

Abstract: We used RUSI (rehabilitative ultrasound imaging) for measurement of abdominal and back muscle in different loading modes.

Methods: We used diagnostic ultrasonography imaging for taking linear measurement of trunk muscles. We measured anteroposterior (AP) dimensions of lateral abdominal wall muscles- m. OE, m.OI, m.TrA and cross-section area (CSA) of lumbar m. multifidus. We compared two groups of sports-floorball players and sportsman using climbing and hanging (climbers, aerialists). We measured positions with compressive force (kneeling on all four with lifted knees) and with traction load (hang with upper limbs with flexion of lower limbs-with leg support and without). Study is made on 50 volunteers.

Results: The pattern of thickness of abdominal muscles is same in all positions in both groups. The lowest is always AP thickness of m. TrA, wider is m. OE and the widest always m. OI.

The resting thickness are in both groups almost in all cases the lowest. AP thickness in m. TrA in floorball players is only exception, there is lowest in hang without legs support. In all other case is resting position always lowest.

For m. OE are results same for both climbers and floorball players-the lowest thickness is in hang with legs support (floorball players 0,84 cm, climbers 0,87), greater activation is in compression (floorball players 0,96, climbers 0,92) and greatest activation is in hang without legs support (floorball players 1,04, climbers 1,03).

For m. OI are results different for climbers and floorball players. Climbers have lowest values in hang without legs support (1,19), greater in hang with legs support (1,23) and greatest in compression (1,30). In contrary, floorball players have lowest values in compression (1,21), greater in hang with legs support (1,22) and greatest in hang without legs support (1,29).

For m. TrA the results are same for both groups. Lowest values are in hang without legs support (floorball players 0,43, which is lower than resting position 0,45, climbers 0,43). Greater is in compression (floorball players 0,47, climbers 0,45), and greatest in hang with legs support (floorball players 0,48, climbers 0,45).

For whole layer are results different for each group. Climbers have lowest thickness in hang with legs support (2,67), higher in hang without legs support (2,72), and highest in compression (2,80). Floorball players have the same lowest thickness hang with legs support (2,59), higher in compression (2,75) and highest in hang without legs support (2,84).

In same positions there are some significant differences in between climbers and floorball players according to t-tests in some cases.

In both groups are the values of m. MF lowest in compression. In resting position, both groups have greater values. In climbers, values of CSA of m. MF in compression are 2,38 and in floorball players 2,24. In both groups are greater dimensions in resting position- 2,44 in climbers and 2,36 in floorball players. In both groups identically, the greatest values are in hang with legs support-in climbers 2,82 and in floorball players 2,69. For hang without legs support the data is missing. According t-tests there are no significant differences in between groups in same positions.

Summary: In traction load in hang with legs support there is very active m. MF and m. TrA, m. OI is active moderately, m. OE is very thin.

In traction load in hang without legs support is on very high level of contraction m. OE and m. Tr A is very thin. For m. MF we do not have data.

In compression load is very active m. OE, m. OI is active moderately. M. MF is on very low level of contraction, thinner than in resting position.

Keywords: ultrasonography, RUSI, compression load, traction load, hang with upper limbs, climbers, floorball players, abdominal muscles, multifidus, CSA, AP thickness