

Effects of abdominal belts on intra-abdominal pressure, intra-muscular pressure in the erector spinae muscles and myoelectrical activities of trunk muscles.

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OBJECTIVE: To evaluate the effects of abdominal belts on lifting performance, muscle activation, intra-abdominal pressure and intra-muscular pressure of the erector spinae muscles. **DESIGN:** Simultaneous measurement of intra-abdominal pressure, intra-muscular pressure of the erector spinae muscles was performed during the Valsalva maneuver and some isometric lift exertions. **BACKGROUND:** While several hypotheses have been suggested regarding the biomechanics of belts and performance has been found to increase when lifting with belts, very little is known about the modulating effects on trunk stiffness. At present, there is no reason to believe that spine tolerance to loads increases with belts. **METHODS:** An abdominal belt designed for weightlifting was used. Intra-abdominal pressure, intra-muscular pressure of the erector spinae muscles and myoelectric activities of trunk muscles (erector spinae, rectus abdominis and external oblique) were measured simultaneously during the Valsalva maneuver as well as three types of isometric lifting exertions (arm, leg and torso lift). A paired t-test was used to analyze for statistical differences between the two conditions (without-belt and with-belt) in intra-abdominal pressure, intra-muscular pressure of the erector spinae muscles and in the integrated EMG of the trunk muscles. **RESULTS:** Intra-muscular pressure of the erector spinae muscles increased significantly by wearing the abdominal belt during Valsalva maneuvers and during maximum isometric lifting exertions, while maximum isometric lifting capacity and peak intra-abdominal pressure were not affected. Integrated EMG of rectus abdominis increased significantly by wearing the abdominal belt during Valsalva maneuvers (after full inspiration) and during isometric leg lifting. **CONCLUSIONS:** Wearing abdominal belts raises intra-muscular pressure of the erector spinae muscles and appears to stiffen the trunk. Assuming that increased intra-muscular pressure of the erector spinae muscles stabilizes the lumbar spine, wearing abdominal belts may contribute to the stabilization during lifting exertions.