



## **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 broken 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
<b>Prevention in general</b>  © EFSMA	<b>Low intensity:</b> 5/week  <b>Vigorous intensity:</b> 3/week	<b>Low intensity:</b> 40–65 % HRmax RPE 10-13  <b>Vigorous intensity:</b> 65-85 % HRmax RPE > 13-16	<b>Low intensity:</b> > 30min/session or 150min/week  <b>Vigorous intensity:</b> > 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.
<b>Coronary heart disease</b>  © EFSMA	3–5/week  <b>Vigorous intensity:</b> 3/week	50–80 % V <sub>O</sub> <sub>2</sub> max or 40-70 % HRmax RPE 12–15  maybe:HITT*	40-60 min/session  <b>Low intensity:</b> < 30 min  <b>Vigorous intensity:</b> > 20 min/session  <b>HITT* :</b> 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
<b>Heart Failure</b>  © EFSMA	3–5/week	<b>Low – moderate intensity:</b> 40-60 %Vo <sub>2</sub> max RPE 11- 15  <b>HITT*:</b> with 90% 4 min and 3 min pause in between	15-60 min/session  <b>HITT*</b> : 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.
<b>Rhythm Disturbances</b>  © EFSMA	3 – 5 /week  2 – 3 /week	<b>Moderate intensity:</b> 40–60 %V <sub>O</sub> <sub>2</sub> max, RPE: 11- 13  <b>Vigorous intensity:</b> 60-80 %V <sub>O</sub> <sub>2</sub> 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).
<b>Arterial Hypertension</b> (Frequent control of blood pressure) e.g. ambulant  © EFSMA	3 – 5 (7) /week  2 -3 (4)/week	<b>Moderate intensity:</b> 40-60 %V <sub>O</sub> <sub>2</sub> max, RPE: 11-13 <b>Vigorous intensity:</b> 60-80 %V <sub>O</sub> <sub>2</sub> 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
<b>Crohn's Disease</b> <b>Ulcerative</b> <b>Collitis</b>  © EFSMA	3/week to start later 5-7/week	<b>Low intensity:</b> <b>40-60 %VO<sub>2</sub>max</b> <b>60 % HRmax</b> <b>RPE: 6-10</b>  <b>No moderate /intense activity during acute exacerbations.</b>	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.
<b>Obstipation (Constipation)</b>  © EFSMA	3– 4/week (every other day)	<b>HR: at least 110/min</b>	30 min/session	Endurance.	Running.	/



	Frequency/Week	Intensity	Time (duration)	Type of training	Type of sports	Strength training
<b>Multiple Sclerosis</b> © EFSMA	3-5/week	65-75 %HRmax 40-70 %VO <sub>2</sub> max 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.
<b>Bronchial Asthma</b> (Possibly bronchodilator before activity) © EFSMA	<b>Low intensity:</b> ≥ 5/week  <b>Vigorous intensity:</b> ≥ 3/week	<b>Low intensity:</b> > 55 %HRmax 30-50 %VO <sub>2</sub> max RPE: 10-12  <b>Vigorous intensity:</b> > 70 %HRmax > 60 %VO <sub>2</sub> max RPE: 10-14	<b>Low intensity:</b> ≥ 30 min  <b>Vigorous intensity:</b> ≥ 20 min	Endurance, strength, flexibility, respiratory muscle training.	Running, walking, cycling, aerobics.	70 % of 1RM, ≥ 2-3/week, 10-15 reps, 1-3 sets.
<b>Kidney Disease</b> (Training for pts. with dialysis below) © EFSMA	3/week	<b>Moderate intensity:</b> 40-60 %VO <sub>2</sub> max RPE: 11-13  <b>Vigorous intensity:</b> 60-80 %VO <sub>2</sub> 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
<b>Diabetes mellitus type 2</b>  © EFSMA	<b>Moderate intensity:</b> 5/week  <b>Vigorous intensity:</b> 3/week	<b>Moderate intensity:</b> 40-70 % $\text{VO}_2\text{max}$ RPE 11-13  <b>Vigorous intensity:</b> 60-90 % $\text{VO}_2\text{max}$ 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, $\geq$ 2-3/week, 8–12 reps, 1-3 sets.
<b>Metabolic Syndrome</b>  © EFSMA	5-7/week	60-70 % $\text{VO}_2\text{max}$ 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.
<b>Obesity</b>  © EFSMA	$\geq$ 5/week	<b>Moderate intensity:</b> 40-60 % $\text{VO}_2\text{max}$ 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
<b>Dyslipidemia</b>  © EFSMA	≥ 5/week	40-75 %V <sub>O</sub> <sub>2</sub> max	≥ 50-60 min (can be in 10 min intervals)	Endurance.	Jogging, running, skiing, fitness classes, brisk walks, cycling, swimming, racquet and ball sports.	
<b>Osteoporosis</b>  © EFSMA	> 5 /week	40-70 %V <sub>O</sub> <sub>2</sub> 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.
<b>Osteoarthritis</b>  © EFSMA	3-5/week	<b>Low-moderate intensity :</b> 40-60 %V <sub>O</sub> <sub>2</sub> max RPE: 11 -13	<b>Aerobic:</b> 30 min (or 3x10 min)  <b>Strength:</b> 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.
<b>Low Back Pain</b>  © EFSMA	<b>Moderate intensity:</b> ≥ 5/week <b>Vigorous intensity:</b> ≥ 3/week	<b>Moderate intensity:</b> 40–65 %HRmax RPE: 10-13 <b>Vigor intensity:</b> 65-85 %HRmax RPE: >13-16	<b>Moderate intensity:</b> 30-60 min/day or ≥ 150min/week <b>Vigor intensity:</b> 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
<b>Rheumatoid Arthritis</b>  © EFSMA	<b>Low intensity:</b> 4-7/week  <b>Moderate intensity:</b> 3/week	<b>Low intensity:</b> 50-70% SFmax RPE: 10-14  <b>Moderate intensity:</b> 60-80% SFmax RPE: 11-15	<b>Low intensity:</b> 30 min  <b>Moderate intensity:</b> 30-60 min	Endurance, strength, muscular endurance.	Cycling, cross-country skiing, (Nordic) walking, light fitness training, dancing.	2-3/week  <b>Strength:</b> 60-80 % of 1RM, 8-12 reps, ≥ 1 set.  <b>Muscular endurance:</b> 30-40 % of 1RM, 15-25 reps, 1-2 sets.
<b>Fatigue Syndrome</b>  <b>Fibromyalgia</b>  © EFSMA	3–5 days/week	<b>Low–moderate intensity:</b> 40-60 %V <sub>02</sub> max, RPE: 11–13  <b>Vigorous intensity:</b> 60–80 V <sub>02</sub> 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
<p><b>Cancer</b></p> <p>(*depending on localisation)</p> <p>© EFSMA</p>	4-5/week, preferred daily	<p><b>Low-moderate intensity:</b></p> <p>40-60 %V<sub>O</sub><sub>2</sub>max, RPE: 11- 13, individually high.</p>	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
<b>Pregnancy</b> (for details see appendix)  © EFSMA	2/week up to week 28 of pregnancy	<b>Moderate intensity:</b> 40-60 %V <sub>O</sub> <sub>2</sub> max HR 135–125/min (acc. to age)	20 – 30 min	Endurance.	Swimming, (Nordic) walking, jogging, stretching.	
<b>Children</b> (age 6 – 18ys)  © EFSMA	daily	<b>Moderate, vigorous.</b> No restrictions.	60 min	Endurance, flexibility, balance, muscular endurance.	Running, ball games, gymnastics, swimming, cycling.	Ad libitum.
<b>Older Adults</b> (> 65 ys.)  © EFSMA	<b>Moderate intensity:</b> ≥ 5/week  <b>Vigorous intensity:</b> ≥ 3/week	<b>Moderate intensity:</b> RPE: 10-12  <b>Vigorous intensity:</b> RPE: 14-16	<b>Moderate intensity:</b> 30-60 min (can start with 3x10 min)  <b>Vigorous intensity:</b> 20-30 min	Endurance, muscle strength and endurance.	Walking, aquatic exercises, stationary cycling, stair climbing.	<b>Moderate intensity:</b> 60-70 % of 1 RM  <b>Low intensity:</b> 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**

- 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)<sup>12</sup>:  
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 child<sup>4</sup>
- 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))

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

\*(VanHees et al., EJPC,2012)

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**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 Surgeons 2014,22:576, Pescatello, 2015)



## Appendix

**HITT: High intensity 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  $V_{O2max}$ , 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  $V_{O2}$  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 to 175 watts, 8 METs to 140 watts, and 6 METs to 100 watts during bicycling exercise.

HRmax – Maximal Heart Rate.

VO<sub>2</sub>max – 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.gloablph.com](http://www.gloablph.com)

**MET calculator** from ergometer and treadmill - tests: MET – calculat or: ([www.fedel.com](http://www.fedel.com))

## **Ratings of Perceived Exertion**

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

<b>RPE Scale 0 – 10 :</b>	<b>RPE Scale 6 – 20</b>
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)





## Ratings of Perceived Exertion Scales

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

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