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MUSCLE ACTIVITY PATTERN IN HIP FLEXION RESISTANCE TRAINING

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Muscle activity pattern in a movement is an indicator of muscle function and gives information about muscle recruitment in a motoric task. The aim of the study was to validate the muscle activity pattern in multijoint hip flexion resistance training with the use of training device constructed according to the patent P.435615 as an exercise designed to activate psoas major, iliacus and gluteus minimus and medius. Targeted muscles present the scheme of increased tension and shortening both in the low back pain [1] and typical posture defects [2].

The study was proceeded with a proper ethical committee approval and under the informed consent of the participant. Motion capture recordings of the exercise were captured with the use of BTS Smart system. Forces between the feet and the device were measured with the strain gauges placed under forefoot, under backfoot and on the back of the foot for both legs. One healthy individual (woman, age 29, weight 49 kg, height 168 cm) performed 28 movement cycles. Kinematic data were implemented in the motion capture driven model in the AnyBody Modeling System (AnyBody Technology A/S, Denmark) with the measured forces applied as boundary conditions.

Inverse dynamics study shows a high activity level of psoas major in comparison to the rest of studied hip flexors. It also shows increased rectus femoris activity in the stabilizing phase of the exercise during the opposite leg movement. Moreover, the study shows that all muscles except psoas major are active both in the active and stabilizing phase of the exercise.

This preliminary study confirms that designed exercise activates aimed hip flexors. It provides additional information about the contribution of each hip flexor to the exercise pointing to a leading role of psoas major. Most muscles were also found to be active both in the active and stabilizing phase of the movement.

1. Geisser ME et al. J. Pain 6:711-26, 2005.
2. Hrysonallis C et al. J. Strength Cond. Res 15:385-90, 2001.