A specific Area in the Femoral Footprint of the Posterior Cruciate Ligament Acts as a Major Contributor in Resisting Posterior Tibial Displacement – A Biomechanical Robotic Investigation

Adrian Deichsel , Thorben Briese, Wenke Liu, Michael J Raschke, Alina Albert, Christian Peez, Elmar Herbst, Christoph Kittl

Department of Trauma, Hand, and Reconstructive Surgery, University Hospital Münster
(Director: Univ.-Prof. Dr. med. M.J. Raschke)

Conflicts of interest

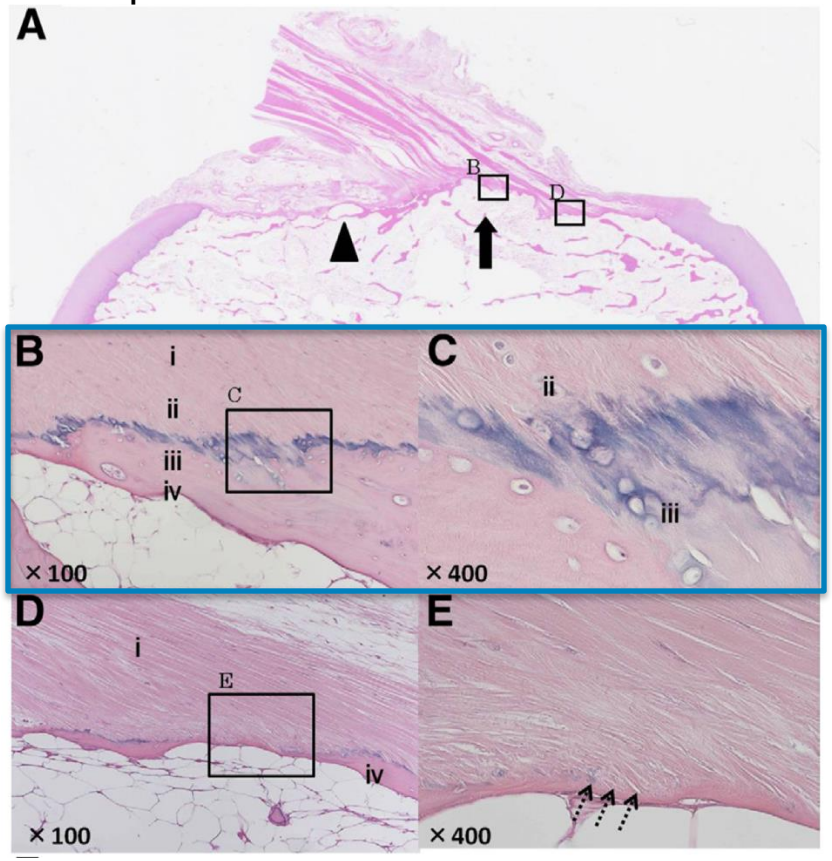
The authors declare no conflict of interest.

Introduction – The ACL is flat – Maybee also the PCL

Flat ACL anatomy

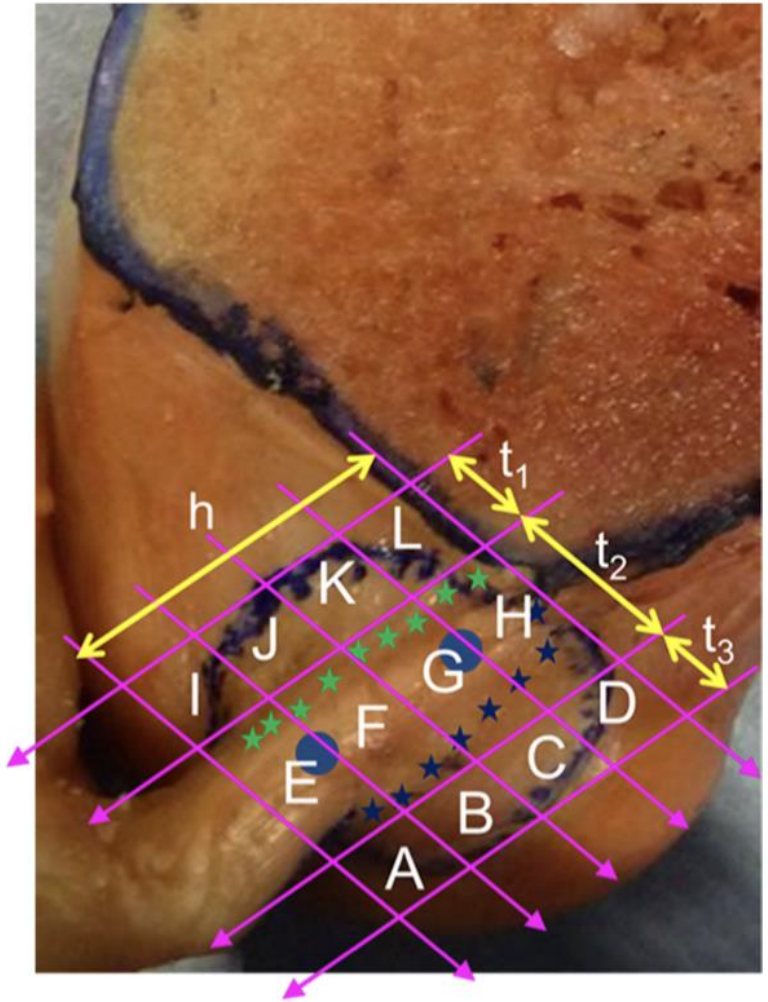
Smigielski et al. BJJ 2016

Corresponds to **“direct fiber”** insertions



Sasaki et al. Arthroscopy 2012

Biomechanically most important



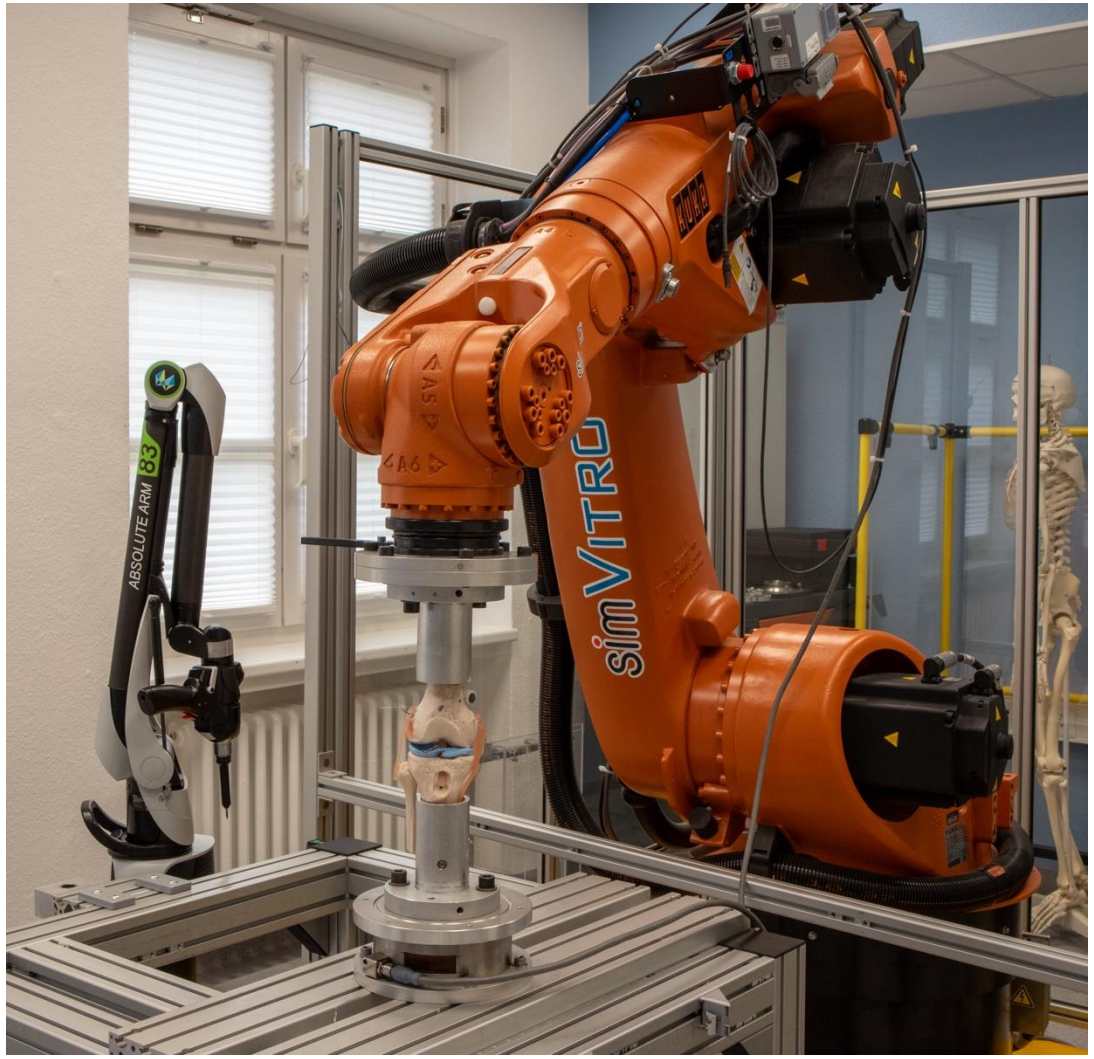
Kawaguchi et al. Arthroscopy 2015

The purpose of this study was to determine the role of different fiber areas of the femoral footprint of the PCL in resisting posterior tibial displacement.

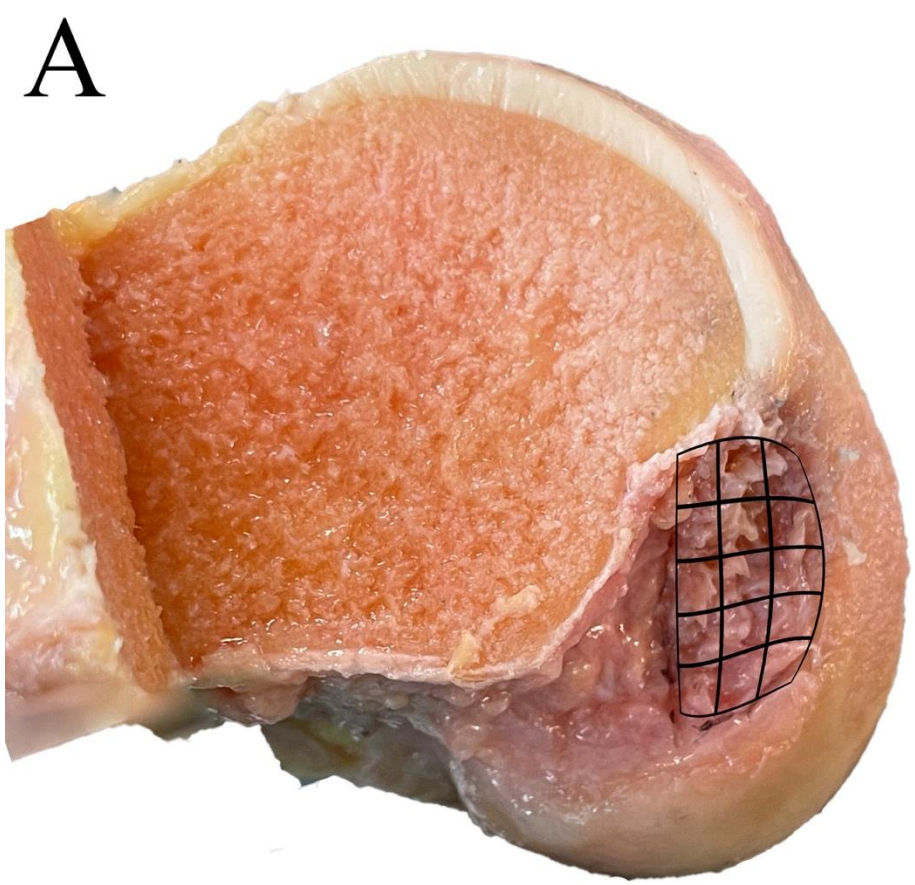
Methods – Robotic Test Setup

After determining the native knee kinematics (89 N anterior/posterior tibial translation (PTT)) in 0 – 90° of flexion, a position-controlled protocol was performed replaying the native displacements, while measuring the force.

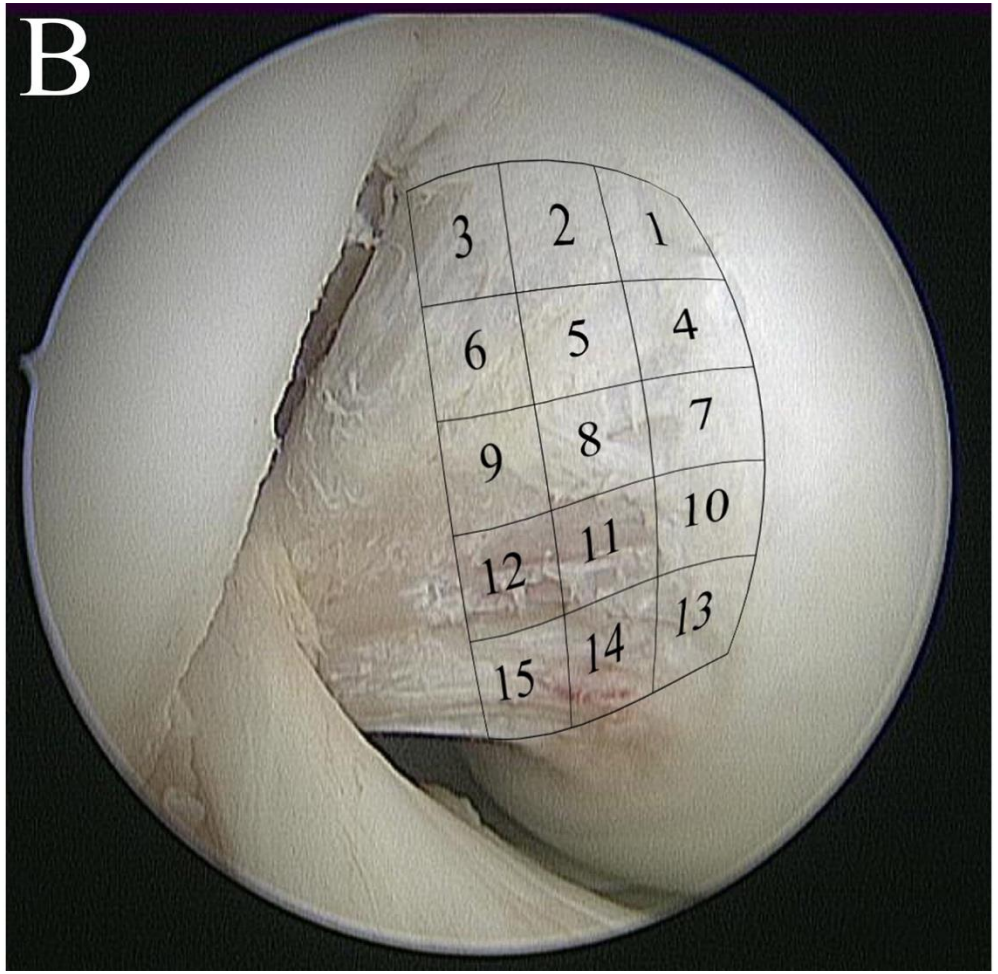
The percentage reduction of force was measured after each cut, by utilizing the principle of superposition



Methods – Cutting Sequence

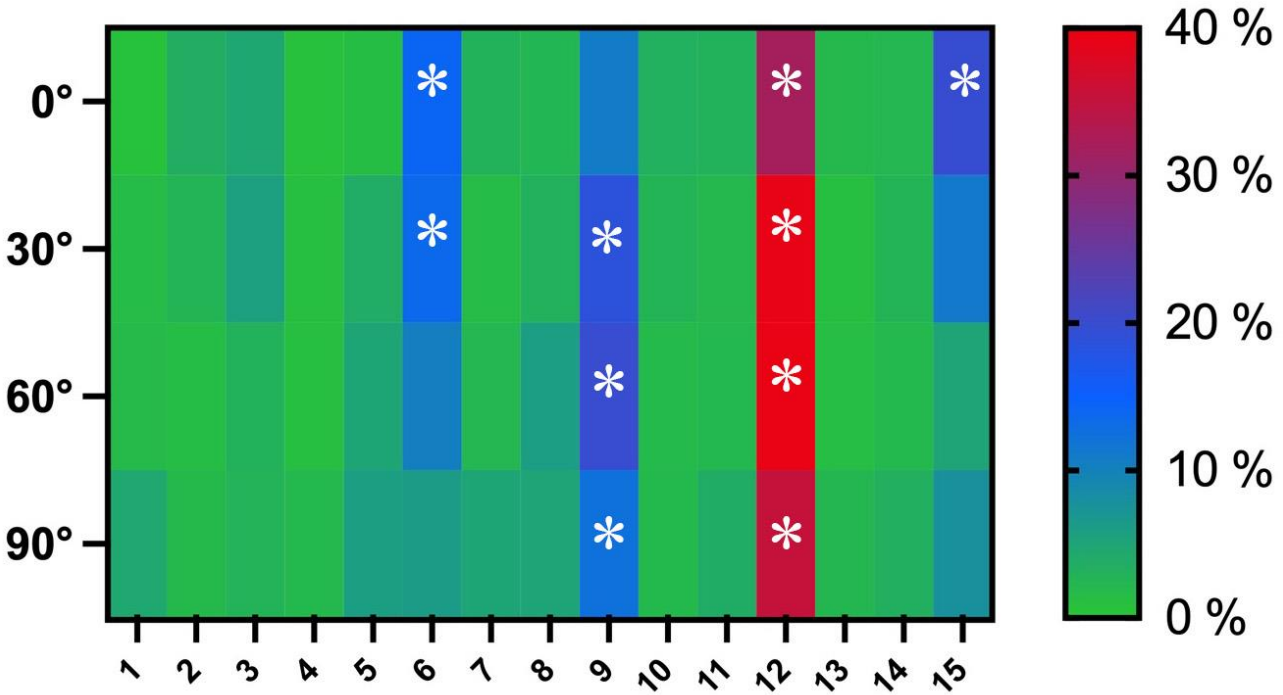


Randomized cutting

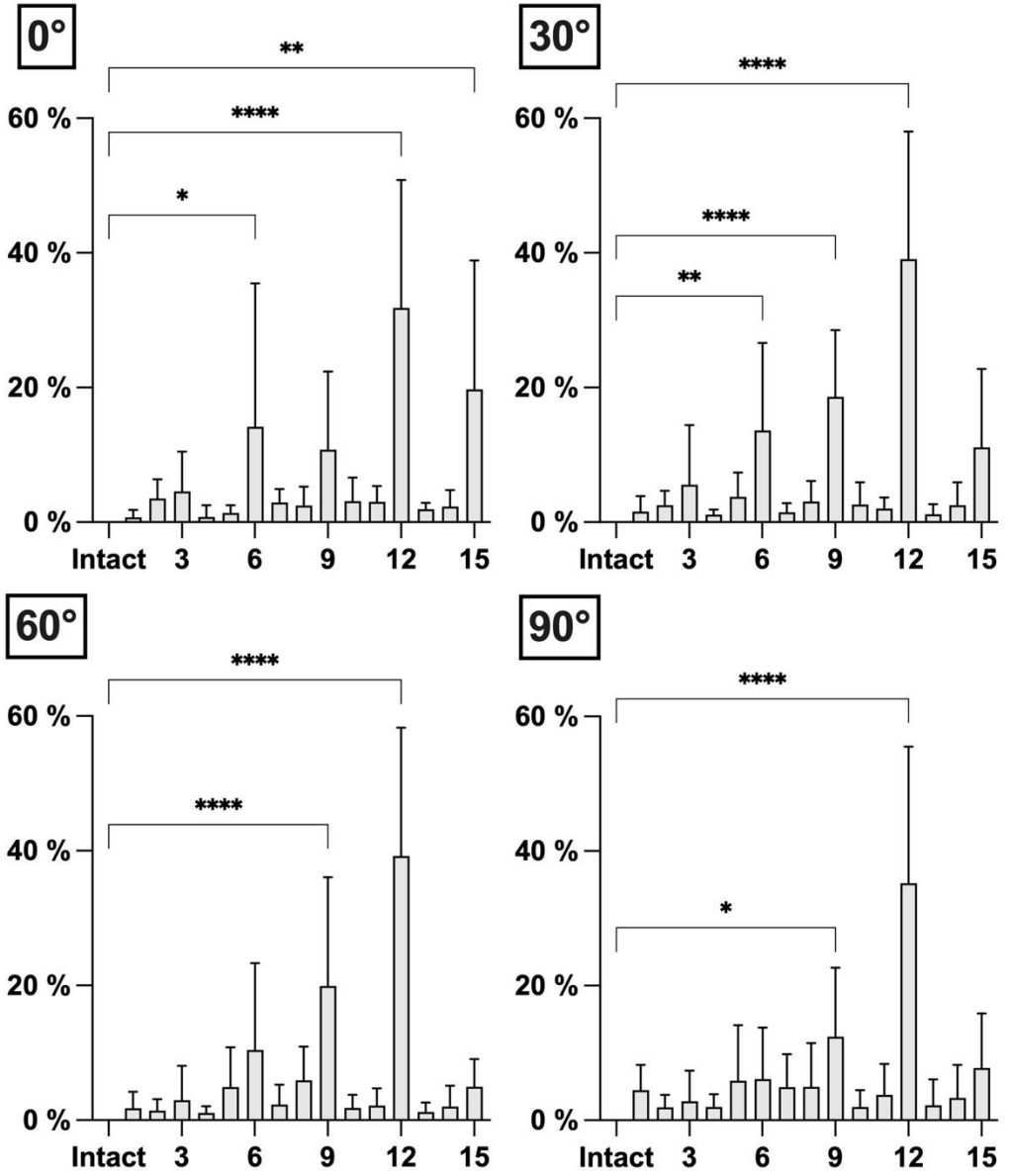


Mixed linear models (in PRISM)

Resultats – Contribution of each Cut



* = p ≤ 0.05



A rectangular / flat area towards the proximal and posterior part of the femoral PCL footprint, directly adjacent to the medial intercondylar ridge, was found to be the main restraint to a posterior tibial drawer force.

UKM
Universitätsklinikum
Münster

Thank you!

Universität
Münster

medizinische
fakultät
Universität Münster

AGA KOMITEE
Research

DKG
JUNGES KNIE

Junges Forum

European Society of Sports Traumatology, Knee Surgery & Arthroscopy
KSSTA
The official journal of ESSKA

Dr. med. Adrian Deichsel
adrian.deichsel@ukmuenster.de

www.traumacentrum.de