



Grant Information Summary:

Sensorimotor Evaluation of Post-Operative Anterior Cruciate Ligament Reconstruction Patients

Practical Implications:

Following rupture of the anterior cruciate ligament, a functional decrease likely occurs in the non-involved limb as well as in the injured limb. Therefore the uninvolved leg may not be a reliable control for making comparisons to the injured limb.

Background

It has been estimated that 50,000 reconstructions are performed world wide each year. Research targeting possible neurological factors in ACL injuries continues to be a popular area of study. There continues to be some debate as to the role of afferent receptors in or around the anterior cruciate ligament. Independent of the exact location or function of these afferents, exact changes in spinal level neural circuitry due to ACL injury are yet to be detailed. Through the use of the spinal reflex loop and balance assessment, it may be possible to identify neurological and functional changes in a post-operative ACL population.

Objective

To determine the effects of anterior cruciate ligament rupture and reconstruction on static postural sway, dynamic balance, spinal reflexes and quadriceps peak force production.

Design and Setting

A 2X2 mixed design ANOVA [Group X Leg] was applied to the static posture, dynamic balance, h-reflex, and strength data. In addition, a priori simple main effects (Legs Within the ACL Group) were calculated to investigate specific differences between legs in the ACL group for these measures. All data were collected in the Motor Control Lab at Indiana University.

Subjects

The experimental group was composed of 20 male and female subjects who had undergone ACL reconstruction with a patellar tendon autograft. The control group was comprised of 20 male and female subjects with no history of significant orthopedic injuries to the lower extremities.

Measurements

The dependent variables were static sway path length, dynamic phase duration, H-max/M-max ratio, and strength deficit.

Results

There were significant differences between the ACL group and the control groups on the measures of dynamic balance and peak torque.

No other measures showed significant differences.

Conclusions

Evaluation of the postural control system under two conditions, static and dynamic, showed differences between the ACL and control groups for the dynamic measures only. These results suggest the presence of independent control mechanisms for the control of static and dynamic postures. In addition, due to the fact that there were no differences between the injured and non-injured legs of the ACL group, the theory of a central postural control mechanism is supported. There likely was no change in the spinal reflexes due to the fact that the subjects were all at least three months post reconstruction. Future research should investigate spinal reflexes in a more acute population. ■

Authors:

Mark Hoffman, PhD, ATC

Department of
Exercise and
Sports Science
Oregon State
University



For further information:

Hoffman MA, Kocaja DM. (In Press 2000). Spinal reflex profiles of the post-operative anterior cruciate ligament reconstruction patients. *International Journal of Neuroscience*.

Hoffman MA, Kocaja DM. (1999). An investigation of dynamic and static postural control in post-operative anterior cruciate ligament reconstruction patients. *Journal of Athletic Training*, 34, 130-135.

Hoffman MA. (1998). "Sensorimotor Evaluation of Post-Operative Anterior Cruciate Ligament Reconstruction Patients." Presentation at National Athletic Trainers' Annual Meeting and Symposium, Baltimore, MD



2952 Stemmons
Dallas, TX 75247
214-637-6282

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