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Influence of Lateral Extra-Articular Tenodesis Combined with Anterior Cruciate Ligament Reconstruction on Knee Muscle Strength

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Faculty Disclosure Information

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INTRODUCTION

- In United States, the annual incidence of ACL injuries is estimated to range between 100,000 and 250,000 cases, with approximately 60,000 to 175,000 reconstructions performed each year.

- The risk of ACL re-rupture increases over time, with reported rates of 3%, 6%, and 9% at 2, 5, and 8 years of follow-up, respectively.

- These injuries primarily affect young patients involved in high-impact sports that require rapid changes of direction, jumping, or physical contact.

INTRODUCTION

- Combining **lateral extra-articular tenodesis** (LET) with ACLR has been shown to reduce graft re-rupture rates compared to isolated ACLR.

- LET procedures involves additional morbidity, particularly when harvesting a portion of the iliotibial band, as described in the Lemaire technique.

- This additional harvesting could impact knee function restoration, particularly postoperative recovery of muscular strength.

- Our objective is to compare the recovery of muscle strength, as measured by isokinetic strength testing, in patients undergoing ACL reconstruction with and without associated LET.

METHODS

- **Retrospective cohort study** which included patients who underwent **anterior cruciate ligament reconstruction (ACLR)**. Patients with neurovascular injuries, tibial plateau fractures, multiligamentous reconstructions, or combined procedures involving osteotomy were excluded.

- Surgeries were performed by knee-specialized surgeons (with at least 10 years of experience) using ipsilateral hamstring tendon autografts.

- Candidates for **LET** were those presenting at least one of the following factors: younger than 25 years old, participation in pivoting sports, high-grade rotational instability (Pivot Shift >2), or generalized ligamentous laxity.

- Upon completion of the rehabilitation protocol, an **MRI scan** was requested to assess graft ligamentization, followed by **isokinetic strength testing**.

METHODS

Isokinetic Evaluation

- Muscle strength of the **hamstrings and quadriceps** was measured using an **isokinetic dynamometer**.
- Participants performed **four repetitions of maximal concentric isokinetic contraction** from 90° of flexion to 0° of knee extension at **angular velocities of 60°/s and 180°/s**.
- The test was considered satisfactory when the strength imbalance between limbs—for both knee extensors and flexors—was less than **10%**, and the hamstring-to-quadriceps ratio was within **±5% of the ideal 66%.**

RESULTS

	GRUPO W/ LET (N=20)	GRUPO WO/ LET (N=48)	P - VALUE
FEMALE	16 (33.3)	7 (35.0)	0.89
AGE	19.4±4.6	25.8±9.0	0.003
EXTENSOR IMBALANCE	11.8±9.6	12.8±11.2	0.73
EXTENSOR IMBALANCE ≥10%	8 (40.0)	23 (47.9)	0.55
FLEXOR IMBALANCE	11.4±9.2	13.2±10.5	0.51
FLEXOR IMBALANCE ≥10%	10 (50.0)	27 (56.3)	0.63

All patients had their knee extensor and flexor muscle strength measured **12 months after surgery** using a **HUMAC NORM isokinetic dynamometer**.

DISCUSSION

- **The main findings of this study** showed that adding a **LET** to **anterior cruciate ligament reconstruction** does not appear to significantly influence functional outcomes in terms of muscle strength balance between knee extensors and flexors at 12 months postoperatively.

- A factor that appears to influence our results is **sex**, as the majority of patients with an extensor imbalance ≥10% were **female**.

- As one of the **limitations** of our study is that **patients were not analyzed based on graft type**, which may have influenced the final outcomes.

- Although no significant differences in muscle strength were observed between the two groups, the addition of LET to ACLR continues to demonstrate **benefits in reducing graft re-rupture rates**, which is an important consideration in clinical practice.

CONCLUSION

- The addition of lateral extra-articular tenodesis to anterior cruciate ligament reconstruction using hamstring autograft does not appear to significantly influence functional outcomes in terms of muscle strength balance between knee extensors and flexors at 12 months postoperatively.

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