European Federation of Sports Medicine Associations

edited by Scientific and Education Commission of EFSMA

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Exercise Prescription for Health

- Training recommendations -

EFSMA recommends:

For yourself and for all your patients:

>>> How to get started

>>> Choose to move

>>> Something is more than Nothing

With regular activity:

Feel better, Be fitter, Live better and longer

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General recommendations for physical activity for health (FITT) (Exercise Prescription for health (EPH)

>>>> 150 Min/week at 3 or 4 days

>>>> 75 min/week at 2 or 3 days

Definitions of FITT:

(modified from Exercise prescription in health and disease, eds.P. O'Halloran and G.Bhogal, *www.fsem.ac.uk)*

Frequency: Number of times per week the activity is performed

Intensity: Level of exercise intensity (vigor) the activity requires.

Calculation of intensity see table below

Time: Duration of physical activity in minutes the activity is performed

150 min/week may be breaked into 10 min periods or 30 min at least

on 5 days a week

Type of exercise: On the one hand endurance, strength, flexibility, balance

or: walking, jogging, cycling, swimming or other sports activities

Special recommendation for prevention and in diseases

Training recommendation for prevention and therapy in diseases (© EFSMA)

General recommendations: Warming up about 3 to 5 min, cooling down 3 – 5 min, flexibility training daily

(For Borg-Scale or RPE – Scale, Abbreviations, Kind of sports, and HITT: High intensity interval training see below)

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Prevention in general © EFSMA	**Low intensity:** 5/week **Vigorous intensity:** 3/week	**Low intensity:** 40–65 % HRmax RPE 10-13 **Vigorous intensity:** 65-85 % HRmax RPE > 13-16	**Low intensity:** > 30min/session or 150min/week **Vigorous intensity:** > 25/min/session or 75min/week	Endurance, strength.	Running, walking, cycling, swimming, skating, cross-country ski.	70 % of 1RM > 2-3/week, 10-15 reps, 1- 3 sets.
Coronary heart disease © EFSMA	3–5/week **Vigorous intensity:** 3/week	50–80 % $V0_2$max or 40-70 % HRmax RPE 12–15 maybe:HITT*	40-60 min/session **Low intensity:** < 30 min **Vigorous intensity:** > 20 min/session **HITT*** : see below	Endurance, strength.	Running, walking, cycling, swimming.	60-75 % of 1RM, > 2/week, 8–12 reps, 2-3 sets.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Heart Failure © EFSMA	3–5/week	**Low – moderate intensity:** 40-60 %Vo2max RPE 11- 15 **HITT*:** with 90% 4 min and 3 min pause in between	15-60 min/session **HITT*** : for details see below	Endurance, strength, combination, respiratory muscle training (30% of max insp. pressure).	Jogging, (Nordic) walking, cycling, aerobics, cross-country ski.	60-75 % of 1RM, 2-5/week, 8–12 reps, 2-3 sets, RPE local 13-15.
Rhythm Disturbances © EFSMA	3 – 5 /week 2 – 3 /week	**Moderate intensity:** 40–60 %$V0_2$max, RPE: 11- 13 **Vigorous intensity**: 60-80 %$V0_2$max RPE: 9 - 15	30-60 min/session 20-30 min/session	Endurance, flexibility, sensomotoric, muscle, endurance.	Running, nordic ski, aerobics, cycling.	40–60 % of 1 RM, 12-15 reps, 3 sets, 8 -10 exercises, RPE 11-13 (- 19).
Arterial Hypertension (Frequent control of blood pressure) e.g. ambulant © EFSMA	3 – 5 (7) /week 2 -3 (4)/week	**Moderate intensity:** 40-60 %$V0_2$max, RPE: 11-13 **Vigorous intensity**: 60-80 %$V0_2$max RPE: 9-15	30-45 min/session 20-30 min/session	Endurance, flexibility, senso-motoric, muscle endurance.	Jogging, (Nordic) walking, swimming, scating, aerobics, dance, cycling.	60-75 % of 1RM, 2-5/week, 8–12 reps, 2-3 sets, RPE local 13-15.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Crohn's Disease **Ulcerative Collitis** **© EFSMA**	3/week to start later 5-7/week	**Low intensity:** **40-60 %VO_2max** **60 % HRmax** **RPE: 6-10** **No moderate /intense activity during acute exacerbations.**	20-30 min/session continuously or 5x4 min bouts	Endurance, strength.	Walking.	50 % of 1RM, 2-3/week, 10-12 exercises, 5-8 reps, 2 sets.
Obstipation (Constipation) **© EFSMA**	3– 4/week (every other day)	**HR: at least 110/min**	30 min/session	Endurance.	Running.	/

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Multiple Sclerosis © EFSMA	3-5/week	65-75 %HRmax 40-70 %VO_2max RPE: 11-14	10min first The increase to 20-60 min	Endurance, strength.		60-80 % of 1RM 2/week, 8-15 reps, 1-2 sets.
Bronchial Asthma (Possibly bronchodilator before activity) © EFSMA	**Low intensity:** ≥ 5/week **Vigorous intensity:** ≥ 3/week	**Low intensity:** > 55 %HRmax 30-50 %$V0_2$max RPE: 10-12 **Vigorous intensity:** > 70 %HRmax > 60 %$V0_2$max RPE: 10-14	**Low intensity:** ≥ 30 min **Vigorous intensity:** ≥ 20 min	Endurance, strength, flexibility, respiratory muscle training.	Running, walking, cycling, aerobics.	70 % of 1RM, ≥ 2–3/week, 10–15 reps, 1-3 sets.
Kidney Disease (Training for pts. with dialysis below) © EFSMA	3/week	**Moderate intensity**: 40-60 %$V0_2$max RPE: 11-13 **Vigorous intensity:** 60-80 %$V0_2$max, RPE: 12-18	30-60 min/day or 150 min/week 30 min/day or 75 min/week	Endurance, interval, muscular endurance, flexibility, balance training, strength training.	Jogging, (Nordic) walking, swimming, scating, aerobics, dance, cycling.	80% of 1RM, 1-2 sets, 8-10 reps, functional training.

Exercise and dialysis

Training has to be differentiated according to time of dialysis: During dialysis patients may use a bed - ergometer (pedalometer). Ergometry in the sitting position depends on fitness and dialysis needle position.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Diabetes mellitus type 2 © EFSMA	**Moderate intensity:** 5/week **Vigorous intensity:** 3/week	**Moderate intensity:** 40-70 % $V0_2max$ RPE 11-13 **Vigorous intensity:** 60-90 % $V0_2max$ RPE: 13-16	20-60 min/session at least every two days optimal: 27 MET hs / Week	Endurance training, frequently strength training.	Jogging, (Nordic) walking, swimming, scating, aerobics, dance, rowing (if possible), cycling.	70 % of 1RM, ≥ 2-3/week, 8–12 reps, 1-3 sets.
Metabolic Syndrome © EFSMA	5-7/week	60-70 % VO_2max RPE 10-13	> 30min/session or 150-300 min/week (can do in Nx10min), 60-90 min for weight loss	Endurance, strength.	(Nordic) walking, jogging, cycling, swimming.	70 % of 1RM, 2-3/week, 10-15 reps, 1-3 sets.
Obesity © EFSMA	≥ 5/week	**Moderate intensity:** 40-60 %$V0_2max$ RPE: 10-14	30-60 min (can start with 3x10 min)	Endurance, strength.	Water gymnastics, cycling, swimming.	40-50% of 1 RM 2-3/week, 10–15 reps, 1 set.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Dyslipidemia © EFSMA	≥ 5/week	40-75 %$V0_2$max	≥ 50-60 min (can be in 10 min intervals)	Endurance.	Jogging, running, skiing, fitness classes, brisk walks, cycling, swimming, racquet and ball sports.	
Osteoporosis © EFSMA	> 5 /week	40-70 %$V0_2$max RPE: 10-13	Bouts of > 10/min or accumulate 30min/day	Aerobic weight-bearing activities, balance training, sensomotoric training.	Walking, jogging, aerobics.	> 2/week, 8- 12 reps max, 1-3 sets.
Osteoarthritis © EFSMA	3-5/week	**Low-moderate intensity :** 40-60 %$V0_2$max RPE: 11 -13	**Aerobic:** 30 min (or 3x10 min) **Strength:** 20-60 min	Endurance, strength, weight control.	(Nordic) walking, cycling, swimming.	40-60 % of 1RM, 2-3/week, 8-10 exercises, 10–15 reps, 1-3 sets.
Low Back Pain © EFSMA	**Moderate intensity:** ≥ 5/week **Vigorous intensity:** ≥ 3/week	**Moderate intensity:** 40–65 %HRmax RPE: 10-13 **Vigor intensity:** 65-85 %HRmax RPE: >13-16	**Moderate intensity:** 30-60 min/day or ≥ 150min/week **Vigor intensity:** 20-60 min/day or ≥ 75min/week	Endurance, strength.	Walking, cycling, swimming, dance, cross-country ski.	70 % of 1RM, 2-3/week, 8-12 reps, 2-4 sets.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Rheumatoid Arthritis © EFSMA	**Low intensity:** 4-7/week **Moderate intensity:** 3/week	**Low intensity:** 50-70% SFmax RPE: 10-14 **Moderate intensity:** 60-80% SFmax RPE: 11-15	**Low intensity:** 30 min **Moderate intensity:** 30-60 min	Endurance, strength, muscular endurance.	Cycling, cross-country skiing, (Nordic) walking, light fitness training, dancing.	2-3/week **Strength**: 60-80 % of 1RM, 8-12 reps, ≥ 1 set. **Muscular endurance:** 30-40 % of 1RM, 15-25 reps, 1-2 sets.
Fatigue Syndrome **Fibromyalgia** © EFSMA	3–5 days/week	**Low–moderate intensity:** 40-60 %$V0_2$max, RPE: 11–13 **Vigorous intensity:** 60–80 $V0_2$max, RPE: 13-16	15-45 min/session 15-30 min/session		All activities with large muscle groups depending on the cause of fatigue	Strength training on an individual basis, at least 2/week with intensity as shown above (prevention)

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Cancer (*depending on localisation) © EFSMA	4-5/week, preferred daily	**Low–moderate intensity:** 40-60 %$V0_2$max, RPE: 11- 13, individually high.	15-60 min/session	Endurance, strength.	All activities with large muscle groups: (Nordic) walking, cycling, skiing, evtl. Swimming.	On an individual basis depending on the cancer location, If arms and legs nor concerned, 2/week strength training.

	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
Pregnancy (for details see appendix) © EFSMA	2/week up to week 28 of pregnancy	**Moderate intensity**: 40-60 %$V0_2$max HR 135–125/min (acc. to age)	20 – 30 min	Endurance.	Swimming, (Nordic) walking, jogging, stretching.	
Children (age 6 – 18ys) © EFSMA	daily	**Moderate, vigorous.** No restrictions.	60 min	Endurance, flexibility, balance, muscular endurance.	Running, ball games, gymnastics, swimming, cycling.	Ad libitum.
Older Adults (> 65 ys.) © EFSMA	**Moderate intensity:** ≥ 5/week **Vigorous intensity:** ≥ 3/week	**Moderate intensity:** RPE: 10-12 **Vigorous intensity:** RPE: 14-16	**Moderate intensity:** 30-60 min (can start with 3x10 min) **Vigorous intensity:** 20-30 min	Endurance, muscle strength and endurance.	Walking, aquatic exercises, stationary cycling, stair climbing.	**Moderate intensity:** 60-70 % of 1 RM **Low intensity:** 40-50 % of 1 RM ≥ 2/week, 8-10 exercises, 10–15 reps, ≥ 1 set.

Comment: Exercise and pregnancy

(From **Korsten-Reck**, Ulrike: Pregnancy and sport : *International SportMed Journal*, 14, 2013: 256- 259 (The FIMS Journal)

General information on endurance training during pregnancy[7]

- Endurance training should always be accompanied by weight training exercises and coordination exercises
- Individually adjusted heart rates (HR) should be chosen in consultation with the supervising physician according to the recommendations (talk test)[12]:
  Women 20-29 years 135-150 HR
  Women 30-39 years 130-145 HR
  Women > 40 years 125-140 HR
- Potentially high individual differences should be taken into account.
  Sports with particularly positive effects for mother and child4
- Cycling on low ground-here the bicycle carries the weight and relieves the spine
- Swimming is especially suited for pregnant women with edema. Contrary to common opinion, the risk of infections is not increased. Furthermore, swimming is a joint-friendly activity. Water temperature should not be below 20° Celsius and not above 33° Celsius to prevent additional circulatory reactions.
- Hiking, walking, jogging, Nordic walking, cross-country skiing, stretching.

General recommendations for physical activity for health (FITT)

(Exercise Prescription for health (EPH)

	Frequency	Intensity*	Time (duration)	Type of activity	Volume
Adults	>/= 5	moderate	> 30 min	Aerobic	> 1000Kcal/week
		150 Min/week at 3 or 4 days			
	>/= 3	vigorous	> 30 min	(An)aerobic	> 1500 Kcal/week
		75 min/week at 2 or 3 days			
	> 2 non-consecutive	40-60 1RM	>/= 20 - 30 min	Resistance	1-3 sets,8 – 12 reps
					8 – 10 exercises

*(VanHees et al., EJPC,2012)

Alternative : Endurance 150 min or more /week moderate intensity at least at 3 - 5 days with at least > 10 min episodes

or	75 min or more/week vigorous intensity	at least at 3 days
Resistance	8 – 10 exercise ,8 – 12 RM	2 days/week or more
Flexibility	2 days /wek or more	stretches, static movements etc.
Balance	“Sensomotoric movements	to tolerance, progressive difficult postures, different muscle groups

(modified from Vopat BG et al: J Am Acad Orthopaedic Surgeans 2014,22:576, Pescatello, 2015**)**

Appendix

HITT: High intensitiy interval training :2 **/week with functional capacity > 5 MET**: 10 min warm up, thereafter with 4 min exercise and 3 min pause, for a total load time of 38 -40 min and cool down for 5 minutes (Conraads et al.2015) with 60 % of V02max, progression to 90 %,

Patients with reduced functional capacity (< 5 METs):Start with continuous endurance training for at least 2 weeks, then start with HITT 2 /week with 60% of V02 max and progression within 4 – 8 weeks to 90%.

Consider: Endurance training (continuous training) is the basis for training in heart disease, add on HITT should be performed as add on intermittent exercise program two times a week if preferred by the subjects. Supervision by an experienced sports physician in patients is mandatory.

(For more details see Conraads et.al.2015 and Liou K et al.,2015)

Table: Classification of Physical Activity Intensity (modified from Pescatello,2014)© **EFSMA**

Intensity (RPE)	V02R (%) HRR	Maximal HR (%)	12 METs* V02max	10 Mets V02max	8 METs V02max	6 METs V02max
Very light	< 20	< 50	< 3,2	< 2.8	< 2.4	<2.0
Light	20 - < 40	50 - < 64	3.2 -< 5.4	2.87- <4.6	2.4 - < 3.8	2.0 - <3.1
Moderate	40- < 60	64 - < 77	5.4 -< 7.6	4.6 – < 6.4	3.8- < 5.2	5.2 - < 7.0
Vigorous (hard)	60 -< 85	77 - < 94	7.6 - < 10.3	6.4 - < 8.7	4.2 - < 7.0	4.1 - < 5.3
Vigorous (very hard)	85 - <100 100	94 - < 100 100	10.3 - < 12 12	8.7 - <10 10	7.0 - < 8 8	5.3 - < 6 6

Abbreviations: HR : Heart rate, HRR: Heart reserve; MET: Metabolic equivalent;
V02max : maximal oxygen uptake; V02R: oxygen uptake reserve. 12 METs corresponds to 215 watts, 10 METs to175 watts,8 METs to 140 watts, and 6 METs to100 watts during bicycling exercise.

HRmax – Maximal Heart Rate.
VO_2max – Maximal Oxygen Uptake.
Reps – Repetitions.
RPE – Rating of Perceived Exertion.
RM – Repetition Maximum. 1 RM corresponds to the maximum weight that can be lifted through the entire exercise movement one time.

Maximal Heart Rate : 208 – 0.7 Age (ys) for men
- 0.8 Age (ys.) for women (Tanaka, 2001)

Metabolic Equivalent

MET and classification: 1 MET: 1 Kcal/kg*h or 4.184 * kJ/kg/*h

Light physical activities: **MET < 3** (corresponds to 25 watts /time, or 50-63% of max HR, RPE 6-10)
Moderate activities: **MET 3 – 6** (corresponds to 75 – 125 watts/ time or 64-76% of max HR; or RPE 11-13)
Vigorous intensity activities: > 6 MET (corresponds to > 150 Watts/time, or 77-93% of max HR,or RPE 14-20)

MET: Table for METs and daily activities: See Ainsworth, BE, Haskell WL,Leon AS et al.:
Compendium of physical activities: classification of energy costs of human physical activities.
MSSE 1993,25:71-80 also:www.gloablrph.com

MET calculator from ergometer and treadmill - tests: MET – calculat or: (www.fedel.com)

Ratings of Perceived Exertion

Intensity according to Ratings of Perveived exertion (for details see below)**:**

	RPE Scale 0 – 10 :	**RPE Scale 6 – 20**
light intensity:	0 – 5	6 - 11
moderate	: 5 - 6	11 - 13
vigorous	: 7 – 8	14 and more

Borg's scale of Ratings of Perceived Exertion (RPE)

No exertion at all
Extremely light
Very light
Light
Somewhat hard
Hard
Very hard
Extremely hard
Maximal exertion

Ratings of Perceived Exertion Scales

	RPE – Scale 6 -20		**RPE – Scale 0 -10** (CR-Scale*) (*Category -Ratio-Scale, anchored at 10)
6	no exertion at all	0	nothing at all
7		0.5	very, very light
	extremely light	1	very light
8		2	fairly light
9	very light	3	moderate
10		4	somewhat hard
11	light	5	hard
12		6	
13	somewhat hard	7	very hard
14		8	
15	hard (heavy)	9	
16		10	very, very hard, maximal
17	very hard		
18			
19	extremely hard		
20	maximal exertion		

(For details see Borg's perceived exertion and pain scales. Gunnar Borg,Human Kinetics, Champaign,Il., 1998)