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The role of the multifidus muscle in lumbar stability - an anatomical approach

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Low back pain (LBP) is a major health problem with important financial implications for society. Chronic LBP is a multidimensional problem with patho-anatomical, neurophysiological, physical and psychosocial aspects. One of the causes of mechanical LBP is instability of the lumbar spine. Imbalance of *mm. multifidi* may play a role in spinal disorders and low back pain in the lumbar spine. Stability of the vertebral column in the frontal plane greatly depends on symmetrical activities of muscles, on both sides of the spine. To extend our data concerning the lines of application along which the forces produced by *mm. multifidi* in particular are acting, directions of these lines with respect to the vertebral column's longitudinal axis were determined in four otherwise normal anatomical whole body specimens (2 men, 2 women). Bony origins and insertions of lumbar multifidus muscles in each specimen were marked by coloured pins, over a number of vertebral levels. Specimens were photographed in standard anatomical conditions, *i.e.* from dorsal views. On the photographs, following characteristics of the *m. multifidus* were measured: a) lengths of subsequent superficial muscle fibers of the multifidus muscle from their origins to their insertions and b) angles of these superficial multifidus muscle fibers with respect to the axis of each segment of the lumbar spine. Compared to female, male specimens showed significantly longer multifidi. Finally, after superimposing AP radiograms of the specimens on their photographs, moment arms of some multifidi respective to nuclei pulposi of lumbar intervertebral discs were measured. Although our data stretch farther caudally, results accord with current biomechanical literature, especially concerning right-left differences, and related to scoliosis visible on radiograms. Epidemiologically, increased percentages of scoliosis during growth - be it partly temporarily - were observed as vertebral column deformations in female gymnasts, in years of intense training, after asymmetrical muscle activities.