04 Knee Biomechanics and rehabilitation I

O4.1 Shape analysis of inter-joint motion coupling patterns in a stair-descent task following ACL reconstruction captures asymmetries in coordination up to two years post-surgery relative to non-injured controls

Background:

* While surgery improves knee stability, motor control may remain impaired and it is not clear when and how normal knee function is restored (Could be a function of compensation from other joints)

Methods:

* Obtained data from 3D marker data recordings, 12 stair-descent trials, 6 per leg to capture alterations in joint kinematics following knee surgery
* Tested participants at 1 month, 10 months and 29-129 months post-surgery and compared with healthy knee controls
* Estimated symmetry using a dissimilarity index derived from **Generalized Procrustes Analyses**
  + method of statistical analysis that can be used to compare the shapes of objects
  + In this case superimposed average shapes of knee-hip, knee-ankle, hip-knee-ankle, and angular displacement time plots

Results:

* Results suggested that asymmetric patterns of joint coupling remain up to 2 years post-surgery however given more time both legs approach similar patterns
* 1 to 10 month groups were similar, but very different from late and control groups (which were similar)

Conclusion:

* Up to 10 months from ACL repair compensation dominates function, however roughly two years into recovery, joint coupling in both legs may share a common kinematic signature. This would suggest a full recovery implying that athletes are returning to activity too soon post injury.

Extra:

Generalized

ANOVA: analysis of variance, a statistical method in which the variation in a set of observations is divided into distinct components.

t-test: comparing the mean between two groups

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