Anatomical and functional relationships between external abdominal oblique muscle and posterior layer of thoracolumbar fascia

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BACKGROUND The abdominal muscles are important for the stability of the lumbar region through the thoracolumbar fascia (TLF). However, the mechanisms of transmission of tension through the abdominal muscles contributing to vertebral stability are unclear. In particular, there is not full agreement regarding the posterior transversal continuity of the external abdominal oblique muscle (EO) with the TLF [1, 2].

METHODS 10 cadavers (approved by the local ethical committee) managed by the ‘Body Donation Program’ at the Institute of Anatomy, University of Padova, and 27 CT images of subjects were used to evaluate the transversal continuity of the TLF with the abdominal muscles. The width of the fascial continuity of EO with posterior layer of TLF along the posterior border of EO was also measured.

RESULTS The epimysial fascia of the EO was in direct continuity with the posterior layer of the TLF in eight cadavers and 23 CT images, whereas in two cadavers and four CT images the epimysial fascia of the EO fused first with the fascia covering the latissimus dorsi, and then both fasciae were in continuity with the posterior layer of the TLF. The width of the fascial continuity of the EO with the posterior layer of TLF along the posterior border of the EO was 40.70±3.92 mm.

CONCLUSION The transversal fascial continuity of EO may explain the transmission of tension from the EO to the posterior layer of TLF and its important role in the maintaining the stability of the lumbar spine through the hydraulic effect. As regards fascial continuity in the trunk, also taking the EO into consideration, the TLF is formed by the fascia of all the abdominal muscles as the rectus sheath. In this manner, myofascial continuity between the TLF and the abdominal muscles is achieved through the aponeurosis and fascia, which ensures synchronisation between the erector spinae and the rectus abdominis.

REFERENCES