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Biomechanical Comparison of ACL-R Using an Iliotibial Band Autograft Reinforcement and Bone Patellar Tendon Bone Graft With and Without Lateral Extra-Articular Tenodesis

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Introduction

- Graft selection for ACL-R has a direct impact on the operation
 - Allograft; 3.8 times ↑ re-rupture than autograft
 - HT; highest graft failure
 - BTB; Anterior knee pain and donor site morbidities
 - QT; knee extensor strength ↓



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Introduction

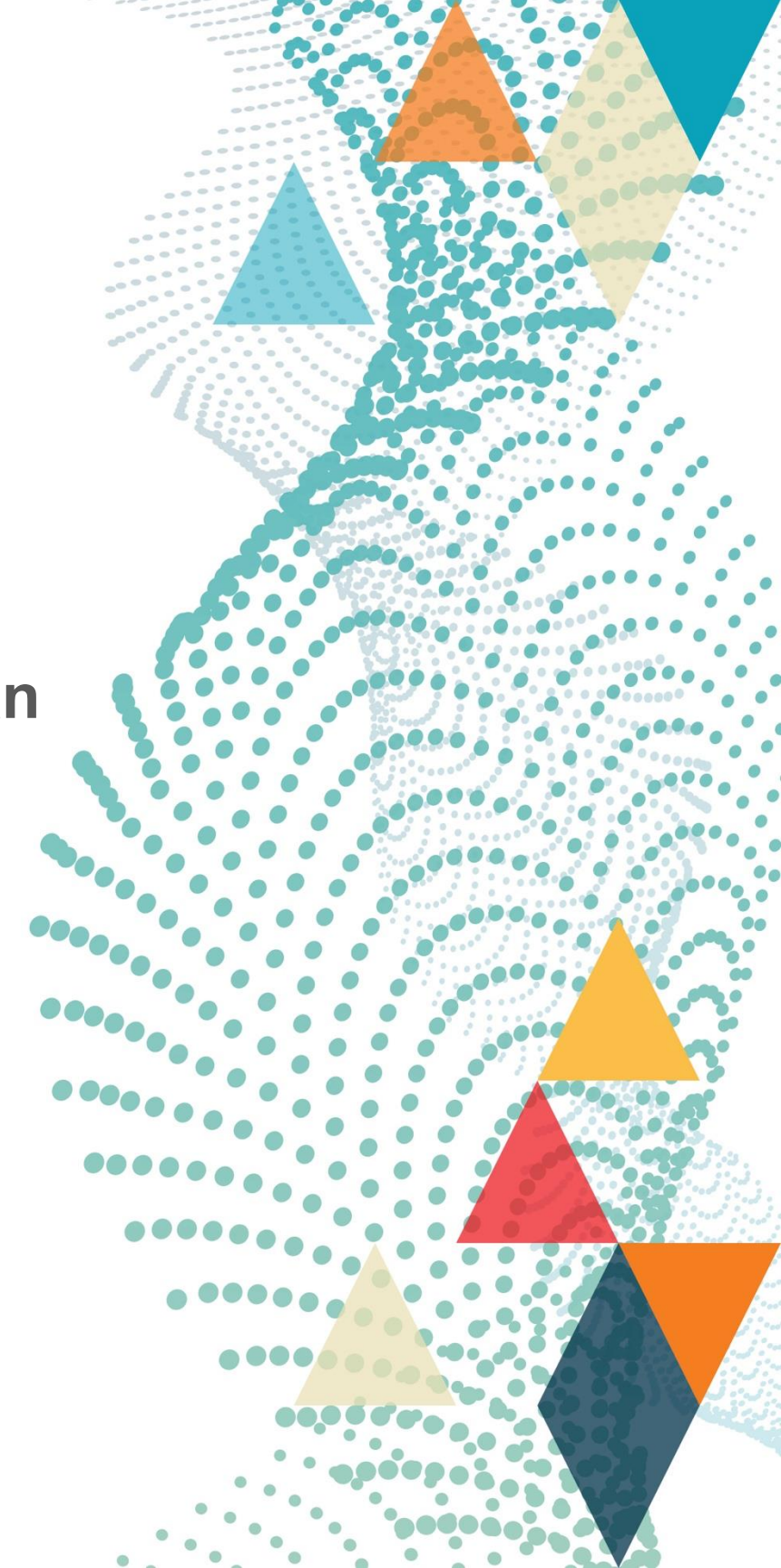
- Iliotibial band (ITB) autograft:
 - ✓ Comparable functional results and failure to BTB autograft
 - ✓ Shorter postoperative knee extensor mechanism recovery than
 - ❖ Bone-patellar tendon-bone (BTB)
 - ❖ Quadriceps tendon (QT)
 - ❖ Hamstring tendon (HT)



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Aim and Hypothesis

Purpose: To compare the kinematic effects of isolated ACL-R using BTB with (ACL-R+LET) and without LET to the iliotibial band autograft anterolateral reinforcement ACL-R.

Hypothesis: The extra-articular reinforcement provided by the ACL-R+LET and iliotibial band autograft anterolateral reinforcement ACL-R would similarly reduce anterior and rotational knee laxity compared to ACL-R with/without LET.



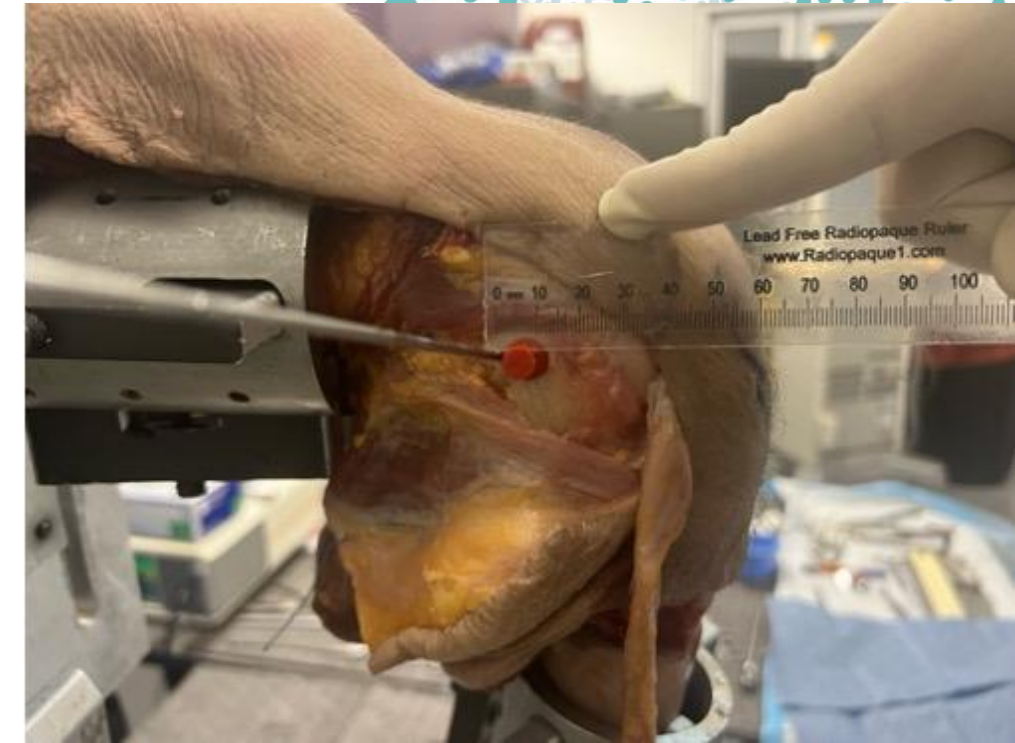
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Methods

- 20 cadavers (mean age: 41.4 years)
- Tested using a robotic system under 3 loading conditions (0°, 15°, 30°, 45°, 60°, 90°):
 - 89 N anterior tibial (AT) load
 - 5 N-m internal rotation (IR) tibial torque 7 N-m valgus moment
 - 5 N-m IR torque (PS)
- SATURN (n=10)
- ACL-R with BTB and ACL-R + LET (n=10)



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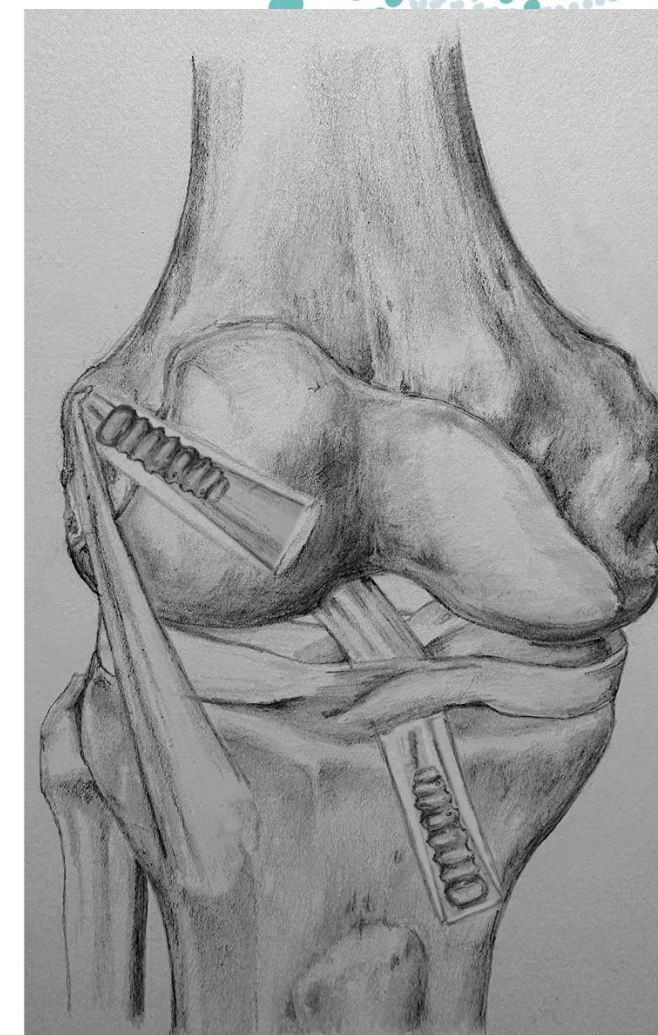
Surgical Technique

- **Single surgeon**
- **BTB; 10 mm, interference screw**
- **LET; Lemaire technique (interference screw)**
- **SATURN**
- **All-inside guides**
- **15 cm, 8-9 mm graft (IF screw)**

Technical Note

Introducing Skeletally-Mature Anterior Cruciate Ligament Reconstruction Technique Using Reinforcement (SATURN) With Iliotibial Band Autograft

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Results - ATT

Anterior Tibial Translation

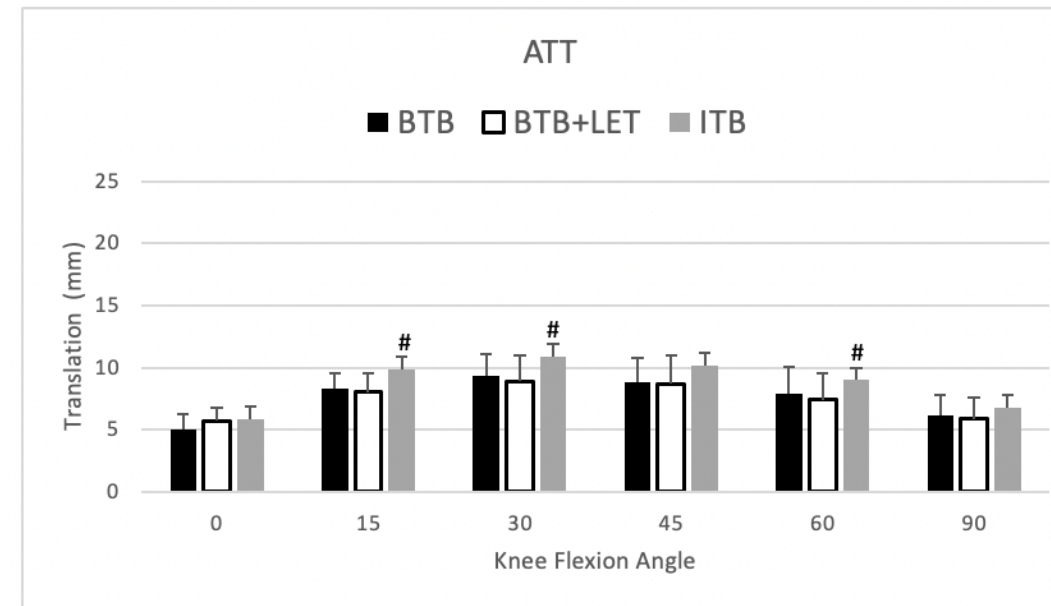
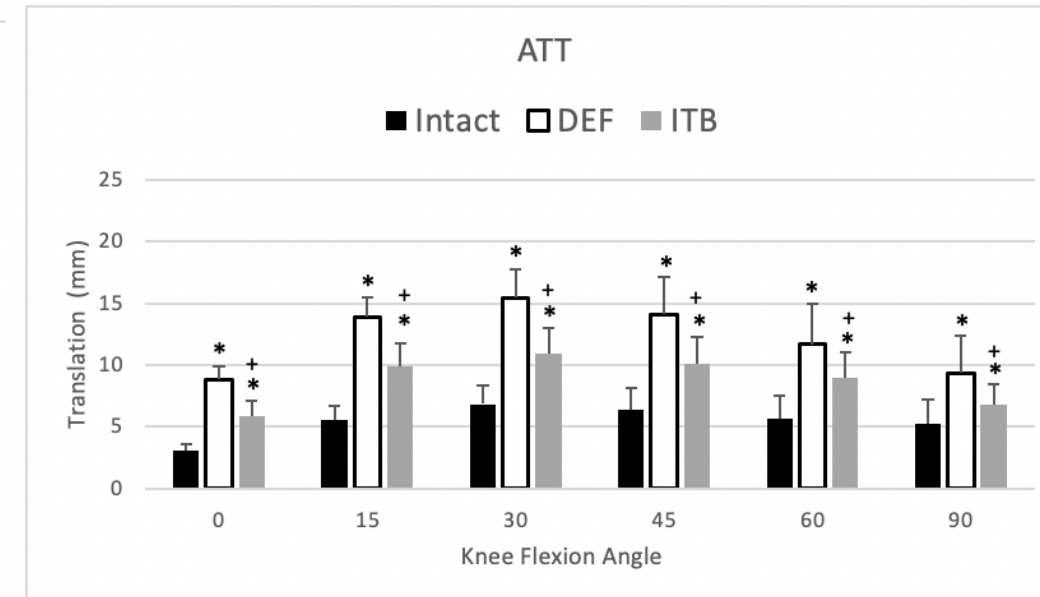
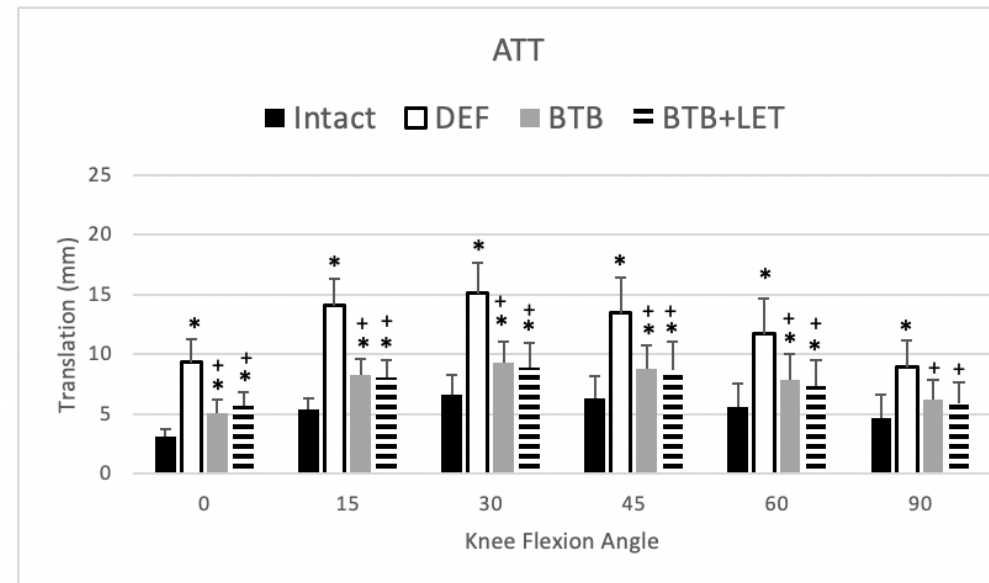
— Native knee $\emptyset$

— BTB vs SATURN,

• No difference

— BTB + LET vs SATURN;

• 15°, 30°, 60°



Results - IR

- Internal Rotation

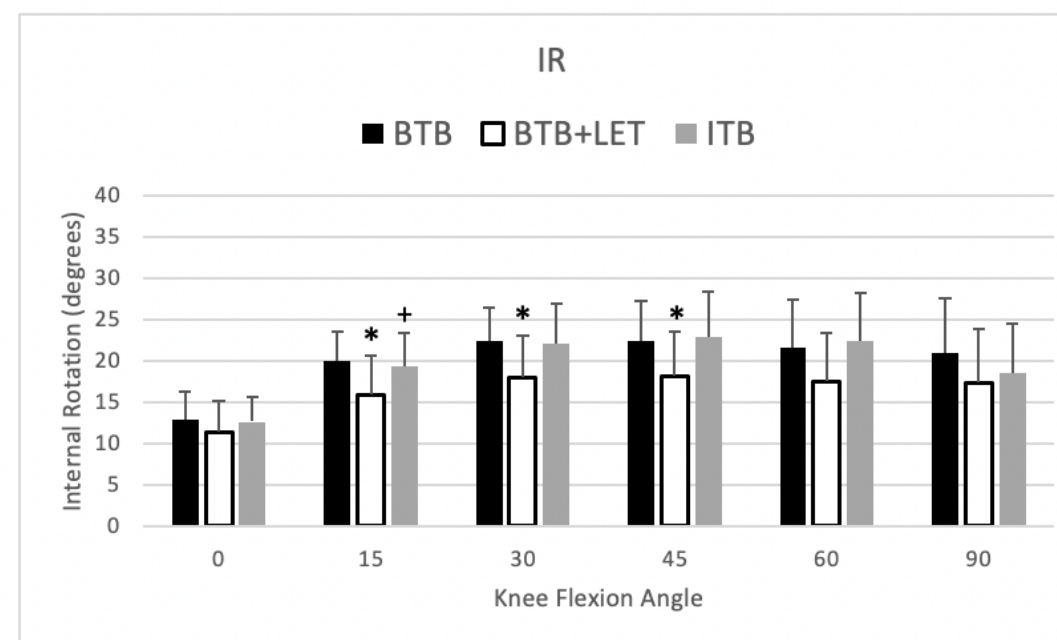
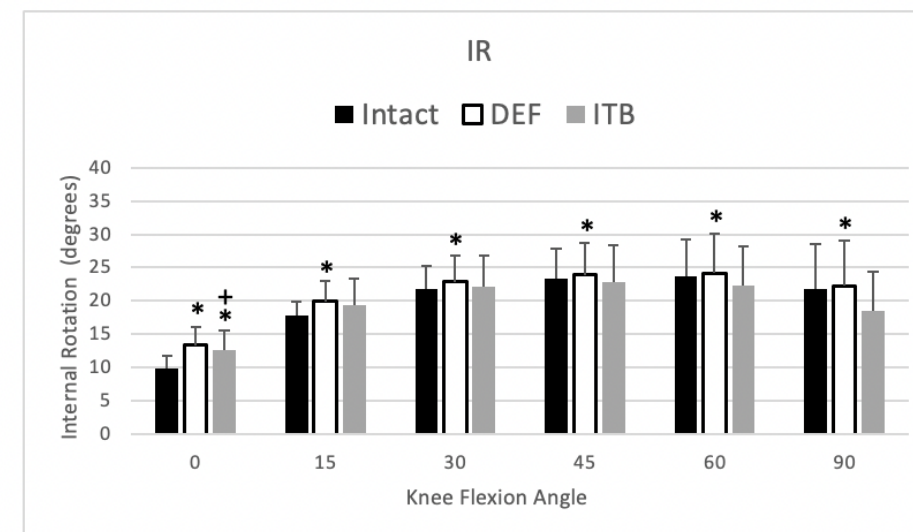
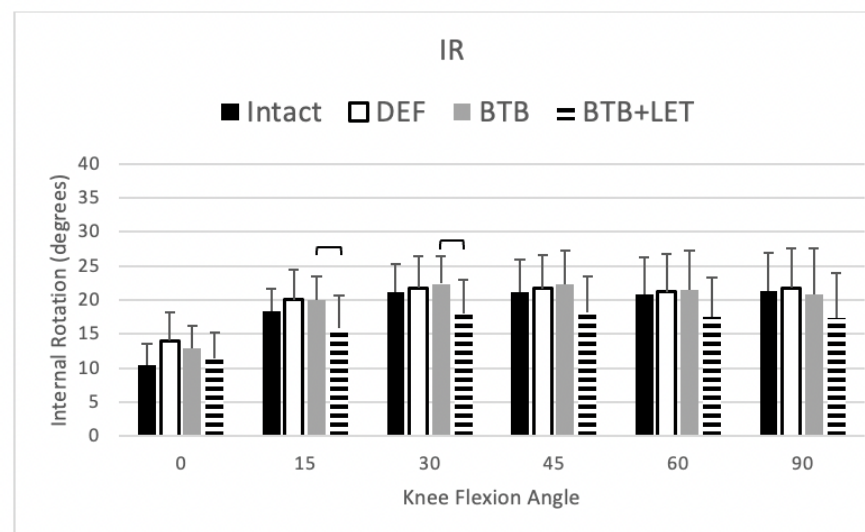
- Native knee ✓

- BTB vs SATURN

- No difference

- BTB + LET vs SATURN

- 15°, 30°, 45°



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Results - PS

- **Simulated Pivot Shift**

- Native knee

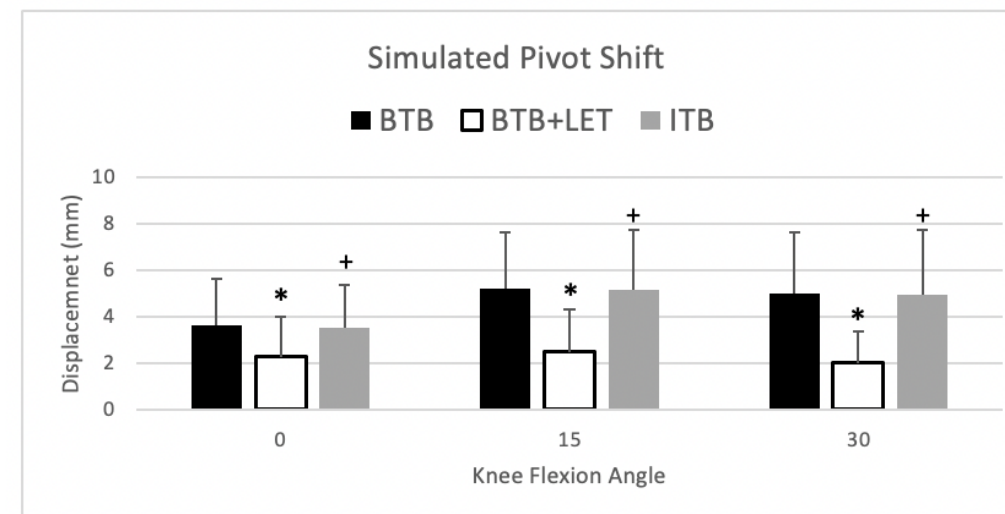
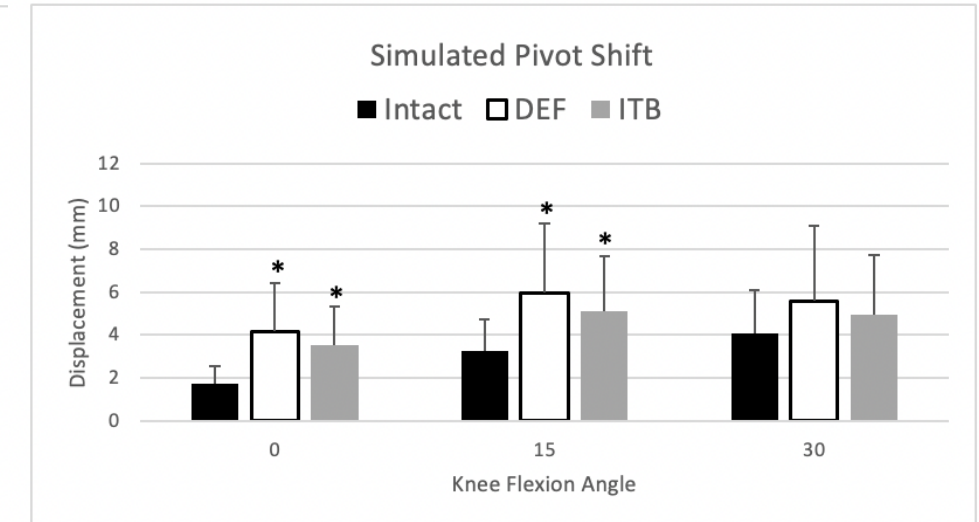
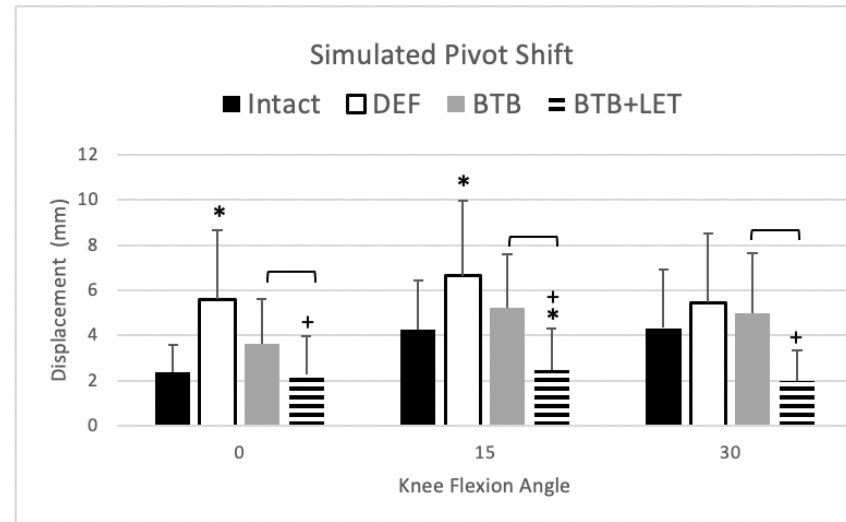
- Overconstrain

- BTB vs SATURN

- No difference

- BTB + LET vs SATURN

- 0°, 15°, 30°



Discussion

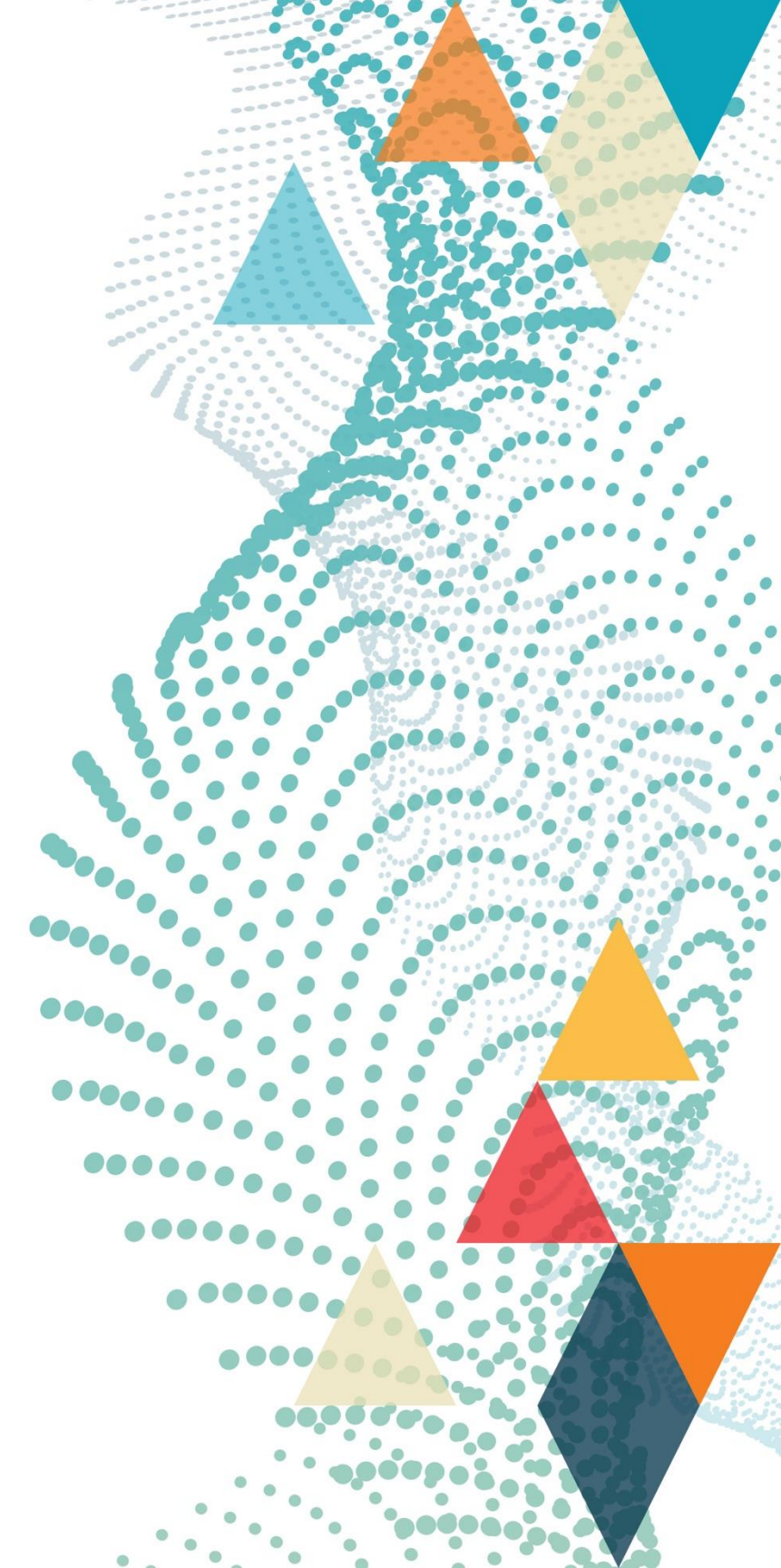
- ❖ ACL-R + LET; reduces ATT postoperative 6 months
- ❖ IR, sufficient in all techniques, LET overconstrain?
- ❖ PS; LET overconstrain



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