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The Static Allograft – Decreased Dynamic Meniscal Extrusion Alters Clinical Success 2 years after primary Medial or Lateral Meniscus Allograft Transplantation

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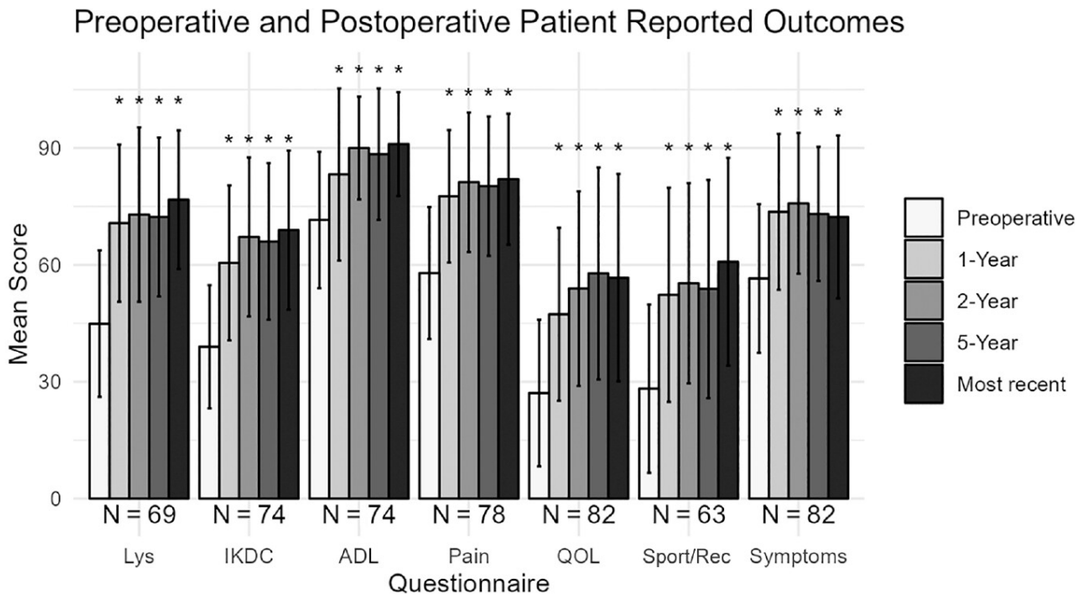
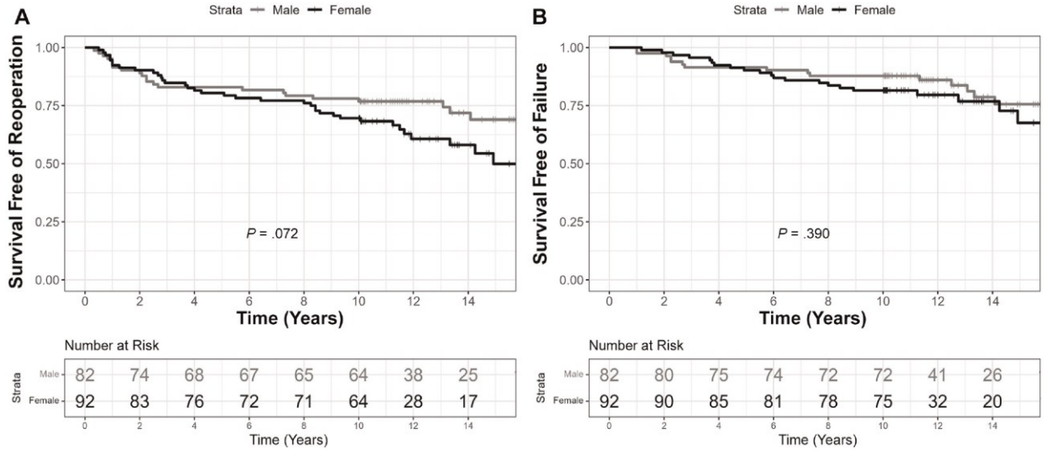
Faculty Disclosure Information

- No conflict of interest to declare.

Background – Clinical Outcomes

- **MAT** shows good long-term outcomes, with **survival rates of ~85% at 10 and 72%** at **15 years**.
- A subset of **MAT** procedures **fail**, but the exact **causes** are **not fully understood**.
- **Failure rates** range from **14–35%,** varying by patient group, technique, and definition.
- **Meniscal extrusion (ME)** is a key research focus, widely studied as a potential cause of graft failure.





(1) Wagner et al. 2023

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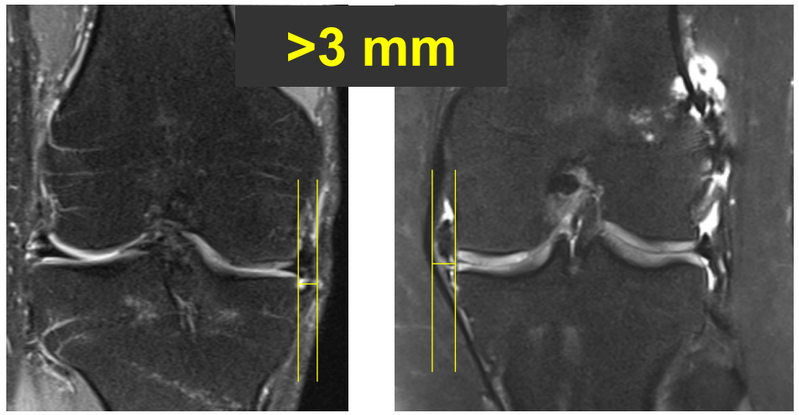
Background – Meniscus Extrusion

- **ME** is a key factor in **graft failure** post-MAT.
- A cutoff of **≥3 mm** is commonly used to define major extrusion.
- However, **not** all extrusions above this threshold are **clinically equivalent**.



Review > Biomed Res Int. 2018 Mar 25:2018:5251910. doi: 10.1155/2018/5251910. eCollection 2018.

Incidence and Extent of Graft Extrusion following Meniscus Allograft Transplantation

Dae-Hee Lee [1]

Mean absolute ME and frequency of major ME following MAT:

- Pooled: 3.15 mm (53%)
- MMAT: 3.26 mm (61%)
- LMAT: 2.90 mm (39%)

(2) Lee, 2018

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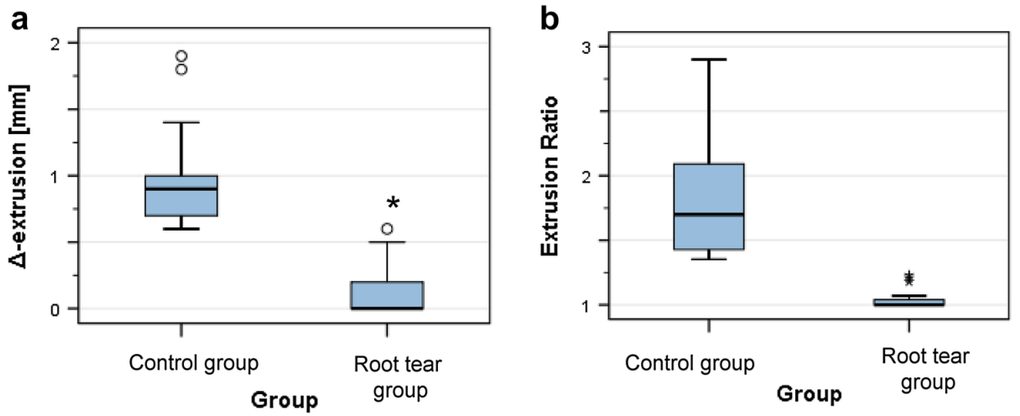
Background – Dynamic Meniscus Extrusion

- Better **monitoring** post-MAT is needed to detect complications early.
- Dynamic ME assessment via **ultrasound** can provide insights into graft **biomechanics**.
- Ultrasound is **effective** for **non-invasive** dynamic ME evaluation.
- **Absence of dynamic ME** may signal medial root injury, known as the **"dead meniscus sign.“**
- Dynamic ME **correlates** with knee pain and could help **monitor graft performance**.

› Knee Surg Sports Traumatol Arthrosc. 2019 Oct;27(10):3311-3317. doi: 10.1007/s00167-018-5341-4. Epub 2019 Jan 3.

No dynamic extrusion of the medial meniscus in ultrasound examination in patients with confirmed root tear lesion

Katrin Karpinski [1], Theresa Diermeier [2], Lukas Willinger [2], Andreas B Imhoff [2], Andrea Achtnich [2], Wolf Petersen [3]



(3) Krapinski et al., 2019

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Aim & Hypothesis

Hypotheses:

Patients with normal dynamic meniscus extrusion have better patient reported outcome metrics compared to patients with reduced dynamic meniscus extrusion following arthroscopic MAT.

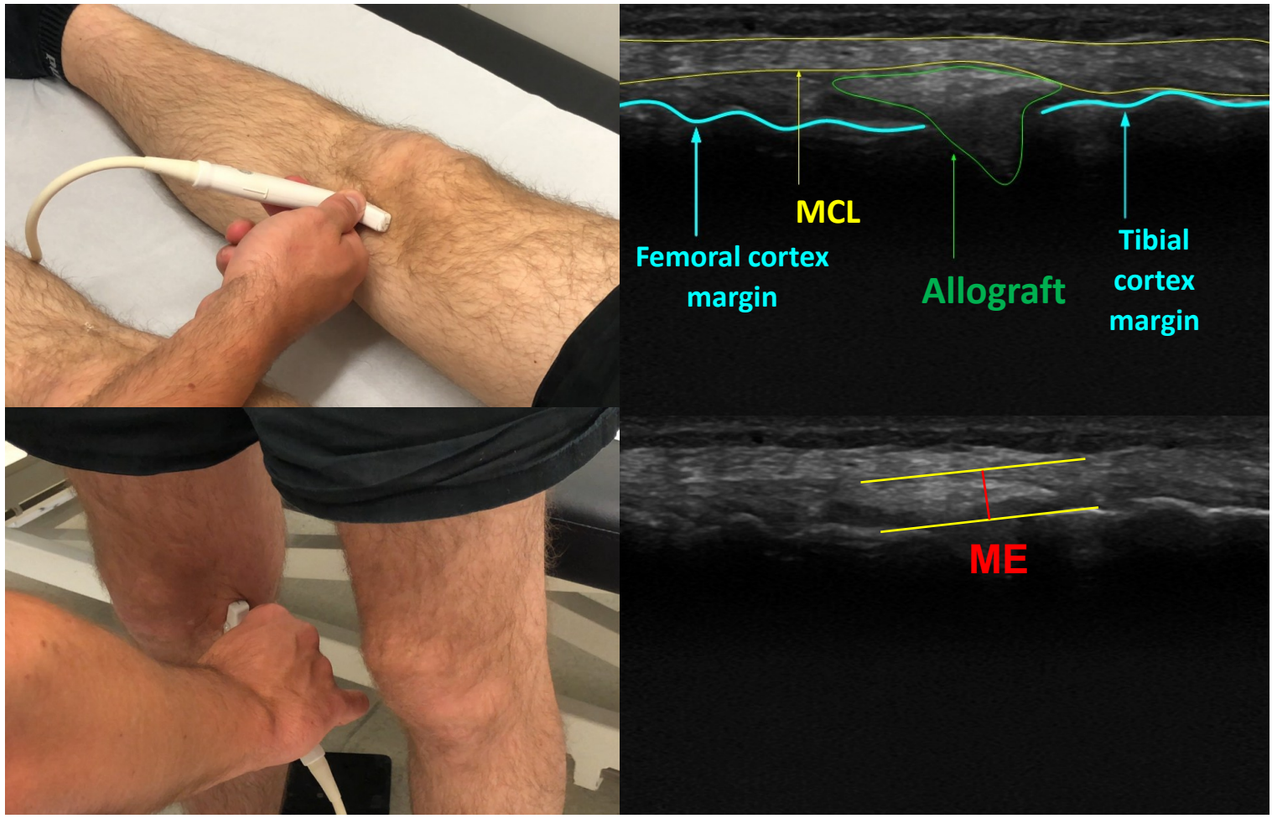
Study design:

Retrospective data analysis

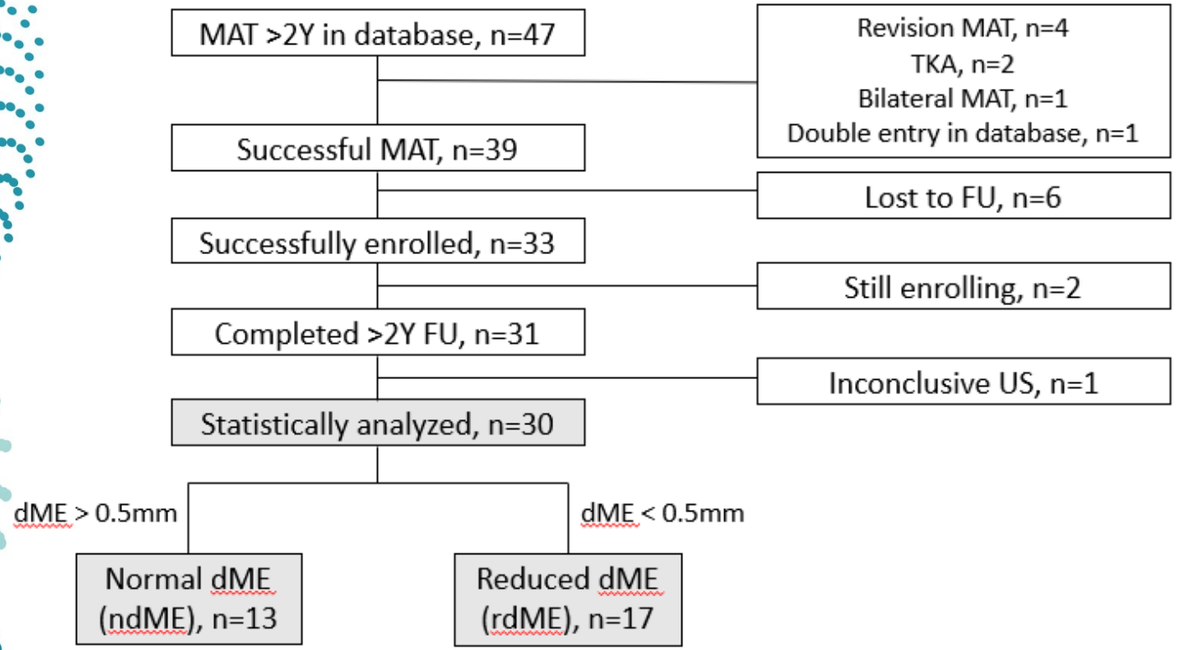
Material & Methods

- **Dynamic ultrasound** measured meniscal extrusion in supine (**unloaded**) and standing (**loaded**) positions.
- **Decreased dynamic ME** (**dME**) was defined as **<0.5 mm** difference between positions.

Δ=dME



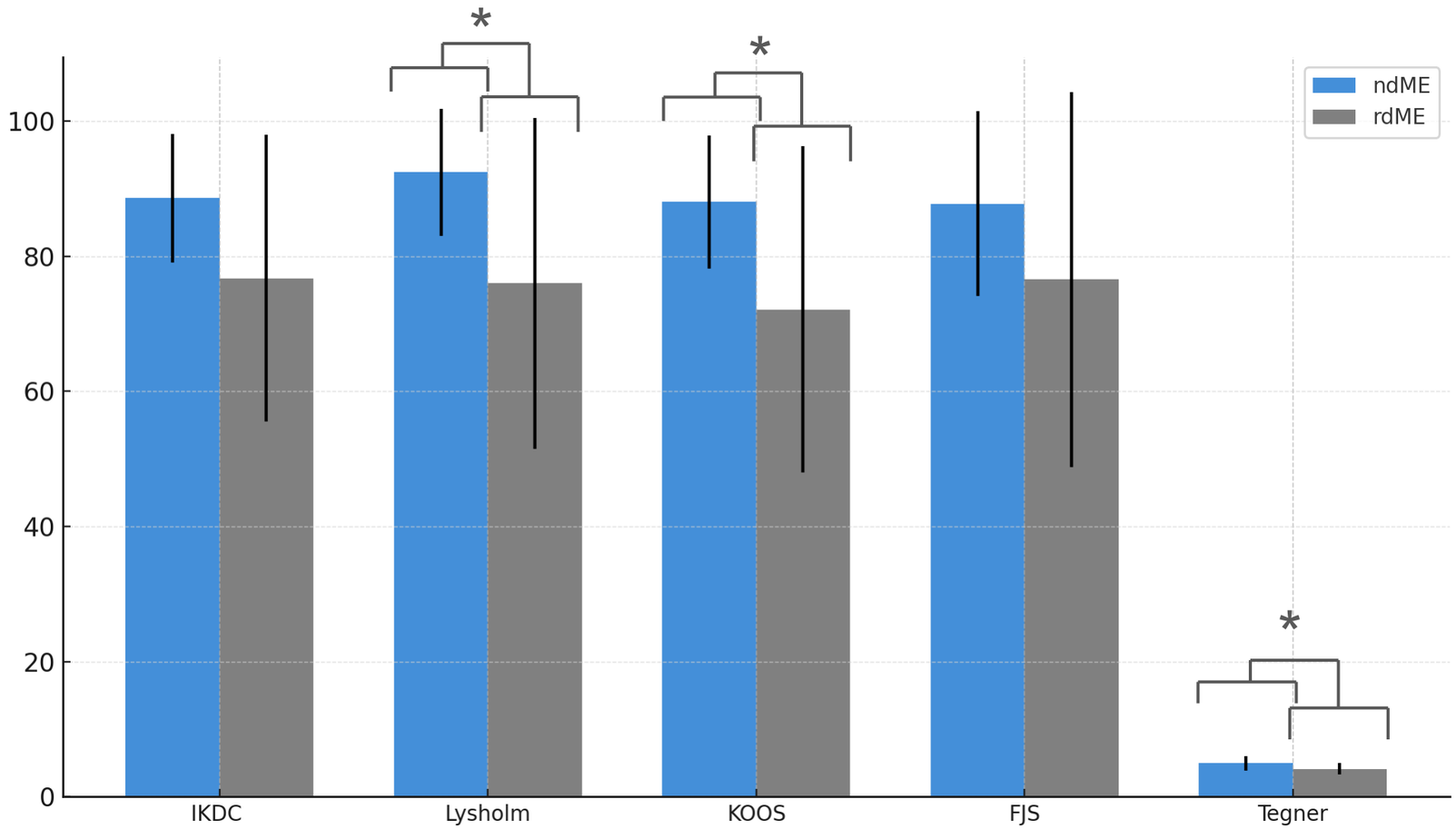
Results – Patient Demographics & Flow-Chart



	ndME, n=13	rdME, n=17	p-value
Age, years	31.9 ± 10.6	36.9 ± 17.2	.22
Male sex, n (%)	8 (61.5)	9 (52.9)	.64
Weight, kg	74.3 ± 12.6	81.0 ± 17.7	.26
Height, cm	174 ± 8.6	175 ± 5.7	.68
BMI, kg/m^2	22.8 ± 7.8	26.3 ± 5.4	.16
Medial meniscus, n (%)	10 (76.9)	11 (64.7)	.47
Follow-Up, months	50.5 ± 16.4	51.7 ± 17.2	.85
Concomitant procedures, n (%)	7 (53.8)	9 (52.9)	.96

cm, centimeter; kg, Kilogram; n, number; ndME, normal dynamic meniscus extrusion; p, p-value; rdME, educed dynamic meniscus extrusion; SD, standard deviation.
All values displayed as mean ± SD.

Results – PROMs



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Conclusion

Healthy menisci exhibit substantial dynamic extrusion under load, and a reduction in dynamic meniscal extrusion (dME) is associated with impaired subjective clinical outcomes at a minimum follow-up of 2 years after primary arthroscopic meniscus allograft transplantation.

Limitations:

- No validation for US
- Heterogeneous and small collective
- Uneven allocation
- Medial and lateral meniscus
- Concomitant procedures

Questions:

- Reason for reduced dME
- Influence of surgical technique
- Centralization
- Rehabilitation

References

1. Wagner KR, Kaiser JT, Knapik DM, et al. Patient-Specific Variables Associated with Failure to Achieve Clinically Significant Outcomes After Meniscal Allograft Transplantation at Minimum 5 Year Follow-Up. *Arthroscopy*. 2023;39(11):2327-2338. doi:10.1016/j.arthro.2023.03.031

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