

# **(XIV.) Ergometry**

# Ergometry (stress testing, exercise testing)

- Work load examination – measurement of ECG and other parameters depending on the increasing degree of work load on the ergometer
- In addition to ECG, the following can be recorded:
  - O<sub>2</sub> consumption, CO<sub>2</sub> output, blood pressure, blood samples (mainly lactate)
- Types of ergometers
  - Bicycle ergometer – load mainly on the lower half of the body
  - Rowing machine – upper body load
  - Rump ergometer – exercise bike for hands, para/quadruplegia
  - Master's step
  - Treadmill
- Can be used in:
  - Sports Medicine
  - Rehabilitation medicine
  - Cardiology



**Ergometry** deals with evaluation of performance (work, power).

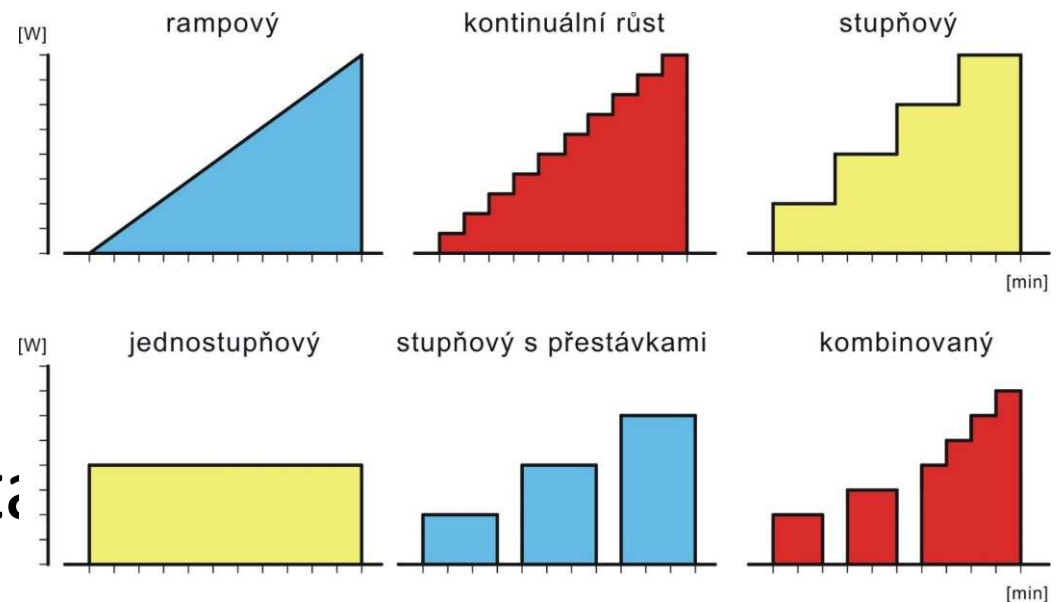
Its name comes from two Greek words: „*ergon*“ = work, „*metron*“ = measure.

The test is a part of complex examinations evaluating responses and adaptation of organism to exercise. It is used to diagnose, to decide about the treatment and/or evaluation of its effectiveness. In the sport medicine, it is used mainly for evaluation of fitness.



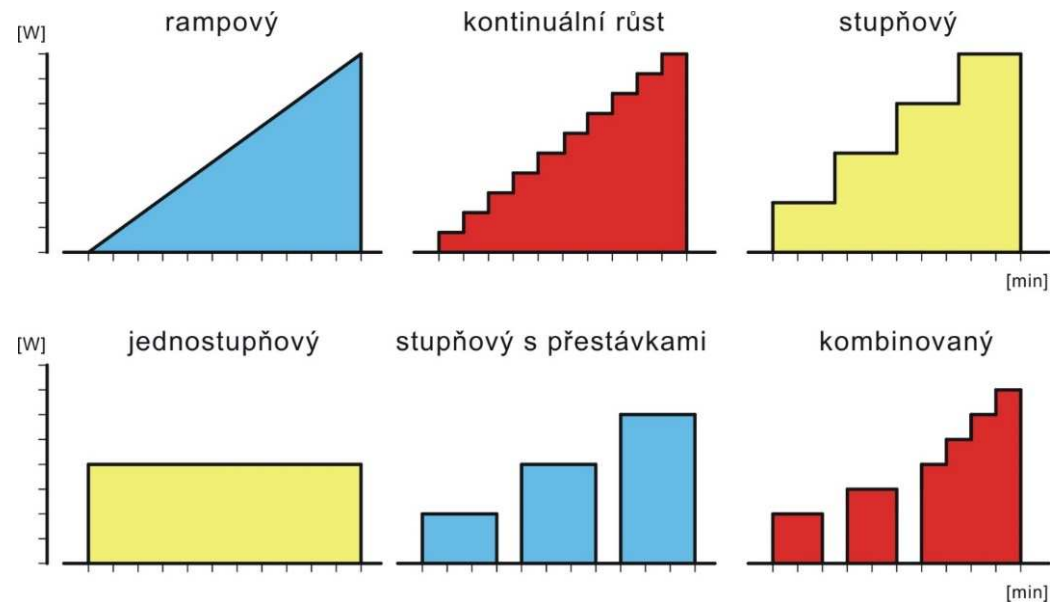
# Basic types of protocols for exercise testing

- Ramp
- Continuous increase
- gradual
- Single stage step
- Intermittent increments
- combination both



# Basic types of protocols for exercise testing

- Ramp
- Continuous increase
- gradual
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# Examination phases:

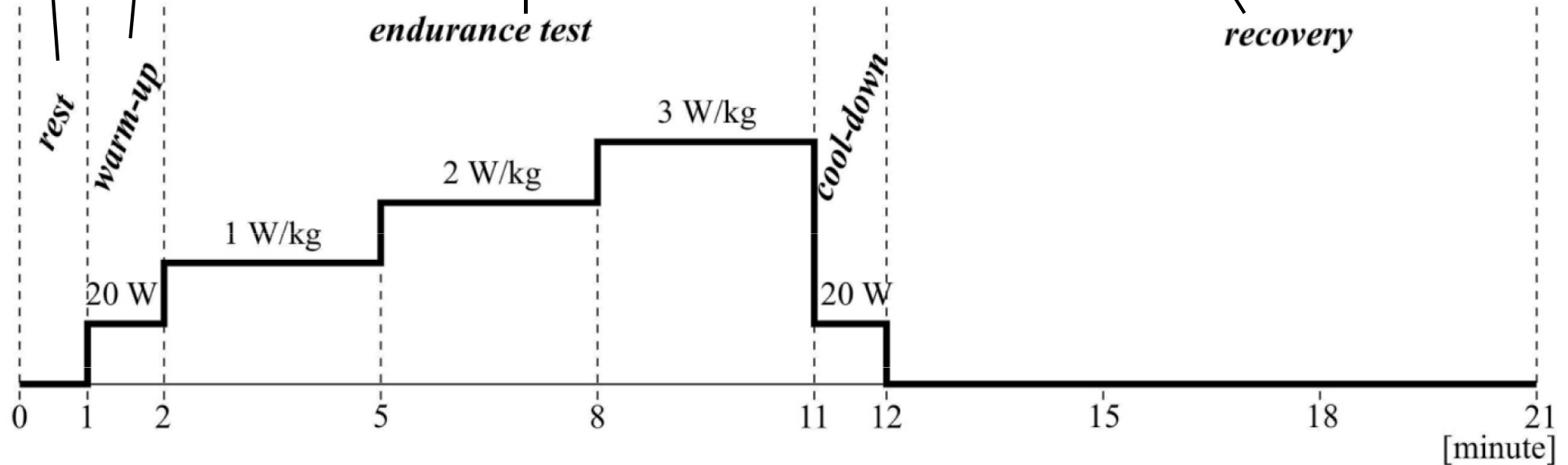
recording  
of resting  
values

exposure of  
examined person to  
graduated physical  
work

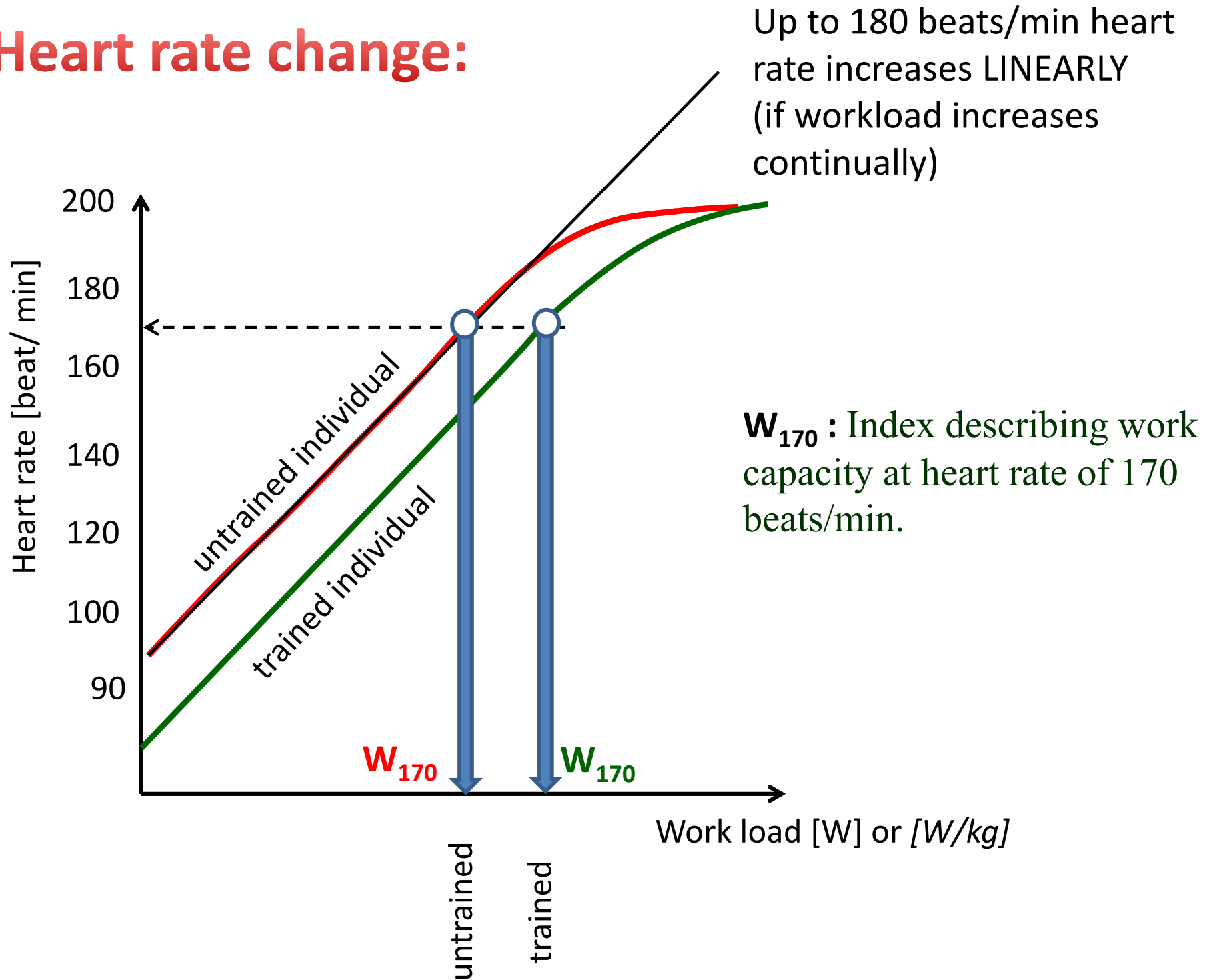
workload of low intensity supporting  
catabolites removal (lactic acid),  
helping heart rate recovery, reducing  
vertigo and collapses (due to after-  
work hypotension)

application of low  
workload in order to  
increas tissue perfusion  
and improve joints  
mobility

follow-up after exercise



# Heart rate change:





# Heart rate change:

$W_{170}$  : Index describing work capacity at heart rate of 170 beats/min

Population norms (Heller, 2005)

A G E	Men		Women	
	[W]	[W/kg]	[W]	[W/kg]
18	178	2,7	103	1,8
20	185	2,7	106	1,8
22	190	2,7	107	1,8
25	193	2,7	109	1,8
30	194	2,6	112	1,8
35	195	2,6	115	1,8
40	195	2,5	118	1,8
45	195	2,4	121	1,8