribed individually. Reps: 10 reps <u>Cardiorespiratory:</u> 15 minute walk. Intensity: 50-70% of max HR. Guidance: Weekly telephone support from a PT. Exercise at a gym was an alternative. Adherence: EG performed 79% of the resistive exercise and 81% of the walks. Control group: 15 minutes ROM exercise program 5 days/week, only activities of daily living and ordinary walks without any telephone support.
Baillet et al.³⁷ 2009 France	48 RA patients, mean age 52 (EG) and 56 (CG) years. 84% women (EG) and 78% female (CG).	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 4 weeks Duration/frequency: 5 hours a day. Description: Exercise program consistent with the ACSM. Cycling, running or resisting pulley cord 45/min/day. During cycling HR=60-80% of max. Intensity: Resistance and intensity of exercise were designed after individual evaluation of each patient. Hydrotherapy pool (60 min/day). Guidance: All exercise sessions was supervised

		Adherence: Not reported Control group: 3 days intervention. Day 1 with hydrotherapy (45 min), day 2 with relaxation exercises (45 min). Flexibility exercises (45 min).
Baslund et al. ³⁶ 1985 Denmark	18 RA patients, 89% women, mean age 49 (EG) and 47 (CG) years.	Exercise modality: Cardiorespiratory Exercise period: 8 weeks Duration/frequency: 4-5/days a week. Description: Cycling. Intensity: Three exercise periods for 5 minutes at a 149-161 H beats/min followed by 5 minutes at a level that allowed the pulse to decrease 10-20 beats/min. Guidance: Supervised in small groups Adherence: All patients followed the exercise program with near 100% compliance. Control group: No intervention
Daltroy et al. ³⁴ 1995 USA	58 patients, with systemic rheumatic disease, 93% women, mean age 37 years.	Exercise modality: Cardiorespiratory Exercise period: 12 weeks Duration/frequency: 30 min, 3/week Description: On stationary bicycles. Intensity: 60-80% of the maximal HR. Guidance: A PT instructed the patients at home the first time and visited the patient again after 2-3 weeks. All patients were contacted once a week to update exercise logs. Adherence: On average 2.7 sessions of exercise (at least 20 min) per week, with only three persons exercising less than twice per week. Control group: Encouraged to maintain their current level of physical activity
de Jong et al. ^{35 38} 2003 The Netherlands	281 RA patients, 79% women and median age 54 (CG) and 54 (EG) years.	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 2 years Duration/frequency: 1.25 hour 2/week Type: Warm-up with stepping aside and jumping. Bicycle training for 20 minutes. Intensity: 70-90% of predicted HR max. Sport or game for 20 minutes. Strength: 8-10 different exercises. Reps: 8-15 Guidance: Supervised Adherence: 14 patients failed to attend the exercise classes. Median 74% attendance rate. Averaged over 2 years, 30% of all participants had a sufficient attendance rate (50-

75%) and 49% had a high attendance rate (75-100%).

Control group: Usual care.

Durcan et al. ³⁹ 2014 Ireland	78 RA patients, 53% women (CG) and 75% female (EG), mean age 59 (CG) and 61 years (EG).	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 12 week Duration/frequency: 2-3/week (strength) and 5/week (endurance). Description: <u>Strength:</u> Major muscle groups with dumbbell weight. Intensity: 40-50% of 1 RM with 15-20 reps for endurance. Some exercises 60-70% of 1 RM with 8-12 reps. <u>Cardiorespiratory:</u> 30 -60 minutes walks per day with daily step count targets and advised to be moderately short of breath on exertion. Guidance: Home exercises. Patients were assessed at baseline and every 3 weeks to adjust the program. Adherence: Not reported Control group: Advice on the benefits of exercise.
Flint-Wagner et al. ⁴⁰ 2009 USA	22 RA patients, 79% women, mean age 51 years.	Exercise modality: Strength Exercise period: 16 weeks Duration/frequency: 75 minutes 3/week Description: <u>Strength:</u> Leg press, leg curl, hip abduction, calf raise, incline press, row and hammer curl. Three options for resistance, 1: Thera-Band or body weight, 2: Thera-Bands and weight machines, 3: dumbbells and weight machines (individualized). Intensity: 70-85% of 1RM Reps/Sets: 6-8/2-3. Guidance: All sessions were supervised in groups of 4. Adherence: Mean attendance was 82%. Control group: Standard care
Häkkinen et al. ⁴¹ 1994 Finland	39 RA patients, 51% women, mean age 41 (EG) and 45 (CG) years.	Exercise modality: Strength Exercise period: 6 months Duration/Frequency: 2-3/week. Duration not given. Description: 9 different exercises for all major muscle groups. Special rubber bands were used for resistance. Intensity: 1st-2nd month: 40% of 1RM, 3rd-4th month: 50-60% of 1 RM, 5th-6th month: 70-80% of 1RM. Reps/sets: 1st-4th month: 15-30/2, 5th-6th month: 6-12/3

Guidance: Not described, but the training program was individually designed.
Adherence: 2/week for 2 months, thereafter on average 2.4 times per week.
Control group: Maintained their habitual physical activities, and performed no strength training at all.

<p>Häkkinen et al.^{42,43} 2001 Finland</p>	<p>62 RA patients, 61% women, mean age 49 years.</p>	<p>Exercise modality: Strength Exercise period: 2 years Duration/frequency: 45 minutes 2/week Type: <u>Strength:</u> Exercises for upper and lower extremities, abdominal and back muscles with elastic bands and dumbbells as resistance. Intensity: 50-70% of 1 RM. Reps/sets: 8-12/2 Guidance: Patients were personally instructed in the strength training program, but exercised at home. Adherence: Compliance in strength exercise averaged 1.4-1.5 times/week from 0-24 months. Control group: Instructed to perform ROM and stretching exercises 2/week. They were free to participate in physical activities except strength training.</p>
<p>Hansen et al.³¹ 1993 Denmark</p>	<p>75 RA patients, 66% women, median age 52 years.</p>	<p>Exercise modality: Cardiorespiratory Exercise period: 2 years Duration/frequency: minimum 3/week. 30 min with aerobic training and 15 min with an overall training program. Description: swimming, cycling, running or jogging for 30 min daily. In addition they had an overall training program for 15 min. Intensity: Group B and C with a pulse rate of 70% of max. Group D were asked to swim or walk as fast as possible for 3 periods of 4 minutes each. Guidance: A: Self-training after instruction in the training program. B: As A plus training with a PT once a week. C: AS A plus weekly group training at the hospital. D: As C but including training in a hot water pool. <i>We combined the four groups in the meta-analysis.</i> Adherence: The attendance rate to the exercise sessions was > 50% for 6/14 in group B, 6/11 in group C, and 9/13 in group D. Control group: No instruction in exercise.</p>
<p>Harkcom et al.³²</p>	<p>17 women</p>	<p>Exercise modality: Cardiorespiratory</p>

1985 USA	with RA mean age 52 years.	Exercise period: 12 weeks. Duration/frequency: G1: 15 min, G2: 25 min, G3: 35 min, 3/week Description: Bicycle ergometer, 5 bouts of exercise separated by a minute rest. Intensity: 70% of max HR. Guidance: Supervised by PT students. Adherence: Not reported. Control group: Continued their routine daily activities.
Hsieh et al. ⁴⁹ 2014 Taiwan	19 patients with AS, 16% women, mean age 36 (EG) and 42 (CG) year.	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 3 months Dose: <u>Strength:</u> 2/week, <u>cardiorespiratory:</u> 35-45 min 3/week Type: <u>Strength:</u> Major muscle groups. Intensity: 60-80% of 1 RM. Reps/sets: 10/2. <u>Cardiorespiratory:</u> Aerobic exercises. Intensity: 50-80% of VO ₂ peak. Guidance: A PT called every 2 weeks. Adherence: Mean compliance was 48%. Control group: ROM and stretching exercises.
Jennings et al. ⁵⁰ 2016 Brazil	70 patients with AS, 30% women, mean age 43 (EG) and 40 (CG).	Exercise modality: Cardiorespiratory exercises. Exercise period: 12 weeks Dose: 30 min 3/week Type: Walking. Intensity: 70% of max HR. Guidance: not described. Adherence: 82.5% frequency in the 12 week program. Control group: Stretching exercises.
Karapolat et al. ⁵¹ 2009 Turkey	37 AS patients, 27% women, mean age 49 (EG) and 48 (CG) years.	Exercise modality: Cardiorespiratory Exercise period: 6 weeks Duration/frequency: 30 min 3/week Description: Group 1: Swimming, Group 2: Walking. <i>We combined the two groups in the meta-analysis.</i> Intensity: 60-70% of max HR measured by Polar pulse watch. 13-15 on the Borg Scale. Guidance: Instructed prior to the start of the program, thereafter unsupervised. Adherence: Not reported. Control group: ROM exercises.
Komatireddy et al. ⁴⁴ 1997 USA	42 RA patients, 76% women,	Exercise modality: Strength Exercise period: 12 weeks. Duration/frequency: 20-27 min at least 3/week

	mean age 61 years.	Description: 7 exercises for major muscle groups with ankle/wrist weights, dumbbells, and elastic bands as resistance. Reps/sets: 12-15/2-3 sets. Intensity: Moderate, 3-4 on a scale from 0-10. Guidance: A video tape demonstrated the exercises and accompanied the subjects through the sessions. Adherence: Not reported. Control group: Non-exercise group
Lemmey et al. ⁴⁵ 2009 United Kingdom	28 RA patients, 82% women, mean age 56 (EG) and 61 (CG).	Exercise modality: Strength Exercise period: 24 weeks Duration/frequency: 2/week (duration not reported). Description: Leg press, chest press, leg extension, seated rowing, leg curl, triceps extension, standing calf rises and biceps curl. Intensity: 80% of 1RM. Reps/sets: 8/3. Guidance: Supervised by an exercise physiologists. Adherence: On average 73% of the sessions Control group: ROM exercises.
Melikoglu et al. ⁴⁶ 2006 Turkey	36 women with RA, mean age 46 (EG) and 50 (CG).	Exercise modality: Cardiorespiratory Exercise period: 2 weeks Duration/frequency: 20 min 5/week Description: On a treadmill. Intensity: 60% of age predicted max HR. Guidance: Individually supervised. Adherence: Not reported. Control group: ROM exercises
Miozzi et al. ²⁷ 2012 Brazil	28 women with SLE, mean age 31 years.	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 12 weeks Duration/frequency: <u>Strength:</u> 35-40 min 2/week, <u>cardiorespiratory:</u> 30 min 2/week Description: 7 exercises for the main muscle groups (bench press, leg press, latissimus dorsi pull-down, leg extension, seated row, squat and sit-ups). Cardiorespiratory exercises on the treadmill. Intensity: <u>Strength:</u> 8-12 RM, Reps/sets: 8-12/4, <u>cardiorespiratory:</u> low intensity Guidance: All exercise sessions were monitored by at least 1 fitness professional. Adherence: Not reported.
Niedermann et al. ²⁸ 2013 Switzerland	106 AS patients, 40% women and	Exercise modality: Cardiorespiratory Exercise period: 12 weeks. Duration/frequency: 30 min 3/week Description: Nordic walking. Intensity: Moderate intensity, 55-75% of max HR for

	mean age was 49 years.	untrained subjects and 65-85% for trained subjects. Guidance: 2 PT supervised sessions per week and one home session. Adherence: 74.6% if the EG performed at least 3 sessions per week Control group: Standard flexibility exercises
Sandstad et al.²⁹ 2015 Norway	15 women with RA or juvenile JIA, mean age 32 (EG) and 33 (CG) years.	Exercise modality: Cardiorespiratory Exercise period: 10 weeks Duration/frequency: 35 min, 2/week. Description: On a spinning bicycle. Intensity: 4 minutes at 90-95% of max HR followed by 3 minutes at 70% of max HR, repeated 4 times. Including 10 minute warm-up. Guidance: Supervised 2/week. Adherence: >80% of the exercise sessions. Control group: No intervention
Sveaas/Berg et al.³⁰ 2014 Norway	24 axial SpA patients, 50% women, mean age 49 years.	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 12 weeks Duration/Frequency: 40 min 3/week (cardiorespiratory), 20 min 2/week (strength) Type: <u>Cardiorespiratory</u> : Interval training on a treadmill. Intensity: 4 minutes at 90-95% of max HR followed by 3 minutes at 70% of max HR, repeated 4 times. Including 10 minute warm-up. Strength: Bench press or chest press, squat or leg press, rowing, exercises for biceps and triceps and abdominal bridge. Intensity: 8-10 RM Reps/sets: 8-10/2-3 sets. Guidance: 2 supervised session per week (PT) and one home session. Adherence: All participants included in the analysis performed ≥80% of the scheduled sessions. Control group: Usual care.
Tech et al.³³ 2003 United Kingdom	65 women with SLE, mean age 39 years.	Exercise modality: Cardiorespiratory Exercise period: 12 weeks Duration/frequency: 30-50 min at least 3/week. Description: The main exercise was walking, but also cycling and swimming. Intensity: 60% pf peak VO ₂ . Guidance: A supervised session every 2 weeks. Adherence: Median number of home exercise sessions was 35 and median of supervised was 5.

		Control groups: No intervention. <i>(The relaxation group is not included as a CG)</i>
Van den Ende et al.⁴⁷ 1996 The Netherlands	50 RA patients, 62% women, mean age 52 years.	Exercise modality: Cardiorespiratory Exercise period: 12 weeks Duration/frequency: 1 hour 3/ week Description: 20 min bicycling and an interval exercise program with knee bending, step ups and walking and strengthening exercises for trunk and upper extremities performed at a high pace. Intensity: 70-85% of age predicted HR during bicycling. Guidance: Supervised in groups. Adherence: 3 patients did not complete the program. Mean attendance rate was 75%. Control group: Written instruction for ROM home exercises
Westby et al.⁴⁸ 2000 Canada	21 women with RA, mean age 56 years,	Exercise modality: Cardiorespiratory and strength exercises Exercise period: 12 months Duration: 60 min, 3/week Description: <u>Cardiorespiratory:</u> Aerobic dance. Intensity: 60-75% of max HR. <u>Strength:</u> Low load exercises using hand and cuff weights and a mat. Guidance: 3 supervised sessions, and then at home. Adherence: Mean attendance rate was 2.1/week (71%). Control group: Usual care
Wiesing et al.⁵³ 1998 Austria	13 PM/DM patients, 9 women, age between 25 and 70 years.	Exercise modality: Cardiorespiratory Exercise period: 6 months Duration/Frequency: 60 min, 2/week for 2 weeks and then 3/week Description: Stationary cycling. Intensity: 60% of max HR. Step aerobics. Intensity: not described. Guidance: Supervised by PT. Adherence: Not reported (VO ₂ max increased 12%) Control group: No training. Continued their usual PA level.

ACSM = American College of Sports Medicine; AS = ankylosing spondylitis; CG = control group; DM = dermatomyositis; EG= exercise group; PA = physical activity, PM = polymyositis; PT = physiotherapist; SLE = systemic lupus erythematosus; SpA = spondyloarthritis; RA = Rheumatoid arthritis; RCT = randomized controlled trial; ROM = range of motion; VO₂max = maximal oxygen uptake; 1 RM = one repetition maximum

* Number of patients included in the results.

