

Biomechanical comparison of 4 Pediatric ACL techniques

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Introduction

- Pediatric ACL injuries are on the rise and there is a higher incidence of meniscus tears in a chronically deficient ACL knee
- Physeal sparing ACL techniques are recommended for children with open growth plates.
- The purpose of this technique was to compare 4 commonly used techniques

HYPOTHESIS

- Our hypothesis was that all techniques would adequately restore the kinematics in an ACL deficient knee.

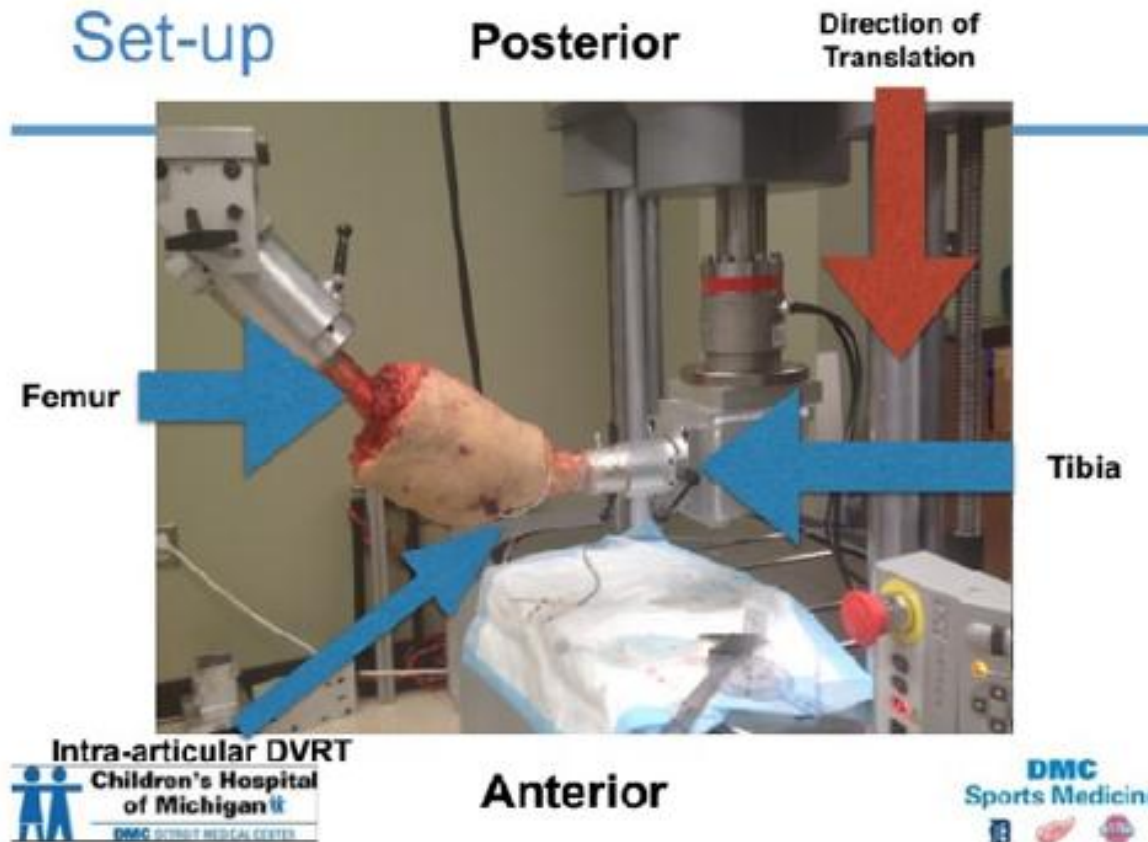
METHODS

- 24 fresh frozen knees were used, 6 for each technique
- All arthroscopic techniques were used
- Hamstring grafts were used for all knees
- 4 techniques were used; All epiphyseal (AE), Partial Epiphyseal (PE), Transphyseal (TP) and a posteromedial portal technique (PMP)

METHODS: TESTS

- Following measurements were done using an INSTRON machine:
- Test 1, translation only with 134N of anterior force
- Test 2, Translation with Internal rotation moment of 10 N-m ,
- Test 3: Translation with internal rotation 10 N-m and valgus moment of 5 N-m(simulating a pivot shift)

Methods : Set up



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RESULTS

- There was a significant difference between Intact and torn ACL at most flexion ranges for all the tests
- However, there was no significant difference between the 4 techniques

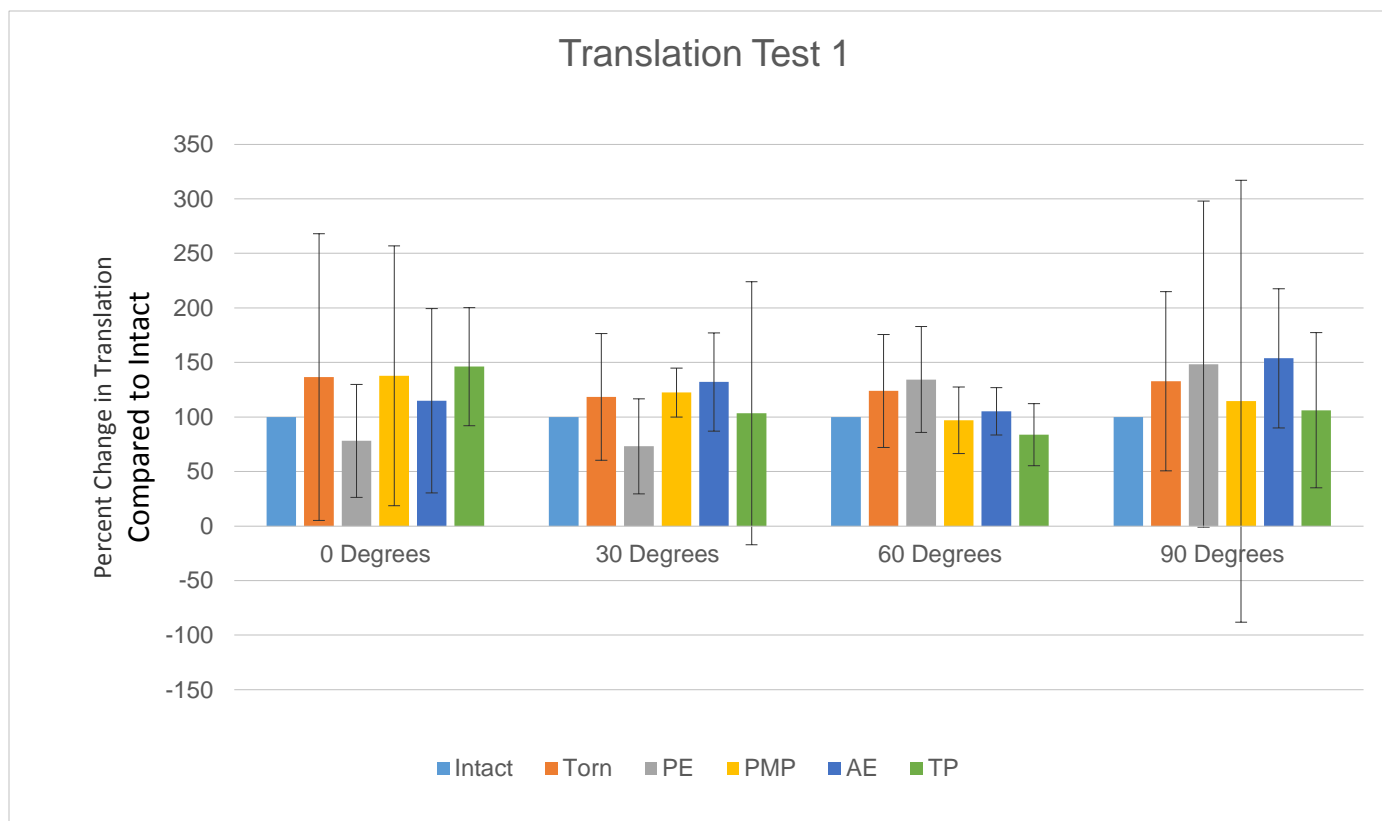
RESULTS

- The partial epiphyseal technique could significantly reduce translation at 0, 30, and 90 degrees for test 3 (simulated pivot shift) when compared to torn
- The all epiphyseal technique could significantly reduce translation at 60 degrees for test 3

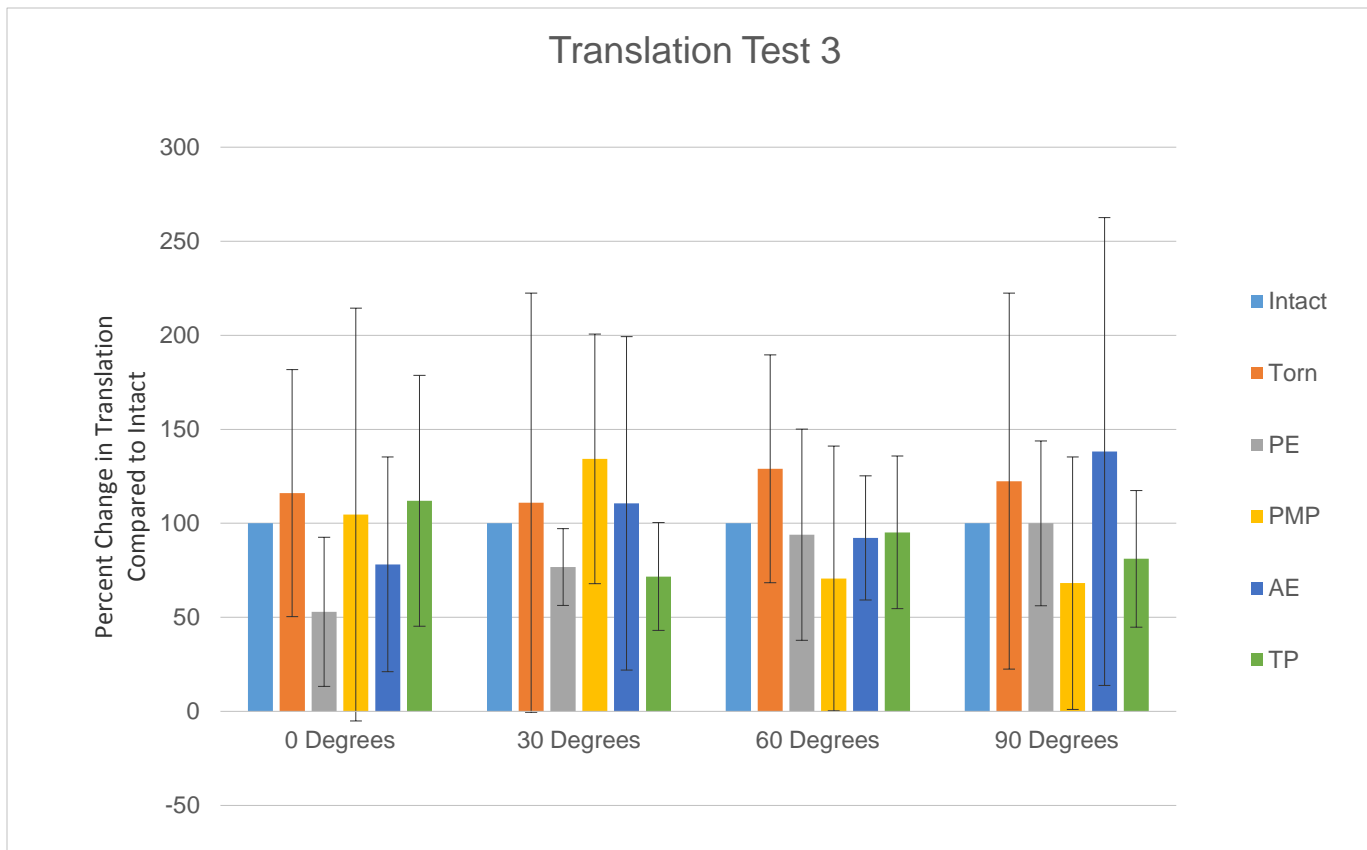
RESULTS

- Although not significant, the partial epiphyseal technique did reduce the translation from torn by 72% and 60% at 0 and 30 degrees for Test 1, almost 50% at 30 degrees for Test 2
- Of all the techniques, the partial epiphyseal technique had the most reduction in translation, especially at lower flexion angles

RESULTS



RESULTS



CONCLUSIONS

- The partial epiphyseal technique seemed to be most effective in restoring knee kinematics especially in lower knee flexion angles
- None of the techniques could restore the normal kinematics