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A Flat Reconstruction of the Medial Collateral Ligament and Anteromedial Structures Restores Native Knee Kinematics - A Biomechanical Robotic Investigation

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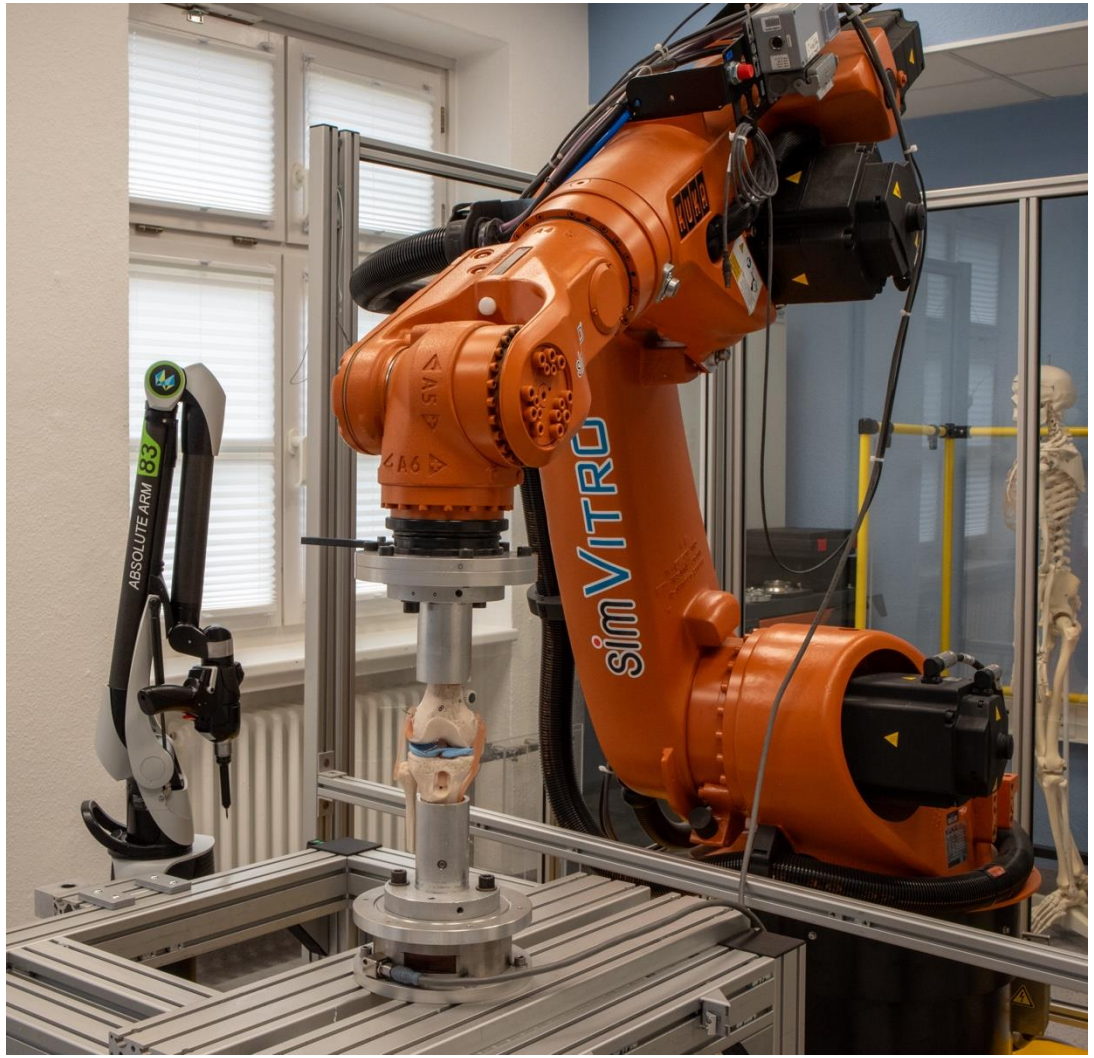
Conflicts of interest

The authors declare no conflict of interest.

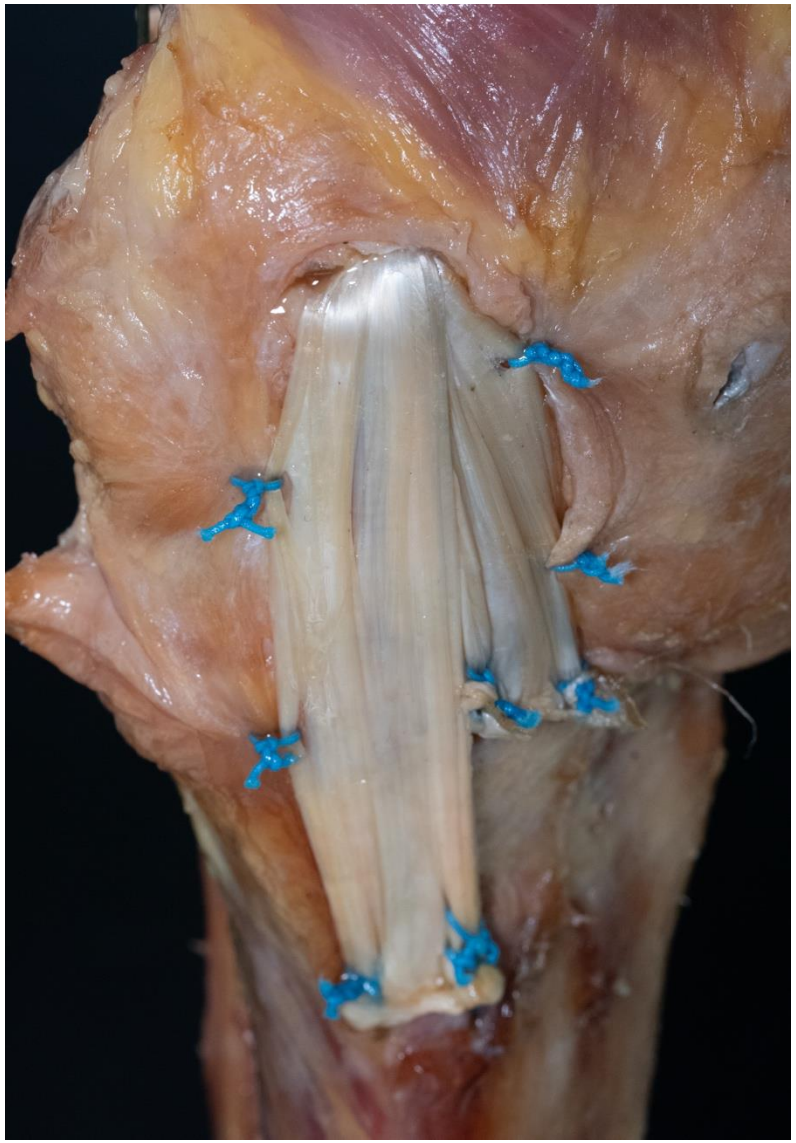
The purpose of this study was to evaluate a flat reconstruction of the sMCL and anteromedial structures in restoring knee kinematics in the combined MCL and anteromedial deficient knee.

Methods – Robotic Test Setup

Force-controlled clinical laxity tests (in 8 human cadaveric knee specimens) were performed with 200 N of axial compression in 0°, 30°, 60°, and 90° of flexion: 8 Nm valgus torque, 5 Nm external tibial rotation (ER) torque, 89 N anterior tibial translation (ATT) force, and an anteromedial drawer test consisting of 89 N ATT force under 5 Nm ER torque.



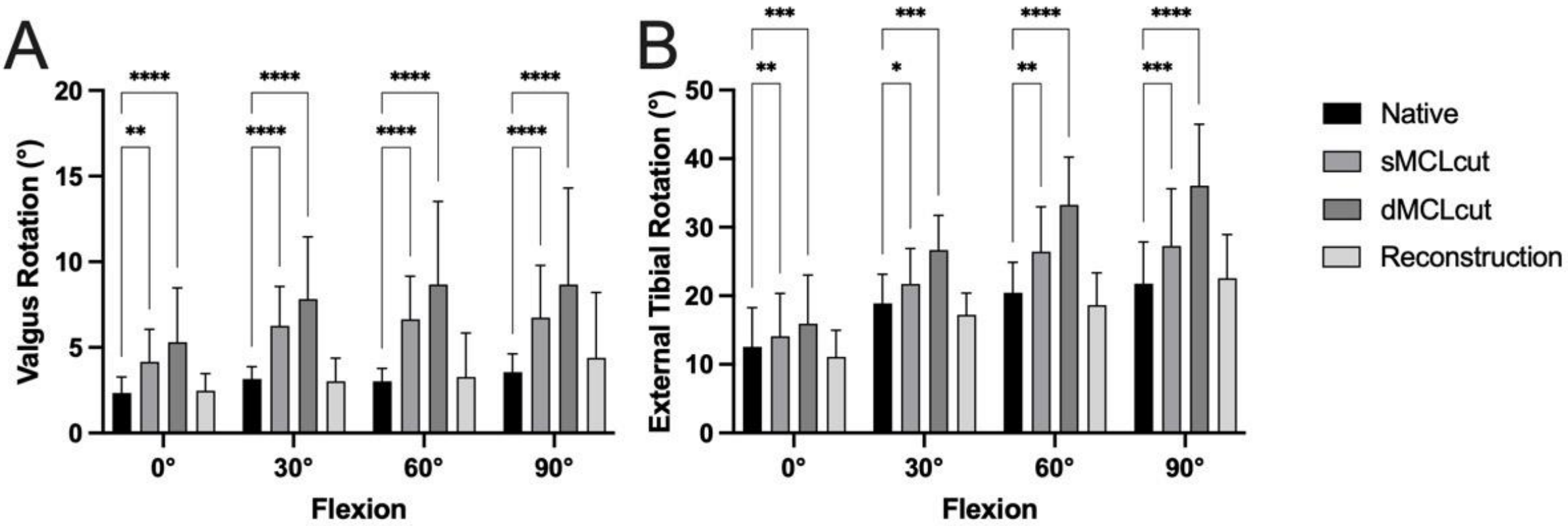
Methodik – Cutting / Reconstruction Sequence



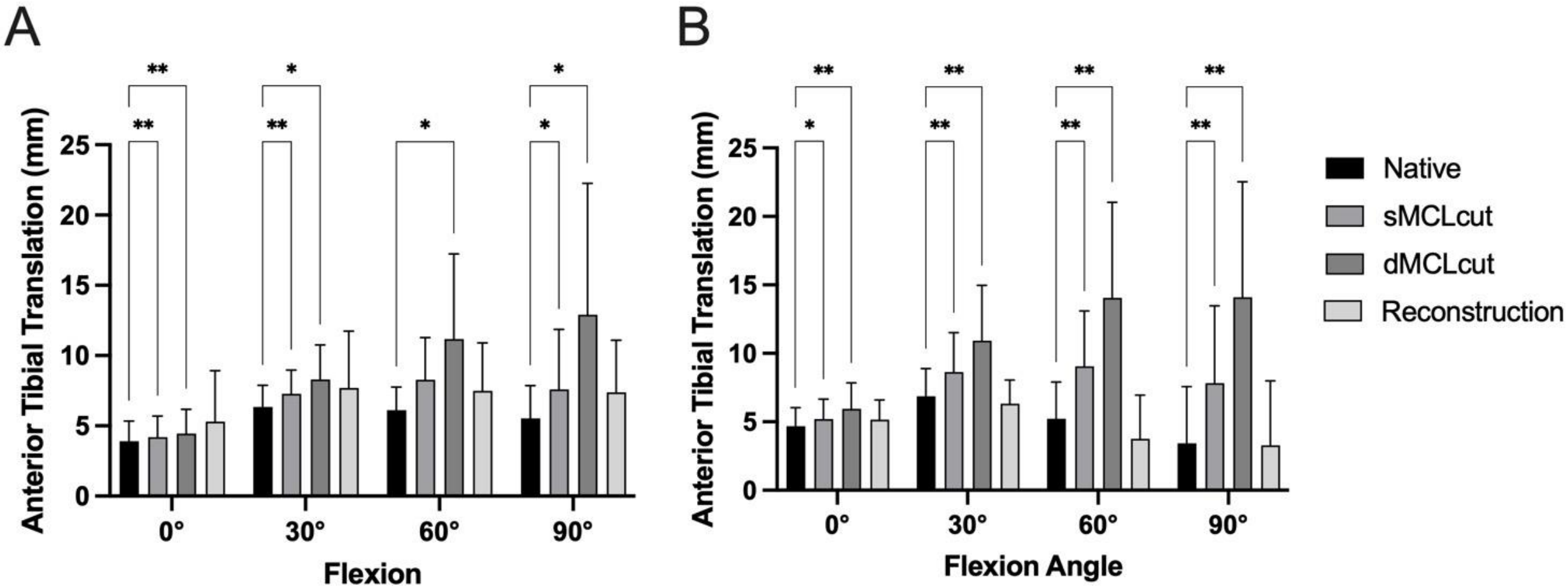
Native → sMCL cut → dMCL cut → Flat Reconstruction

Statistics: Mixed linear models

Results – Valgus / External Rotation



Results – Anterior / Anteromedial Tibial Translation



Insufficiency of the superficial and deep MCL leads to excess laxity in valgus, external tibial rotation, anterior tibial translation, and anteromedial translation, which can be restored by a combined flat reconstruction of the superficial MCL and the anteromedial corner.

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Thank you!

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