

# The Role of Gluteus Medius Muscle in Stabilizing The Knee Joint During Jumping and Landing on Unstable Surface

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## Abstract

**Introduction:** In sports where unilateral jumps and landings occur, injuries in the knee joint are frequent. Knowing the relationship between unilateral jumping ability and knee joint stabilization, we could easily predict the risk of knee injuries with simple tests.

**Methods:** Twenty-five healthy men participated in our examinations. The following three measurements were made: 1.: maximum isometric force/torque in knee extension, -flexion, and in hip joint abduction. 2.: propulsion impulse with force plate during the maximal unilateral jumps. 3.: landing from a height of 30 cm to an unstable surface. In all three tests, activity of vastus lateralis (VL), vastus medialis (VM), biceps femoris (BF) and gluteus medius (GM) were measured using EMG surface electrodes.

**Results:** The order of normalized EMG activities during unilateral jumps was: GM (172%), VL (122%), VM (108%), BF (52%). The EMG activities have shown similar values during landing:(114%, 94%, 92%, 50%). The relative abduction torque correlated with the propulsion impulse. The relative hip joint abduction torque correlated negatively with the relative BF activity during landing.

**Conclusion:** From the high activity values of GM during jumps and landings we can conclude that the valgus control of the knee joint is important. The vertical jump performance is influenced by the relative strength of GM. Subjects with weaker jumping ability and/or weaker hip joint abduction force activate the BF more during landing on unstable surface.

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