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Effect of different pull-up execution on muscle activity of the upper extremity, shoulder and trunk

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Bar pull-up is complex multijoint exercise used for developing muscular strength in upper limb, shoulder and trunk. It is used for increasing sports performance in a wide variety of sport disciplines. The aim of this study was to describe the muscle activity of upper extremities, shoulder and trunk during the different variants of pull-up. Thirteen healthy male adults (age 23.8 ± 2.9 years, height 1.78 ± 0.07 m, body mass 79.7 ± 7.9 kg), regularly carried on strength training, participated in this study. Muscle activity was recorded with wireless EMG System (Delsys Inc., Natick, USA) in 14 muscles of the dominant side of the body. Testing protocol included 7 types of pull-up executions which differs in width of the hands gripping the bar and in the position of the trunk and lower extremities. Only the concentric (ascending) phase of the motion, modified to last 2 second, was measured. The mean amplitude of activity was calculated for each muscle. Values from two trials were averaged for each pull-up execution. Statistical analysis was performed using the Willcoxon test. The results showed significantly lower muscle activity of pectoralis major and upper trapezius with the increasing bar grip width. Rectus abdominis and obliquus externus also showed significant differences between most of the pull-up variations. Erector spinae and deltoideus showed significantly increased activity only during the bend back pull-up compared to other positions. For triceps brachii, biceps brachii, brachioradialis, infraspinatus, latissimus dorsi, serratus anterior and middle trapezius there were no significant differences between pull-up executions.

Biography

Petr Linduška has studied his master degree in physical education and biology at Palacký University Olomouc, Faculty of Physical Culture, where he currently continues also in his Ph.D studies in Kinanthropology with the specialization in biomechanics of human motion. Moreover he is a high school teacher. His research interest includes isokinetics, motor control, fitness and sport training.

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