

**METHOD AND DEVICE FOR ASSESSMENT OF FUNCTIONAL STATE  
OF SKELETAL MUSCLES IN WEIGHTLIFTERS**

Master Student Lind, M.,  
Dr. Habil. Biol., Prof. Vain A.  
University of Tartu, Tartu, Estonia

In training administration of weightlifters it is very important to estimate the influence of changes in training load and capacity on neuromuscular system. Method of myometry and device Myoton give a possibility to gather the information regarding the state of skeletal muscles easily and in training condition.

The method of myometry is based on performing a short time impact to the muscle of the device testing end with mass of 18 grams. The acceleration sensor registers the graph. The computer program calculates the muscle stiffness, the frequency and the logarithmic decrement of damping of the measured oscillations of the muscle.

The elasticity is characterized by the logarithmic decrement – a value which shows, how much energy is dissipated during a period of oscillation. It is calculated in this way:

$$\Theta = \ln ( a_1 / a_2 ) ,$$

where  $a_1$  is the first amplitude of acceleration and  $a_2$  is the amplitude of acceleration a period later.

The index of elasticity is calculated in this way:

$$I_e = 1 + \frac{(\Theta_r - \Theta_c^2)}{\Theta_c (1 + \Theta_r)} ,$$

where  $\Theta_r$  and  $\Theta_c$  – logarithmic decrements of damping of natural oscillations of muscles in their relaxed and contracted state correspondingly.

Four high-level male weightlifters participated in the study during a one-year period. The following muscles were studied: *m. gastrocnemius caput mediale*, *m. tibialis anterior*, *m. rectus* and *biceps femoris*, *m. erector spinae*. In addition to myometric measurements the individual record setting dates were registered.

Results of present study demonstrated that improvement of elasticity index was accompanied by individual record setting in most athletes. It is possible to conclude that weightlifters set personal records with greater elasticity index of measured muscles.