

## **The analysis of the internal structure of flat bench press**

Muscle activity normalized with respect to maximal potential under static conditions (%) helped fully evaluate the effects of increased load on the internal structure of flat bench press between men and women. Activity in working muscles increases with external load in both males and females. There are differences in muscle activity associated with the different internal structure of the movement between men and women. The most important difference between flat bench press in both sexes is the different activity of the triceps brachii muscle (long head). This activity increases significantly in men, while in women there was no statistically significant increase in the activity of the triceps brachii muscle under the influence of increasing external loads. The differences in electromyography changes with progressive loads between male and female athletes may result from the lower level of strength of the upper limbs in women caused by lower activity of the triceps brachii muscle compared to men (Gołaś et al. 2018).

Electromyography allows the assessment of neuromuscular control of the activity of specific muscle groups. The multi-set resistance exercises performed with a moderate load (60% 1RM) to concentric failure may result in considerable acute fatigue of a central and a peripheral origin. (Zajac et al. 2015). It can be concluded, than the inability to increase tension in successive repetitions and the limited number of repetitions performed in the last (10) set, can be explained by fatigue of the CNS and accumulation of metabolism by-products (Zajac et al. 2015).

Analysis muscle activity patterns is widely used to improve resistance training effectiveness, e.g. to improve bench press (BP) performance (Gołaś et al. 2018, Stastny et al., 2017, Vigotsky et al. 2017). This result indicate, that triceps brachii muscle activity (long head)

significantly increased in the influence of 6 weeks of targeted resistance training. Research shows that the deltoid muscle and pectoralis major muscle adapt to the training stimulus to a lesser extent. Additionally, the 6-week period used in this research could be too short for more significant changes in the internal structure. The purpose of such analyses is to identify possible deficiencies in muscle activation or the most active muscle group when overcoming external resistance (Maszczyk et al. 2016, Van den Tillaar et al. 2012), which might help to improve performance, overcome training stagnation or prevent injury (Serner et al. 2014). If a lack of muscle activation is found, targeted muscle strength training should be used to improve the weak muscle group (Stastny et al. 2018, 2014, 2016).

The essence of electromyography in sport has been an issue raised for a long time. It is particularly important in the aspect of the sport training process. In the presented series of research that constitute scientific achievement, the main research problem is the analysis of the activity pattern of the prime movers in the resistance exercise, which is flat bench press. The results obtained from the above analyzes will allow a more complete description of the physical activity, which is flat bench press, and therefore to increase the efficiency of the training process, both experienced and beginners in this exercise and in this sport.