

# **(XIV.) Ergometry**

Physiology I - practicals

**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.

# Examination phases:

## PREPARATORY PHASE

recording of resting values

## RESTING PHASE

preparation to the test, connecting to equipment

## „WARM UP“ PHASE

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

## LOAD PHASE

exposure of examined person to graduated physical work

## „COOL DOWN“ PHASE

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

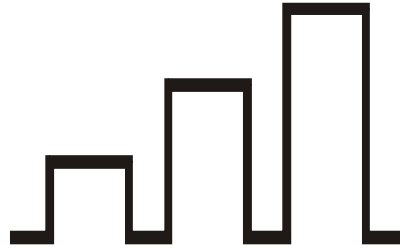
## RECOVERY PHASE

follow-up after exercise

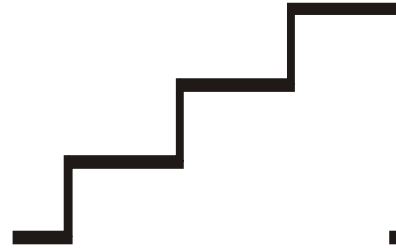
# Basic protocol types :



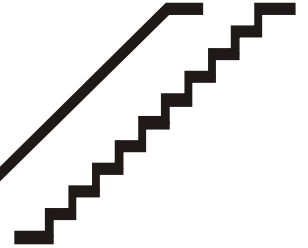
Single stage test



Intermittent incremental steps

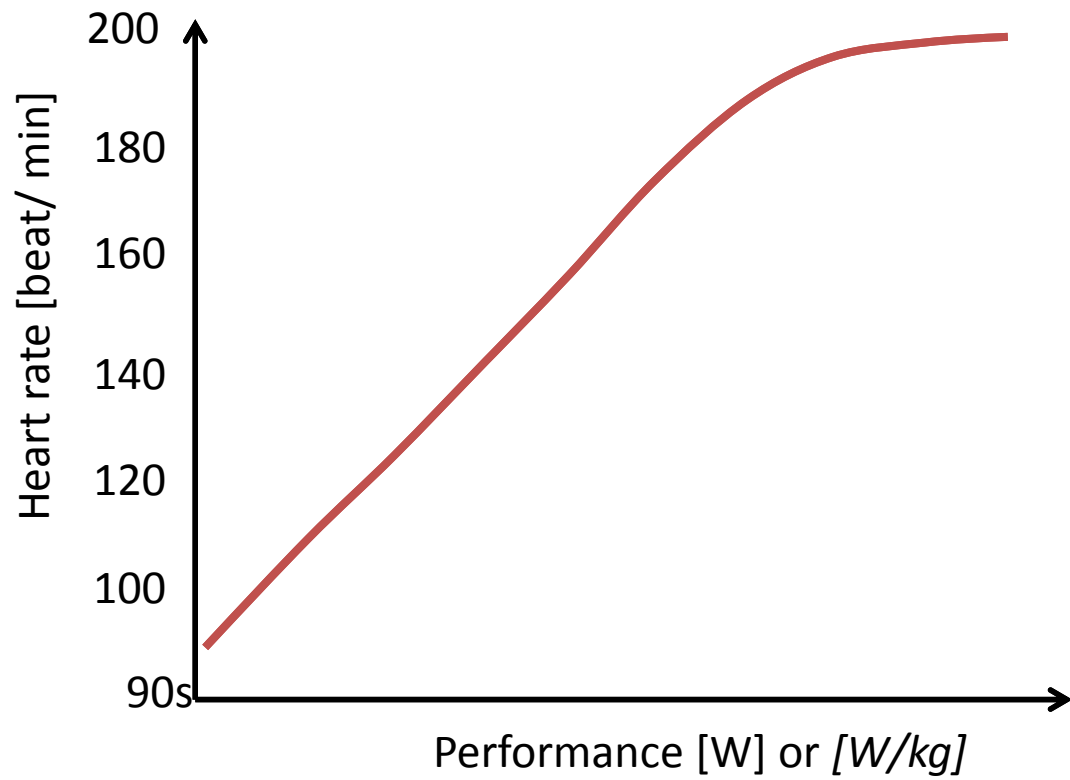


Continuous incremental step

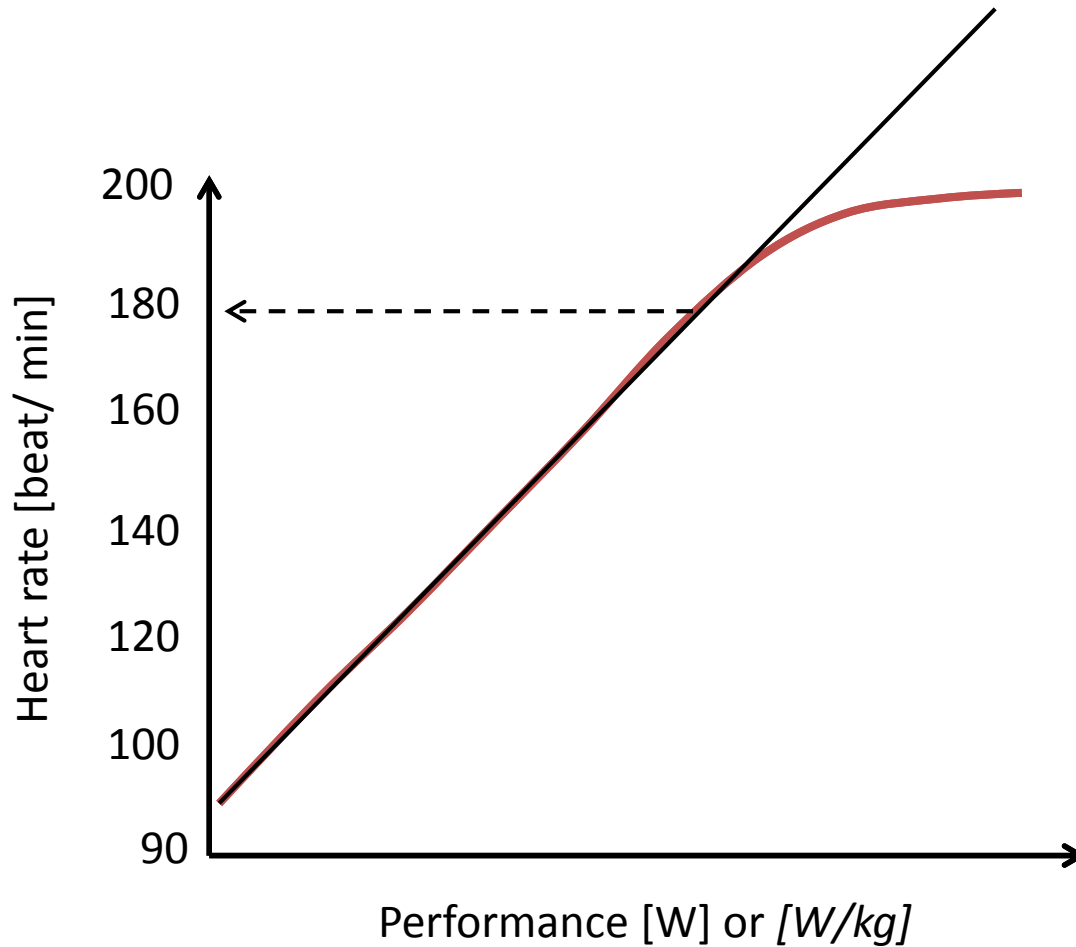


„ramp“ protocol

# Heart rate change:



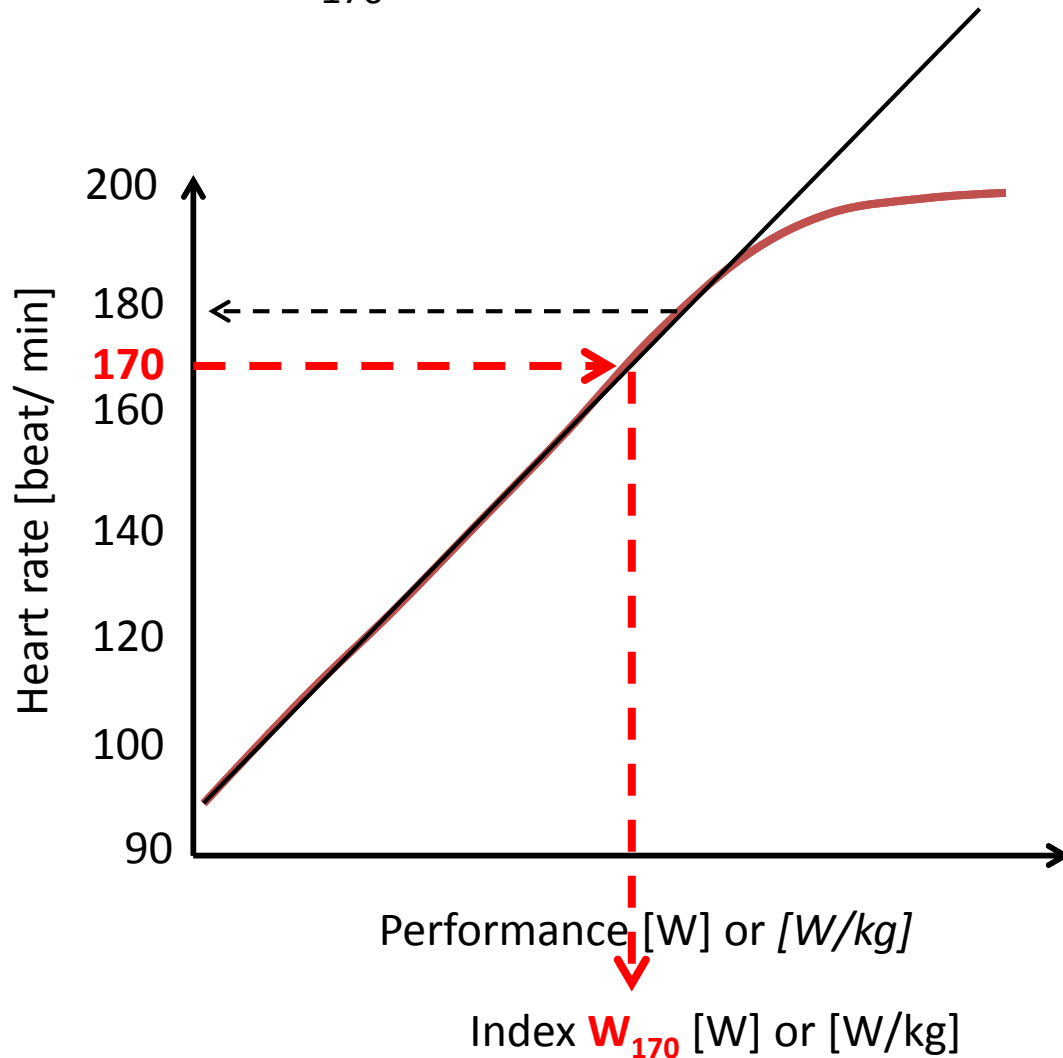
# Heart rate change:



Up to 180 beats/min  
heart rate increases  
**LINEARLY**  
(if workload increases  
continually)

# Heart rate change:

Index  $W_{170}$  extrapolation



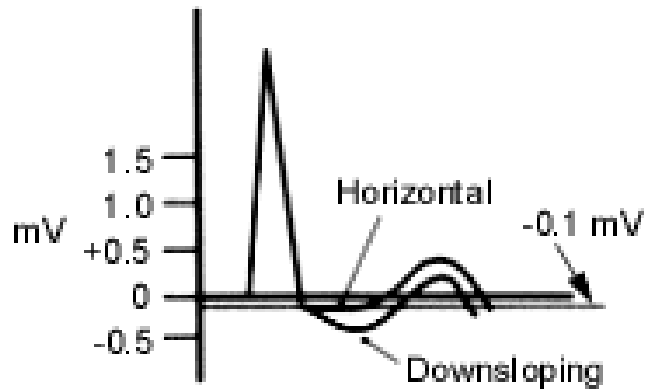
Index describing work capacity at heart rate of 170 beats/min

Population norms (Heller, 2005)

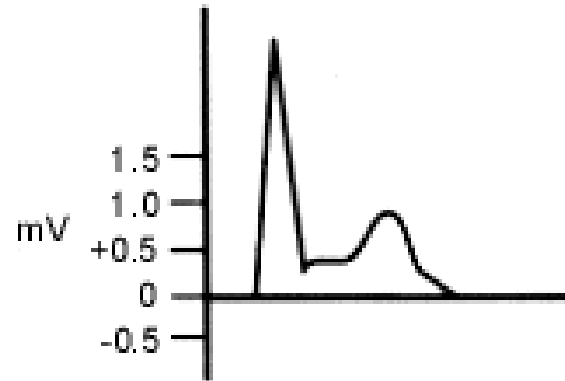
AGE	Men		Women	
	[W]	[W/kg]	[W]	[W/kg]
18	178	2,7	103	1,8
20	185	2,7	106	1,8
22	190	2,7	107	1,8
25	193	2,7	109	1,8
30	194	2,6	112	1,8
35	195	2,6	115	1,8
40	195	2,5	118	1,8
45	195	2,4	121	1,8

# ECG DURING EXERCISE

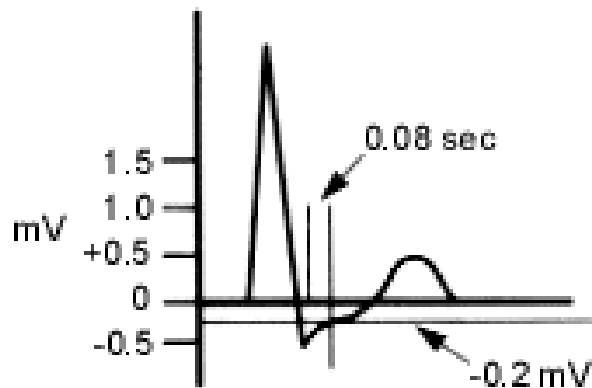
Provocation test, e.g. for heart ischemia



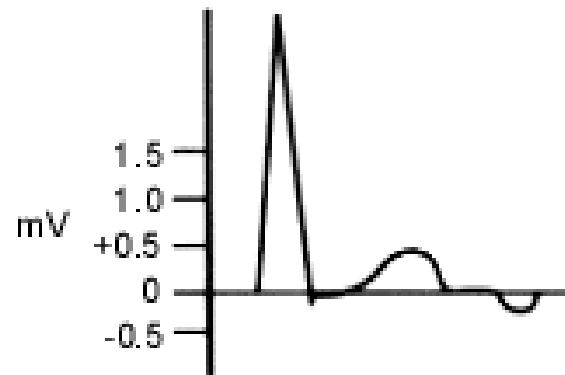
**Horizontal downsloping ST-segment depression,  $\geq 0.1$  mV**



**ST-segment elevation  $\geq 0.1$  mV**



**Upsloping ST-segment depression,  $\geq 0.2$  mV, 0.08 seconds from the J point**



**U-wave inversion**