

Abstract

Tremor is a rhythmic oscillating movement of body parts caused by alternating contractions of muscle agonists and antagonists. It is an involuntary movement occurring in healthy individuals as well as in individuals with neurological disabilities. Physiological tremor depends on several factors, including stress and response (fatigue). No one has monitored this connection so far, so I decided to find out whether tennis training affects the parameters examined with the accelerometer and on the muscular strength of the hand.

The thesis is divided into two parts. The first theoretical part describes the facts about tremor, then the metabolism of sport, the effects of vibration, the biomechanics of tennis and accelerometer-based methods. The second practical part describes the methodology of the thesis and presents the results of the experiment. The positives and weaknesses of the study are emphasized in the discussion.

Healthy individuals who play tennis actively were included in the research. They were examined on the tennis courts of the HAMR Sport Branik complex before and immediately after the training unit.

The examination included a medical history, a questionnaire about the range of hours played, subjective perception of pain using the Visual Analogue Scale, the force of a hand grip with the Hand grip test and an accelerometric examination to display the frequency of tremor.

The study involved 10 people, one of whom was excluded due to an orthopaedic defect of the upper limb. After evaluating the anamnestic data, a total of 9 people was included in the project, of which 6 boys and 3 girls with an average age of $22 \pm 5,85$ years (with training intensity from 5 to 22 hours per week).

The results show an increase in muscle strength after the training unit on both upper limbs, on the right upper limb by an average of 2,5 kg and on the left upper limb by 5 kg.

From the selected parameters of the accelerometric examination f_{\max} and PSD_{\max} , the increase of the given value was in most cases after the training unit. A higher increase in frequency with maximum tremor is recorded on the left upper limb with the eyes open, when there was an increase of 0,23 Hz, while on the right upper limb a decrease of 0,09 Hz was recorded. With the closed eyes in case of the right upper limb, the frequency increased by a total of 0,26 Hz and on the left upper limb by 0,21 Hz.

Considering spectral density, the value always increased. On the right upper limb with the eyes open, the value increased by 2,25 dB/Hz, with the eyes closed there was even greater increase of 3,36 dB/Hz. On the left upper limb, PSD_{max} increased by 3,68 dB/Hz with the eyes open and 1,79 dB/Hz with the eyes closed.

The results of the study show that the tennis training in healthy individuals increases muscle strength and there is an increase in the frequency of maximum tremor and spectral density of power.

Key words: tremor, accelerometer, Visual Analogue Scale, hand grip strength, hand grip test, examination of healthy individuals