

Title: Ultrasound assessment of the lateral abdominal wall muscles morphology in adults with non-specific low back pain

Low back pain is the most common cause of disability with life-time prevalence above 80%. International guidelines for low back pain suggest using clinical triage for low back pain differentiation. The triage divides low back problems to three categories: radicular pain, serious spinal pathologies and non-specific low back pain (n-s LBP). Within those problems, the non-specific disorders are the most common, arising to 85-95% of all low back problems. Unfortunately, the 'non-specific' means that we do not exactly know which structures or processes are responsible for symptoms.

There are plenty of possible sources of non-specific low back feelings. Symptomatic afferentation can arise from zygapophyseal joints, external layers of intervertebral discs, spinal ligaments or muscles, fascia, dura mater and other structures. Great majority of them are overloaded during decreased muscular control of the neutral zone of spinal or pelvic junctions. Altered behaviour of stabilising muscles like transversus abdominis or lumbar multifidus may participate in pathomechanics of so-called 'non-specific' low back pain. From that reason ultrasound imaging is extensively used for trunk muscles evaluation.

In this dissertation, thickness of lateral abdominal wall muscles in non-specific low back pain subjects (n=80) have been measured and compared to asymptomatic controls (n=21). Moreover, questionnaire research using visual analogue scale was conducted to assess intensity of low back pain. Thickness of external oblique, internal oblique and transversus abdominis muscles simultaneously on both sides were calculated based on ultrasonograms and compared in supine, sitting, four point kneeling and standing positions. Also different muscle actions were incorporated to the research including rest position, voluntary isometric muscle contraction and abdominal hollowing manoeuvre. In the supine position, active straight leg raise test was realised to evaluate reflexive muscle response.

Statistical analysis of collected data shows that the thickness of every measured abdominal muscle can interfere with low back pain. Significant correlations were observed in all three muscles of the lateral abdominal area. Incidence of non-specific low back pain was associated with muscles on both: right and left side of the body and in different positions. But there are no difference between subjects with non-specific low back pain and healthy controls in terms of muscle thickness changes during consecutive body positions and muscle actions. Significant asymmetry of abdominal muscles has been observed in n-s LBP patients compared with volunteers without low back symptoms. Another analysis showed that there is no correlation between age and lateral abdominal wall muscles thickness, observed in

ultrasound imaging. And lastly, muscle thickness depends on body position, although the dissimilarities are comparable in both: n-s LBP and control group.