# COMPARISON OF KT-1000 RESULTS IN HAMSTRING AND QUADRICEPS TENDON GRAFT TYPES AFTER ADOLESCENT ACL RECONSTRUCTION

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**Introduction:** Hamstring tendon autograft (HT) and quadriceps tendon autograft (QT) are commonly used graft sources for anterior cruciate ligament reconstruction (ACLR). Despite encouraging outcomes with the use of QT autograft, post-operative knee ligament laxity in this graft type is unknown. The KT-1000 arthrometer provides an objective measurement of anterior tibial translation after ACLR surgery at three different levels of force application, thus providing a quantitative value for knee ligament laxity. Side to side differences of less than 3 millimeters have been reported as representative of non-impaired anterior tibial translation. KT-1000 measurements have not been reported after QT autograft ACLR.

**Methods:** A retrospective chart review of patients undergoing ACLR from 2013-2021 at Connecticut Children's was conducted. KT-1000 testing was completed by a sports physical therapist as part of routine return to sport testing 6-9 months after surgery. Patient demographics and KT-1000 results were recorded and two-sample T tests were used to compare the HT and QT groups.

**Results:** 173 subjects met inclusion criteria (99HT, 74QT) and there were no significant differences in age, height, weight and BMI between groups (Table 1). The QT group had significantly greater displacement at 15 pounds and 20 pounds of force for involved and uninvolved limbs (Table 2). The QT group had greater displacement at 30lbs of force for the uninvolved limb (5.59 vs 4.91, p=0.02). No significant side to side differences were seen in KT-1000 between graft types at 15, 20 and 30lbs of force, with side to side differences for both groups less then 3 millimeters (Table2).

**Discussion:** The QT group had significantly greater measured anterior tibial translation at 15 and 20lbs. However, no significant differences in side to side comparisons of QT or HT autograft. These results suggest that both autograft types are functional in maintaining adequate ligament strength. Differences in anterior displacement between graft type may be due to the tendon grafts properties or surgical fixation devices used at the time of surgery.

**Clinical Relevance**: Both QT and HT options are viable options for ACL reconstruction. It is unknown if the increased tibial translation noted on KT-1000 is due to the inherent graft properties or the varied fixation methods used to secure the ACL grafts. Future studies should evaluate this as well as increase the power of the study.

**Tables:**

**Table 1: Patient Demographics of Graft Type**

| | QT Group (n=74) | HT Group (n=99) | p value |
|---|---|---|---|
| Sex | 44M/30F | 42M/57F | |
| Age at Surgery (years) | 15.55 ± 1.75 | 15.68 ± 1.82 | 0.63 |
| Height (cm) | 168.20 ± 8.40 | 166.91 ± 8.99 | 0.33 |
| Weight (kg) | 65.68 ± 16.98 | 66.98 ± 14.84 | 0.60 |
| BMI | 23.03 ± 4.67 | 23.97 ± 4.81 | 0.20 |

Values are expressed as mean ± SD; All p values are based on t-test. Abbreviations: QT: quadriceps tendon autograft; HT: hamstring tendon autograft.

**Table 2. KT-1000 Results of Graft Type**

| | | QT Group (n = 74) | HT Group (n = 99) | p value |
|---|---|---|---|---|
| Time since surgery (days) | | 239.45 ± 48.34 | 210.34 ± 40.92 | **<0.01*** |
| KT-1000 15lbs (mm) | Involved | 3.57 ± 1.47 | 3.03 ± 1.50 | **0.02*** |
| | Uninvolved | 2.90 ± 1.26 | 2.15 ± 1.14 | **<0.01*** |
| | Side to side difference | 1.01± 0.95 | 1.02 ± 0.98 | 0.95 |
| KT-1000 20lbs (mm) | Involved | 5.10 ± 1.67 | 4.49 ± 1.82 | **0.02*** |
| | Uninvolved | 4.16 ± 1.65 | 3.37 ± 1.41 | **<0.01*** |
| | Side to side difference | 1.22 ± 1.26 | 1.34 ± 1.25 | 0.54 |
| KT-1000 30lbs (mm) | Involved | 6.78 ± 2.01 | 6.24 ± 2.11 | 0.90 |
| | Uninvolved | 5.59 ± 2.05 | 4.91 ± 1.80 | **0.02*** |
| | Side to side difference | 1.55 ± 1.45 | 1.67 ± 1.28 | 0.58 |

Values are expressed as mean ± SD; All P values are based on t-test, ***statistically significant, p <0.05.**