Isokinetic Testing in Evaluation Rehabilitation Outcome After ACL Reconstruction

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ABSTRACT

Introduction: Numerous rehab protocols have been used in rehabilitation after ACL reconstruction. Isokinetic testing is an objective way to evaluate dynamic stability of the knee joint that estimates the quality of rehabilitation outcome after ACL reconstruction. Our investigation goal was to show importance of isokinetic testing in evaluation thigh muscle strength in patients which underwent ACL reconstruction and rehabilitation protocol. Subjects and methods: In prospective study, we evaluated 40 subjects which were divided into two groups. Experimental group consisted of 20 recreational males which underwent ACL reconstruction with hamstring tendon and rehabilitation protocol 6 months before isokinetic testing. Control group (20 subjects) consisted of healthy recreational males. In all subjects knee muscle testing was performed on a Biodex System 4 Pro isokinetic dynamo-meter at velocities of 60°/s and 180°/s. We followed average peak torque to body weight (PT/BW) and classic H/Q ratio. In statistical analysis Student’s T test was used. Results: There were statistically significant differences between groups in all evaluated parameters except of the mean value of PT/BW of the quadriceps et velocity of 60°/s (p>0.05). Conclusion: Isokinetic testing of dynamic stabilizers of the knee is need in diagnostic and treatment thigh muscle imbalance. We believe that isokinetic testing is an objective parameter for return to sport activities after ACL reconstruction.

Key words: isokinetic test, ACL reconstruction, rehabilitation.
of knee joint on isokinetic dynamo-meter Biodex 4 pro System. During the postoperative ACL rehabilitation we recommend hamstring strengthening exercises to reduce anterior tibial translation. There are studies that show adverse results about return strength of hamstring muscles after ACL reconstruction (5, 6). Some of them demon-

4. RESULTS

Statistically there are significant differences in the mean value of peak torque to body weight (PT/BW) in patients of experimental group et velocity 60°/s (p<0.01). (Figure 1). No significant differences were found in the mean value of PT/BW knee extensor muscle between evaluated groups et velocity 60°/sec (p>0.05) (Figure 2).

In addition, the endurance of dynamic stabilizers of the knee (extensor and flexor knee muscles) was statistically significant better in patients of experimental group versus control (p<0.01) (Figure 3 i 4.)

Observing the mean value of the classic H/Q ratio, there was statistically significant differences between evaluated group of patients in favor of experimental group (p<0.05) (Figure 5).

5. DISCUSSION

Our primary finding was that patients after ACL reconstruction and underwent rehabilitation did not have muscle disbalance in knee flexors and extensor. A major area of focus in our study was to examine effect of rehabilitation protocol in this patients which we demonstrate by measurement muscle parameters of dynamic stabilizers of knee joint on isokinetic dynamo-meter Biodex 4 pro System. During the postoperative ACL rehabilitation we recommend hamstring strengthening exercises to reduce anterior tibial translation. There are studies that show adverse results about return strength of hamstring muscles after ACL reconstruction (5, 6). Some of them demon-
strate relatively fast hamstring strength recovery, right after 12-14 weeks postoperatively on the preinjury level (5). On the other hand, Seto et al reported that hamstring strength in the reconstructed limb was significantly less in patients after ACL ligamentoplasty even after five years postoperatively (6). Results of our finding show complete recovery of the hamstrings muscles after 6 month postoperative and agrees to the study show by Wilk et all. Other than just of the recovery of hamstring muscle strength this all applies to endurance. Accelerated rehabilitation protocols after ACL reconstruction commonly employs immediate motion, weight bearing, neuromuscular electrostimulation and exercise to avoid inactivity and muscle hyprophy of the quadriceps. We all know that the recovery of quadriceps muscle is very slow process. Up to 2 years may be needed to regain normal quadriceps muscle performance following ACL reconstruction (7). Even though, our results demonstrate that there are no significant differences in quadriceps strength muscle between ACL reconstructed patients and healthy recreational sportsmen. However, we showed that endurance of quadriceps muscle is significantly better in ACL reconstructed patients versus patients in control group, so we can conclude the positive outcome of adequate and continued rehabilitation. Our results do not agree with findings of Hoffman et al, but we must take in account that the study takes another surgical technique (patellar tendon graft) (8). The hamstring/quadriceps muscle strength ratio has been used as an indicator of normal balance between the knee flexors and extensors (9). It is some of very significant parameter in estimating the time of return to sports activities. Our ACL reconstructed patients after 6 months of the rehabilitation have the value of H/Q ratio in the recommended level which allows them to go back into sports activities.

6. CONCLUSION
Isokinetic testing of dynamic stabilizers of the knee is need in diagnostic and treatment thigh muscle imbalance after ACL injury and surgical intervention. It is an objective parameter for decision of return to sports activities after ACL reconstruction.

CONFLICT OF INTEREST: NONE DECLARED.

REFERENCES