EFFECT OF ACL GRAFT TYPE ON SIDE-STEP CUTTING IN YOUNG ATHLETES

**Objectives**

- Anterior cruciate ligament (ACL) injury is common in pediatric athletes.
- ACL surgical reconstruction is often a better alternative compared to non-operative treatment.
- Common graft types include patellar tendon (PT) and hamstring tendon (HT).
- Slightly higher re-tear rate for HT vs PT.

**Purpose:** To assess differences in movement strategies during side-step cutting between PT and HT in young athletes with recent ACL reconstruction (ACLR).

**Methods**

- Dominant limb from 19 athletes without lower extremity injury/surgery.
- 15.2 ± 1.8 years.
- 27 limbs with recent unilateral ACLR.
- 5.1-8.0 months post-operative.
- 17 with HT grafts.
- 15.8 ± 1.5 years.
- 10 with PT grafts.
- 16.3 ± 1.5 years.
- Lower extremity 3D data during the deceleration phase of a side-step cut (Figures 1 & 2).
- Group differences assessed using analysis of variance with Bonferroni post-hoc tests.

**Results (Table 1)**

<table>
<thead>
<tr>
<th>Approach velocity (LL)</th>
<th>Knee Flexion Extension Moment Nm/kg</th>
<th>Knee Flexion Extension Excursion (°)</th>
<th>Knee Flexion Extension IC (°)</th>
<th>Knee Flexion/Extension Moment Nm/kg</th>
<th>Knee Flexion/Extension Excursion (°)</th>
<th>Knee Flexion/Extension IC (°)</th>
<th>Power Absorption at Knee Nm/kg</th>
<th>Power Absorption at Knee IC (°)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2 ± 0.5</td>
<td>2.8 ± 0.5</td>
<td>2.1 ± 0.2</td>
<td>2.0 ± 0.3</td>
<td>0.1 ± 0.2</td>
<td>0.1 ± 0.2</td>
<td>0.5 ± 0.3</td>
<td>0.3 ± 0.1</td>
<td>0.3 ± 0.1</td>
</tr>
</tbody>
</table>

**Table 1:** Power absorption at the knee between graft choice groups and controls.

**Discussion**

While both ACLR groups demonstrated reduced GRFs compared with controls, the HT group displayed greater adaptations proximally with increased hip flexion and frontal plane pelvic excursion. The reduced knee loading in the PT group may be due to anterior knee pain associated with PT grafts.

**Conclusions**

The HT group exhibited proximal deviations as a possible movement adaptation, while the PT group demonstrated an altered power absorption strategy at the knee. Because none of the known biomechanical risk factors for ACL injury, such as increased knee valgus moment, were present other factors likely account for the observed higher re-tear rate in HT vs. PT ACLR. Understanding the effect of graft choice on biomechanical movement patterns can offer clinical guidance in regards to the rehabilitation process and return to sport decision making.

**References:**