IMPROVED KNEE STABILITY AFTER 4-WEEKS WHOLE VIBRATION TRAINING

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In spite of the common use of whole body vibration (WBV) data about the effects of a long-term training on functional joint control is lacking. As a result of the high incidence of knee joint injuries in sports, the study aimed to quantitatively assess the effect of 4-week WBV training on the reflex activity of the thigh muscles and on the anterior tibia translation as criteria for knee stiffness. 19 subjects were divided into a control (n=6) and a study group (n=13). The study group trained 3 times per week. Each training session lasted 3*1 minutes on a vibration plate. The vibration stimulus was 30 Hz applied by a vertical amplitude of 4 mm. Knee stability was assessed after mechanically induced anterior tibia translation while subjects were standing upright in 30° knee flexion prior to training and after 2 and 4 weeks. Anterior tibia translation was determined by two potentiometers. Reflex activity of the extensor and flexor muscles of the thigh was recorded by surface electromyography (EMG) to determine reflex sizes and latencies of the short latency response (SLR) and medium latency response (MLR). Biomechanical analysis already revealed a significant decrease in anterior tibia translation after 2 weeks which remained constant until week four. Reflex sizes of SLR and MLR were also significantly reduced after 2 weeks. No further significant decline to WBV training was observed at week four in reflex sizes. Latencies of both reflex components remained unchanged throughout the long-term training intervention. Our results indicate that a long-term WBV training improves functional knee joint stability. It is likely that the observed effect is based on the muscle tuning theory which is suspected to alter the stiffness-related properties and to enhance the energy-absorbed capacity of the muscle-tendon complex.

Keywords: ACL, Training and Testing

12th Annual Congress of the ECSS, 11–14 July 2007, Jyväskylä, Finland