For many disease patterns of the lumbar spine it is assumed that the muscular stabilisation of osseous and cartilaginous anatomical structures plays an important role. Especially the M. multifidus and M. transversus abdominis play a decisive role within the muscular stabilisation. Therefore, a lot of exercises try to activate these muscles in therapy and sport practice. However, there is nearly no evidence for the efficiency of these exercises.

The purpose of this study was to examine different stabilisation exercises in respect to their potential to activate the main stabilising muscles (Mm. longissimus, iliocostalis, multifidus L5 and transversus abdominis) and additional synergistic muscles (Mm. longissimus, iliocostalis).

13 Students (age: 23.9 ± 1.8; bw: 66.9 ± 10.1 kg; height: 174 ± 6.2 cm) without any acute low back pain, scoliosis or hyperlordosis participated in this study. They performed an MVC test and different exercises in prone and quadruped position as well as exercises with an aerobar or rotational components. Surface EMG was taken from Mm. multifidus, iliocostalis and longissimus according to the SENIAM recommendations. During main activation phases mean values were built and IEMG data calculated.

Based on the averaged IEMG values, a special ranking of the different exercises was generated. Exercises with highest activation in the M. multifidus compared to MVC condition were executed in prone position, followed by quadruped position and after that by exercises with aerobar.

According to Arokoski et al. (1999) it is possible to measure the surface and deep multifidus at the level L5 with surface electrodes. By analysing the highest values in muscle activity it is assumed, that these exercises have a high training effect on these specific muscles or structures. Therefore we ranked the exercises respective to the activation level of the M. multifidus. This contrasts to traditional recommendations according to literature. There it is stated, that due to the high percentage of type I fibres the best training stimulus is within an intensity between 30-40 % of MVC. To enhance the capability of a muscle for spinal stabilisation – besides intermuscular coordination – the specific aspect is to enlarge muscular force. In order to archive these higher forces, higher muscular activities should be used to train these muscles. The highest activities of the m. multifidus were obtained during exercises executed in prone position. This could be attributed to the specific position and the rapid movement of extremities during these exercises.

Ranking of the m. multifidus activity as shown with this study, offers good training exercises of these muscles to effect a stabilization of the lumbar spine during high demands in sports and everyday life activity.


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