

# Prevention by Physical Activity: The Relevance of Physical Activity and Fitness

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## Introduction

Physical activity may be regarded as a drug or polypill but by far more, it works like a pleiotropic agent. Many positive effects are observed from brain, heart and lungs to the legs and muscles [1].

Training induced effects first occur in the working muscles with increased mitochondrial size and numbers, and function. Thereafter, cardiovascular function is improved in a manifold way with slowing heart rate, increased cardiac output and finally with intense training leading to eccentric hypertrophy [3].

With respect to exercise as prevention and a form of therapy, we observe many established indications (Table 1). Further, there is clearcut, nonlinear dose-response relationship, many somatic and psychosomatic effects, only few side effects with muscle or bone problems and rare contraindication such as acute diseases (Figure 1).

For preventive purpose, the dose response -relationship is of great significance. It implies that the most important step is from exercise deficiency with sedentary lifestyle (including screen time) and physical inactivity to moderate physical exercise. With increasing amount of training, fitness is improved, but preventive effects increase only moderate. This then is the way to motivate patients and healthy inactive subjects. A little bit of movement is better than nothing. Walking and nordic walking is mostly the first step of beginners and can be performed by almost all subjects and patients. One more effective motivation is the exercise prescription for health using the FITT acronym (Figure 2). Every physician during every patient's contact should recommend physical activity with regards to frequency, intensity, duration and type of physical activity. Information for this kind of prescription have been published in details (Fyss Book, ACSM book, [www.efsmascientific.eu](http://www.efsmascientific.eu)). In short and general, 150 min./week of moderate training and 75 min./week as vigorous training splitted in 3 or 4 sessions, are recommended to everybody. Evidence based positive

effects of regular physical activity to prevention and treatment of disease (Table 1).

In some diseases, not prescribing exercise as therapy, such as in diabetes mellitus or in preventing dementia, may even be malpractice. Physical activity as prevention and treatment is similar to drug therapy (NACI et al.) and to some extent even more effective than one tablet [4,5].

Besides endurance training, strength training twice a week increases further the positive effects on health. However, the main goal of exercise training is not only longevity, but mainly less disability, better autonomy and independency in the elderly. Notably, regular physical activity should start in childhood and at school with a daily hour of exercising. This then leads to better cognitive function in children but similar in the elderly or aged person.

Training prevents sarcopenia, improves heart and brain function and has positive effects on the immune system. In a broader sense, physical activity includes other forms such as yoga and tai chi. Yoga increases muscle strength and muscle function, improves mental toughness, control of body movement and increases active recovery after sports.

Yoga therefore plays a significant role as a useful supplement to physical activity. Nonetheless, regular physical activity is the mainstay of a health lifestyle.

## References

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Diseases with evidence –based positive effects of physical activity and exercise training: Prevention, Therapy	
Disease	Evidence, Class, Level
Coronary artery disease	IA
Primary and secondary prevention	IA
Arterial hypertension	IA
Heart failure (EF increase)	IA
Metabolic Syndrom, Diabetes mellitus	I,A
Cancer (breast, colon)	IA
Chronic kidney disease	IA
Prostatic cancer	IIB

**Table 1:** List of indications for physical activity for prevention and therapy. Evidence is indicated by level and grade.

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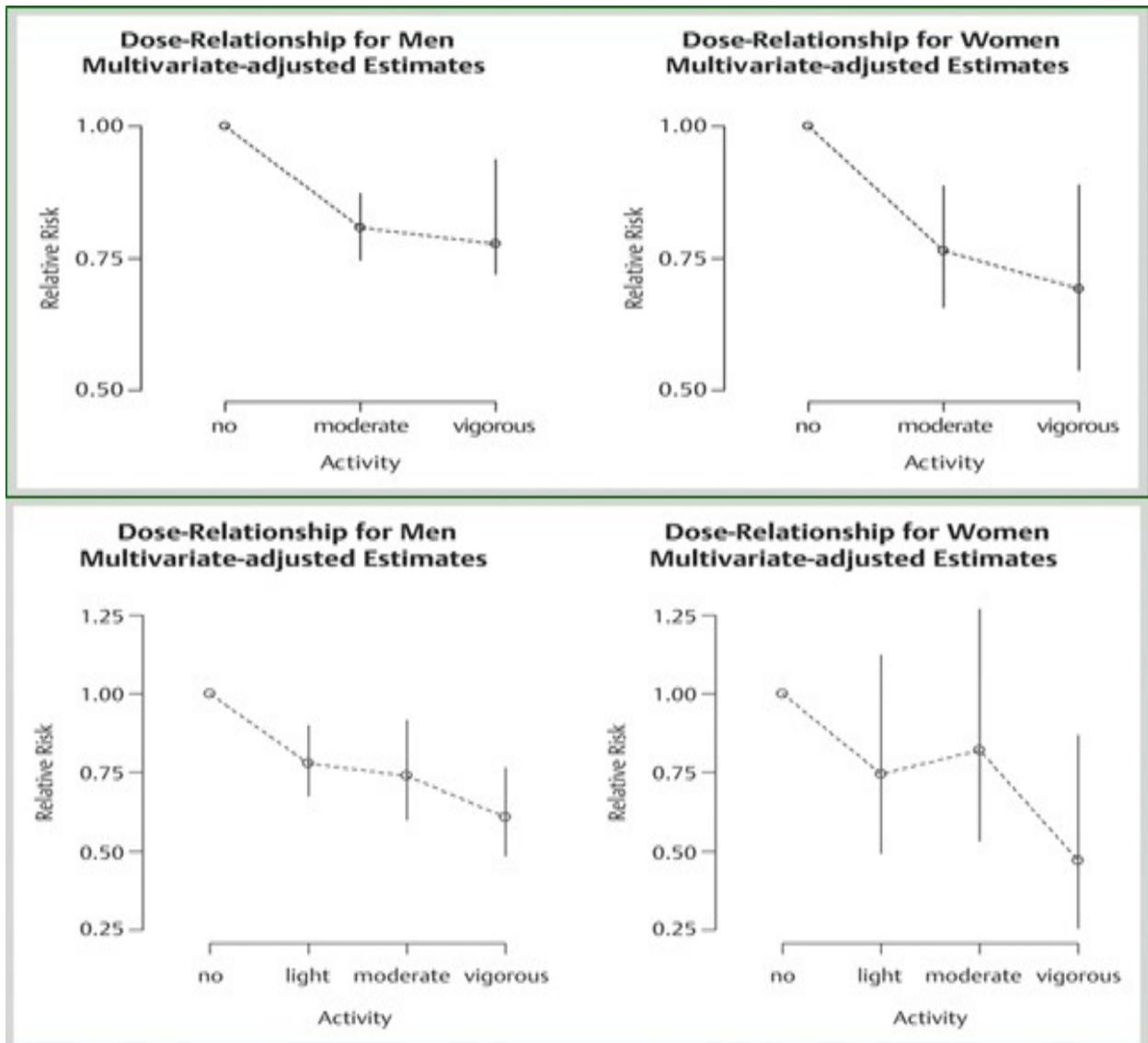


Figure 1: Non-linear relationship of training intensity versus risk reduction of mortality [2].



## Prescription for Exercise

### ENDURANCE TRAINING

.....x/wk, each ..... Min  
 Training Heartrate: ...../min  
 Borg-Value:  
 Warming up: 5 min, cooling down: 5 min

**Recommended training:**

Slow Walk	Fast Walk	Nordic Walk	Running
Swimming	Cycling	Others	

**Ergometer Training:**  
 .....Watt/ ...min for warming up .....Watt/min..... minutes

### STRENGTH TRAINING

.....% 1RM.....REPs .....SETS  
 .....muscle groups

Gymnastics/ Balance/Coordination	.....wk each.....min
Ball Games	.....wk each.....min
Others (Golf, Dance,..)	.....wk each.....min

Sport Physician .... Date: ....

In case of dyspnoe, irregular heart beats, chest pain or dizziness,  
stop activity and counsel your doctor.

**Figure 2:** Exercise prescription for health ([www.efsma-scientific.eu](http://www.efsma-scientific.eu)).

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