THE EFFECT OF MUSCLE IMBALANCE ON MOTION OF SQUAT

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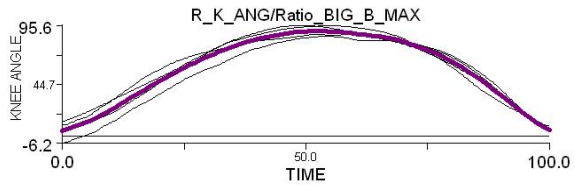
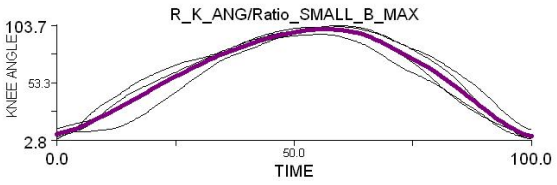
INTRODUCTION: Some authors (Ann 2005) have suggested that muscle imbalance between antagonist and agonist, and deficits can have a negative influence on functional ability and thus be a cause of musculoskeletal injury. The primary purpose of this research was to understand and investigate the motional and muscle activity characteristics, of the overhead and back squat, considering the participants' muscle imbalance.

METHOD: For this study, 8 males (age: 22.25±0.83, weight: 74.75±9.31) from Seoul National University were participated.
All the participants were required to partake in two separate tests. The first test was an isokinetic test for the shoulder, spine, hip, knee and ankle joints to calculate the extension-flexion muscle strength ratios. While these tests were done the muscle activity of the soleus, gastrocnemius, Tibialis anterior, rectus femoris, biceps femoris, gluteus maximus, lumbar and anterior-posterior deltoid were recorded at 2000Hz. Then 3 days after this the subjects had to perform the back squat for 0%, 25%, 50%, 100%, 125% of their body weight and the overhead squat for 0%, 25%, 50%. Kinetic and kinematic data were collected using 8 cameras and 2 AMTI force platforms. For the isokinetic measurement the Cybex 770 was used and for the electromyography signals of the muscles Zero wire was used. Knee angle, Relative angle between shank and trunk, Moment of each joint, COP, COG were calculated using Visual 3D.

RESULTS: Statistic tables will be presented at the conference





There were significant differences($p<.05$) on right and left knee angles between two groups which were classified by thigh muscle imbalance during motion of back squat for maximum weight (125%) and overhead squat for maximum weight (50%).

DISCUSSION: It's clear from the results of this research; there exist certain patterns in squat motion according to muscle imbalance as barbell weight increase. Subjects who have more balanced muscle ratio of thigh could squat more deeply.

CONCLUSION: This study showed that muscle imbalance could be one factor contributing to abnormal motion of the two squat types. We can conclude that having a balanced body is needed for normal performance.

REFERENCES:

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