

**Outcome of a combined
ACL and ALL reconstruction
with a minimum
2-years follow-up.**

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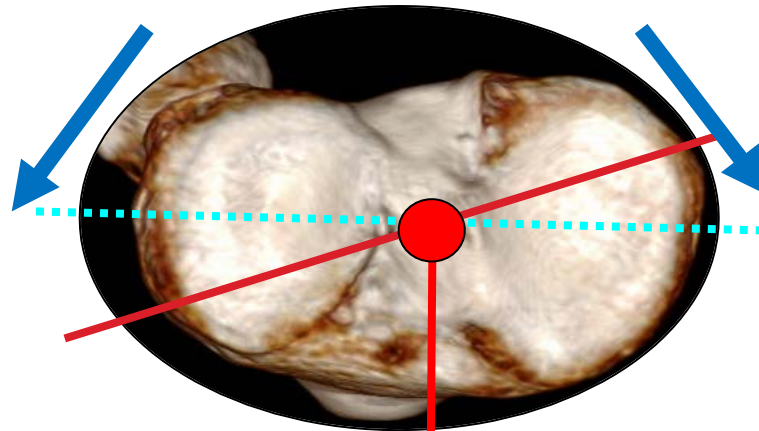
Since 2003 with **G. WALCH & P. CHAMBAT**



- Sports Medecine
- 600 ACL / year

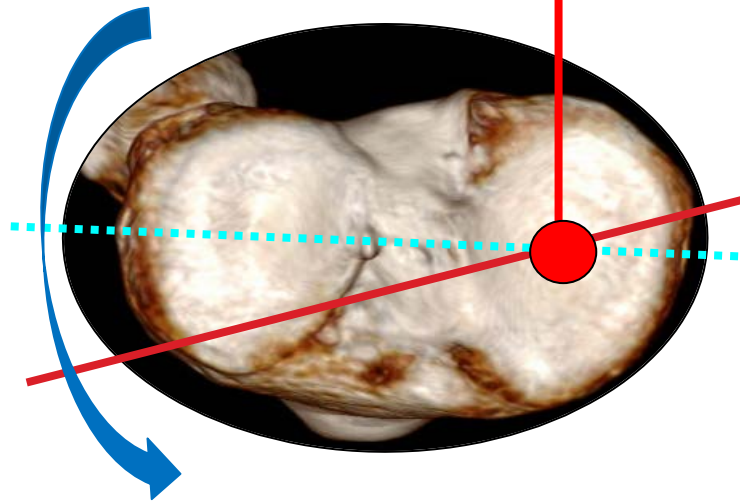
Biomechanics

Normal ACL

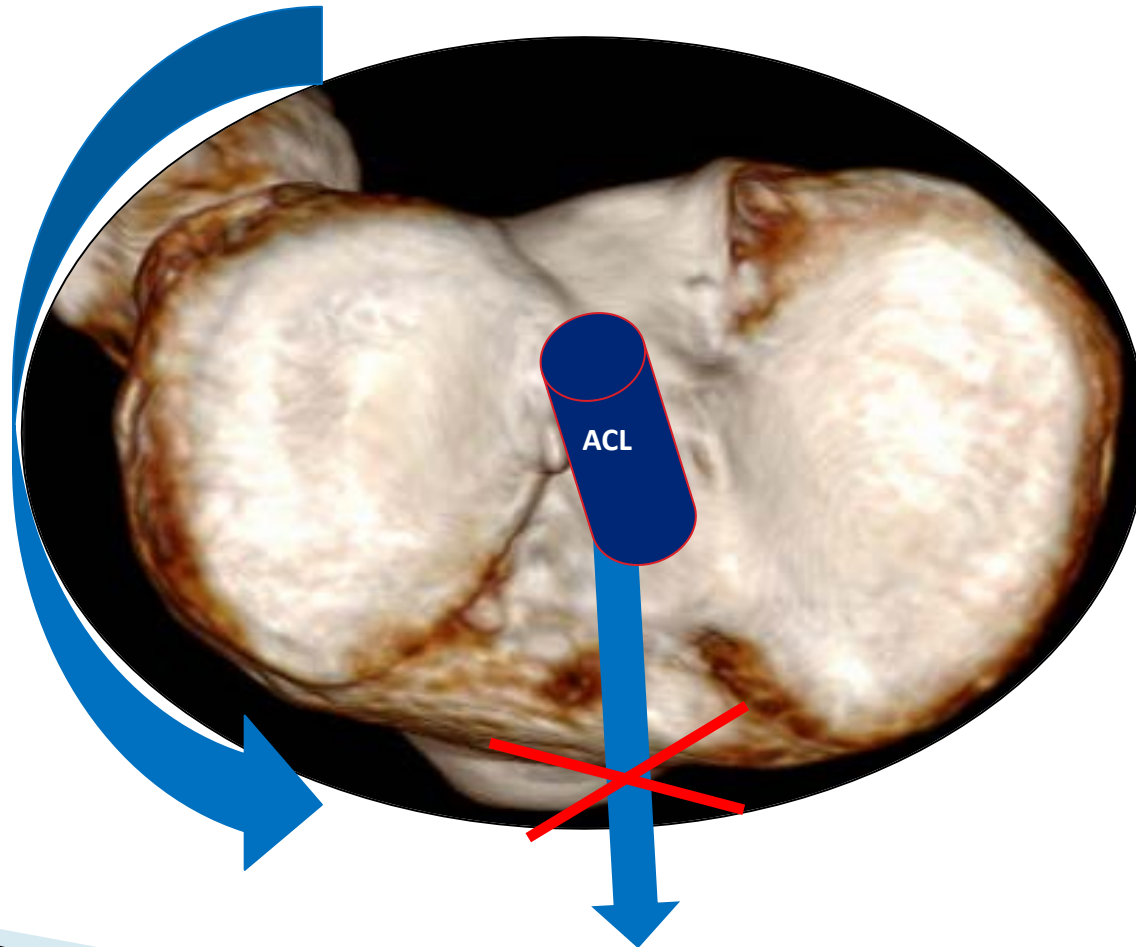


Rotational Axis

ACL Rupture

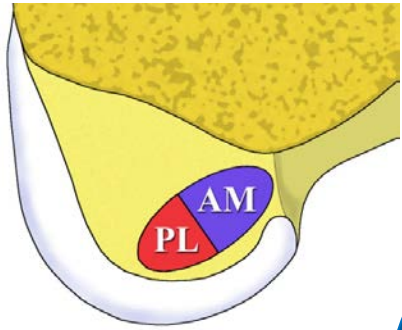


Biomechanics

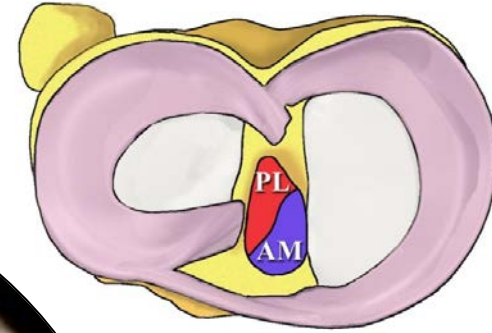
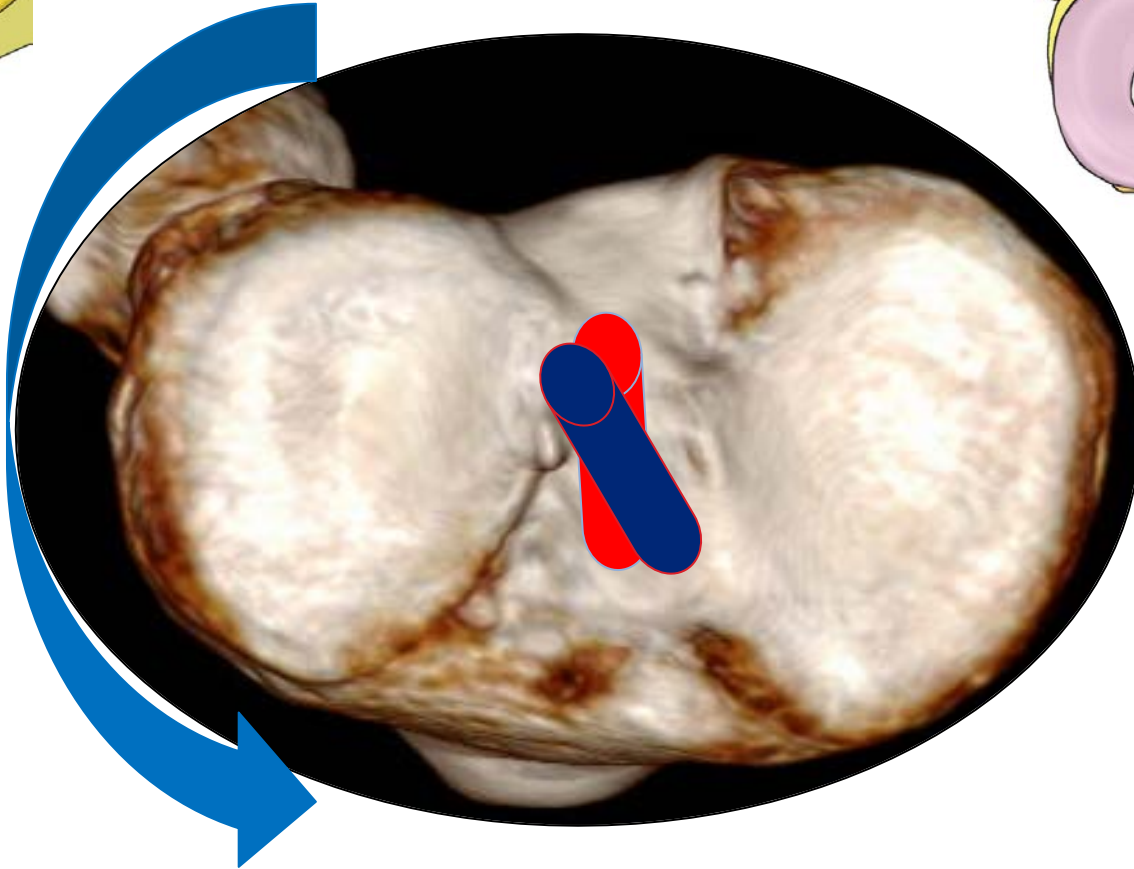


Gabriel MT, Woo S-H et al. Distribution of in situ forces in the anterior cruciate ligament in response to dynamic loads. *J Orthop Res.* 2004

Biomechanics



?

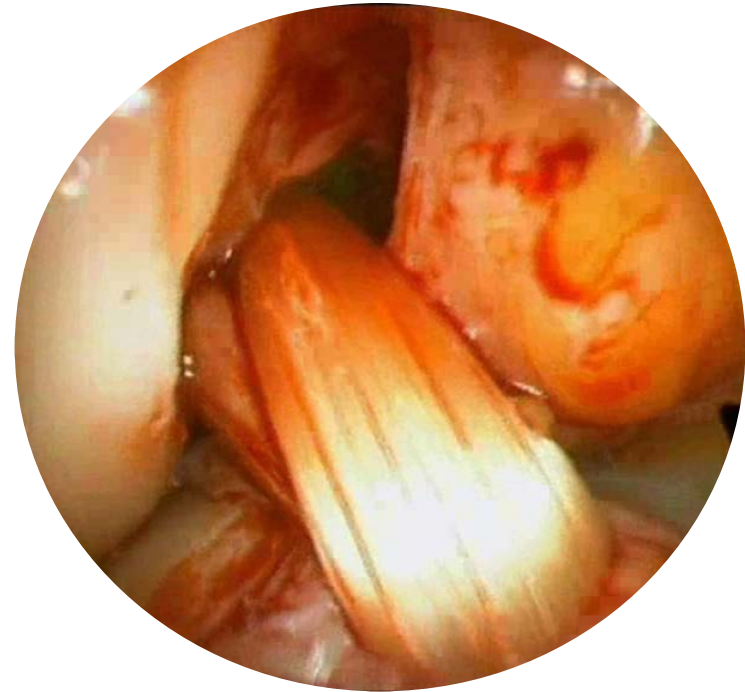


Yasuda K et al. Anatomic reconstruction of the anteromedial and posterolateral bundles of the anterior cruciate ligament using hamstring tendon grafts. *Arthroscopy* 2004.

Double Bundle R

2006 to 2008: 400 ACL DB

- ↗ Graft Rupture
- ↗ Cyclops Syndrome
- 20% Pivot Shift ++



Sonnery-Cottet B et al. Clinical and operative characteristics of cyclops syndrome after double-bundle anterior cruciate ligament reconstruction. *Arthroscopy*. 2010.

Meredick RB et al. Outcome of single-bundle versus double-bundle reconstruction of the anterior cruciate ligament: a meta-analysis. *Am J Sports Med*. 2008

New Ligament.....?

New ligament discovered in knee by Belgian surgeons

By Smitha Mundasari
Health reporter, BBC News



Surgeons describe new ligament



Des chirurgiens belges redécouvrent un ligament du genou

PHYS ED | NOVEMBER 13, 2013, 12:01 AM | 60 Comments
Doctors Identify a New Knee Ligament
By GRETCHEN REYNOLDS

Le ligament, décrit par un médecin au XIX^e siècle puis oublié, est involontairement lésé par les chirurgiens lors d'une opération des ligaments croisés.

New Ligament Discovered in Human Knee In Belgium

Anatomy

Jack Hughston, 1976

Anterolateral structures

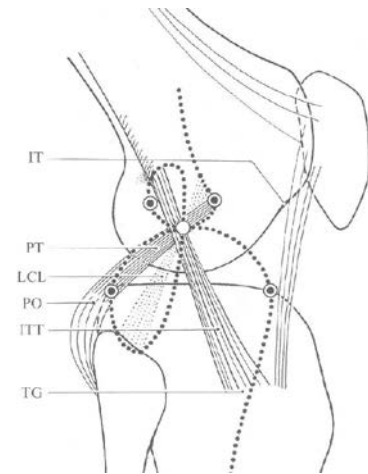
= middle one third of the lateral capsular ligament

Werner Muller, 1982

Lateral Femorotibial Ligamentous attachment

= deep posterior portion of the iliotibial tract

+ Middle capsular ligament



Hughston JC, Andrews JR et al.

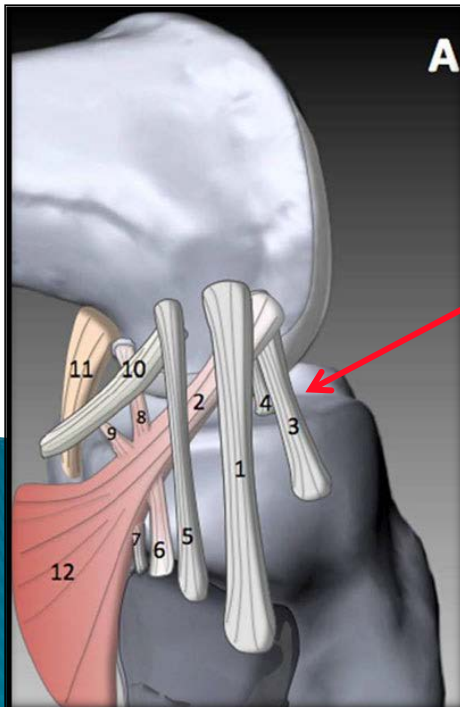
Classification of the knee ligament instabilities. Part II. The lateral compartment. *J Bone Joint Surg Am.* 1976.

W. Muller, The Knee, *Springer-Verlag*, 1982

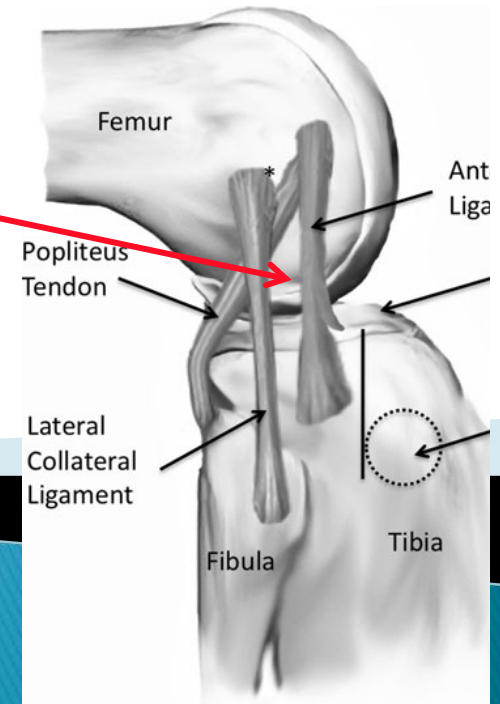
New Ligament.....?

Navigated Knee Kinematics After Tear of the ACL and Its Secondary Restraints: Preliminary Results

Monaco E et al. *Orthopedics* 2010



ALL

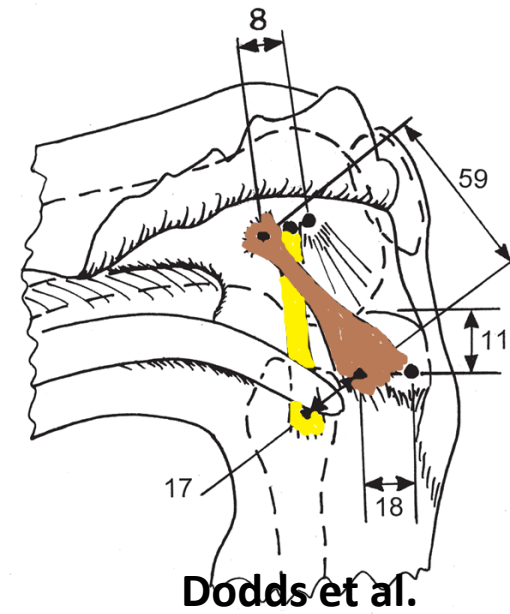
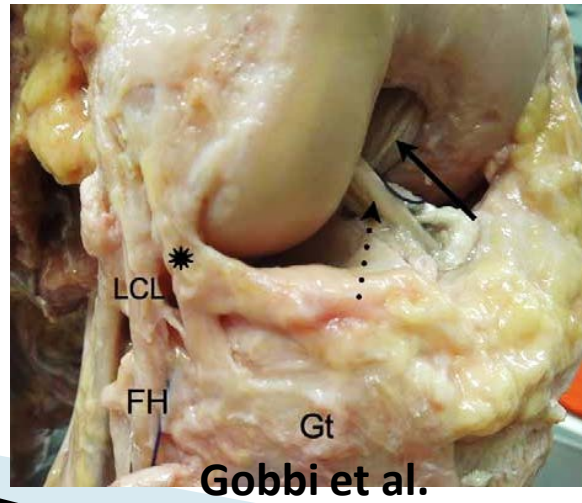
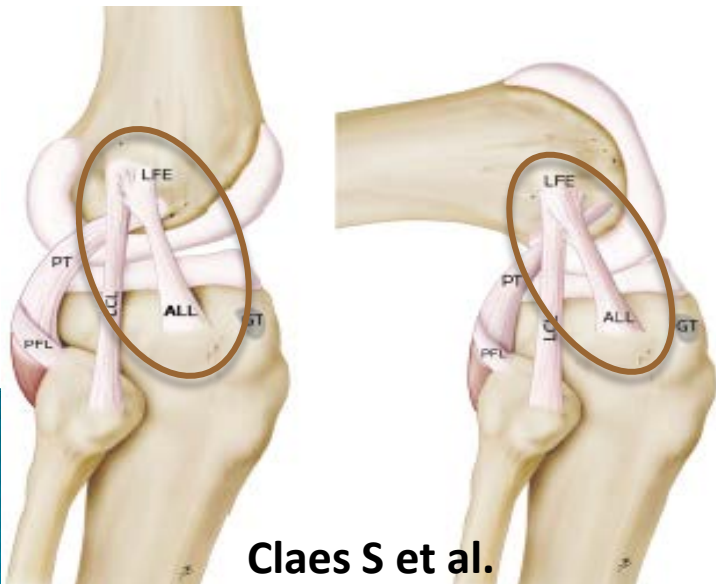


Anterolateral Ligament

Claes S, Bellemans et al. Anatomy of the anterolateral ligament of the knee.
J Anat. Oct 2013

Gobbi RG, Camanho GL et al. Anatomy and Histology of the Knee Anterolateral Ligament.
Orthop J Sports Med. Dec 2013

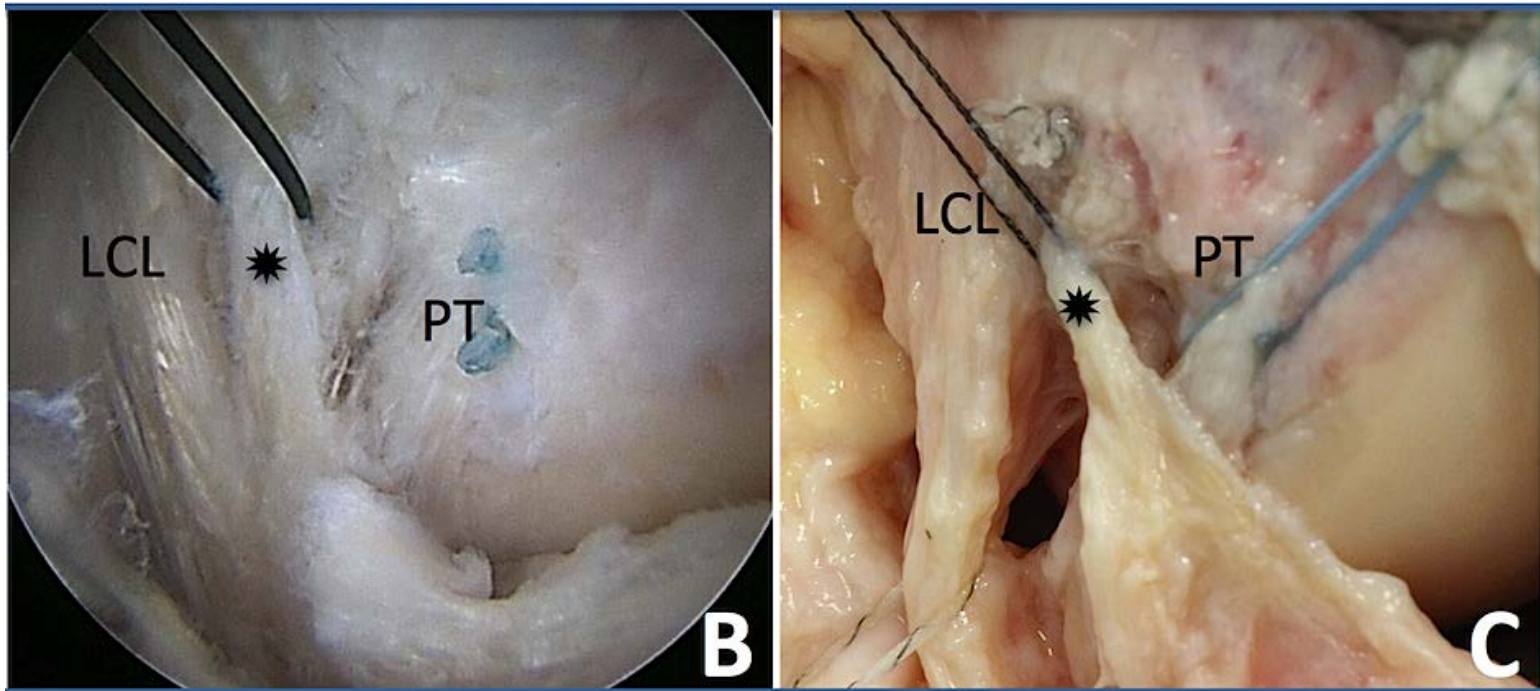
Dodds AL, Amis AA et al. The anterolateral ligament: Anatomy, length changes and association with the Segond fracture. *Bone Joint J.* March 2014



Anterolateral Ligament

Sonnery-Cottet B et al.

Arthroscopic Identification of the Anterolateral Ligament of the knee
Arthros Tech 2014



Biomechanics of ALL

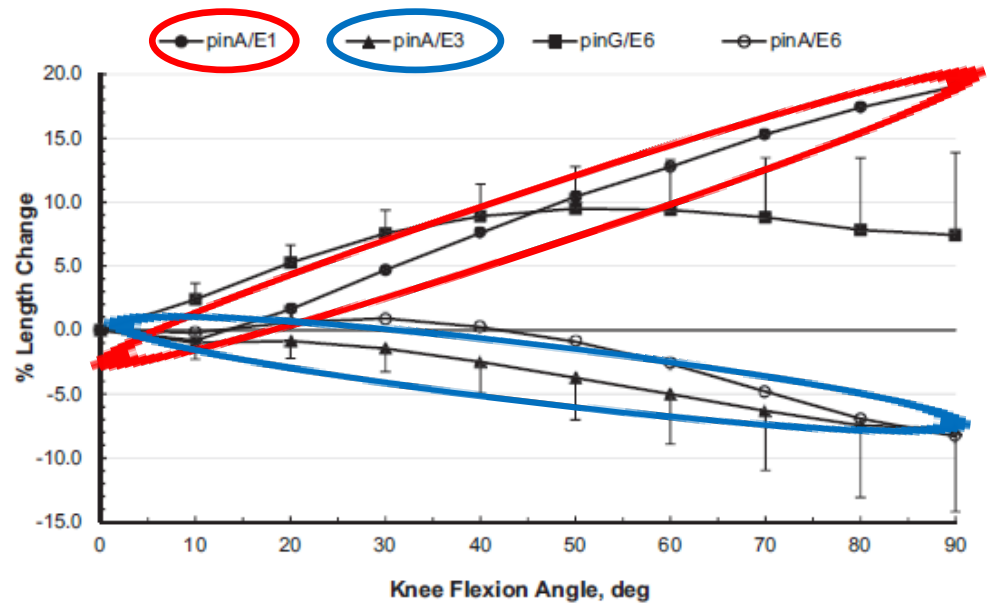
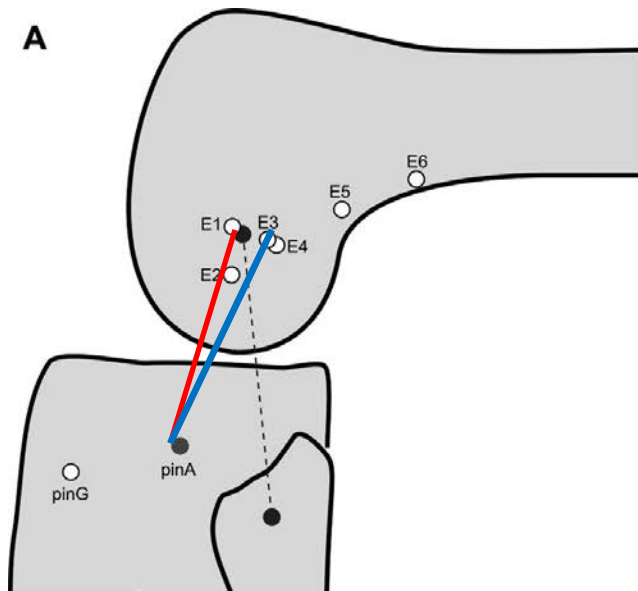
Monaco E et al. Navigated knee kinematics after tear of the ACL and its secondary restraints: preliminary results. *Orthopedics* 2010

“The lesion of the **AnteroLateral FemoroTibial Ligament** increases tibial rotation and could be correlated to the **pivot shift phenomenon.**”

Claes et al. *ISAKOS 2013, AAOS 2013*
Selective cutting of ACL bundles/ALL

“Ruptured **ALL** is prerequisite for **grade 3 Pivot shift** in ACL deficient knee”

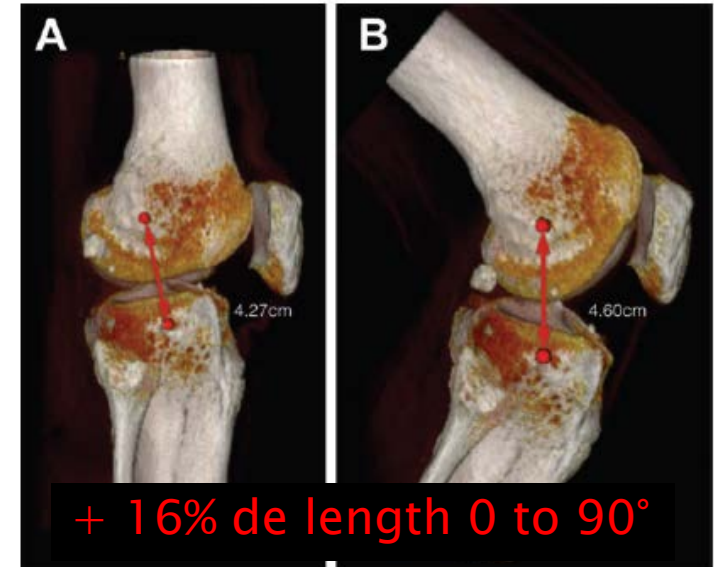
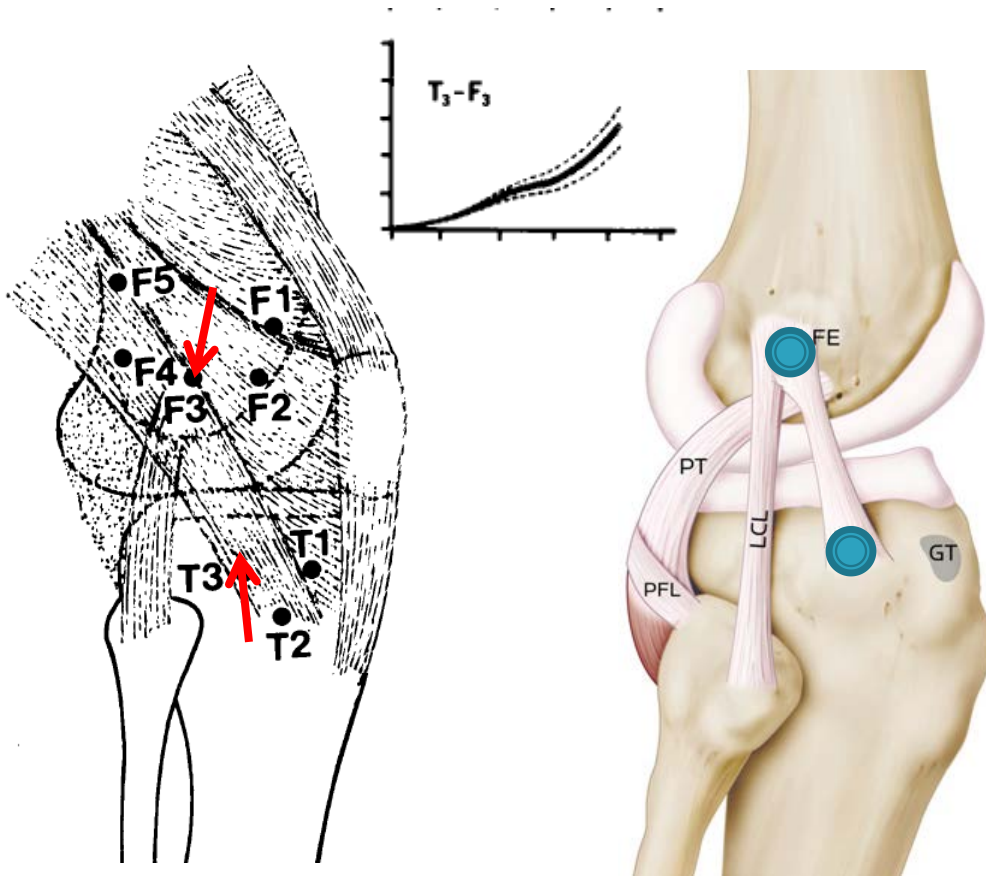
Biomechanics of ALL



Length Change Patterns in the Lateral Extra-articular Structures of the Knee and Related Reconstructions.

Kittl C, Amis AA et al. *Am J Sports Med.* 2015

Biomechanics of ALL

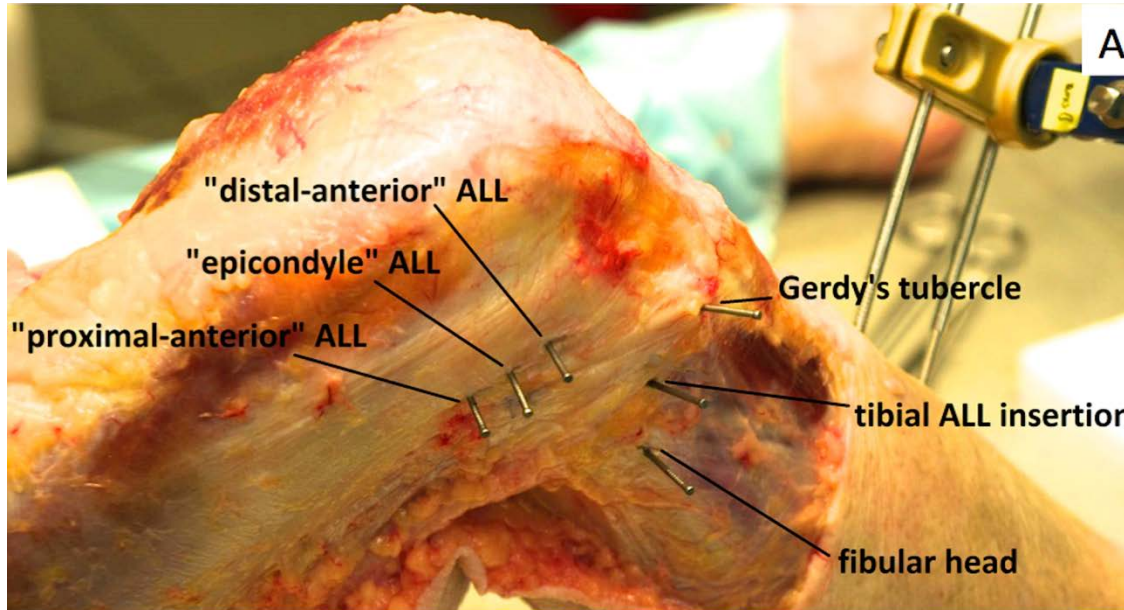


KUROSAWA AJSM 1991

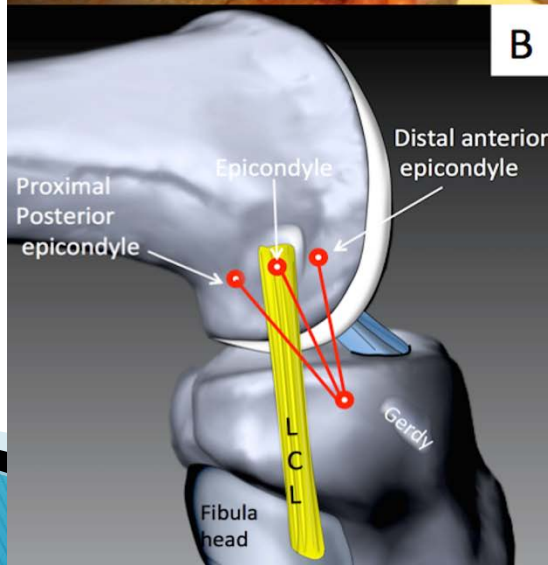
CLAES J Anatomy 2013

Helito AJSM 2014

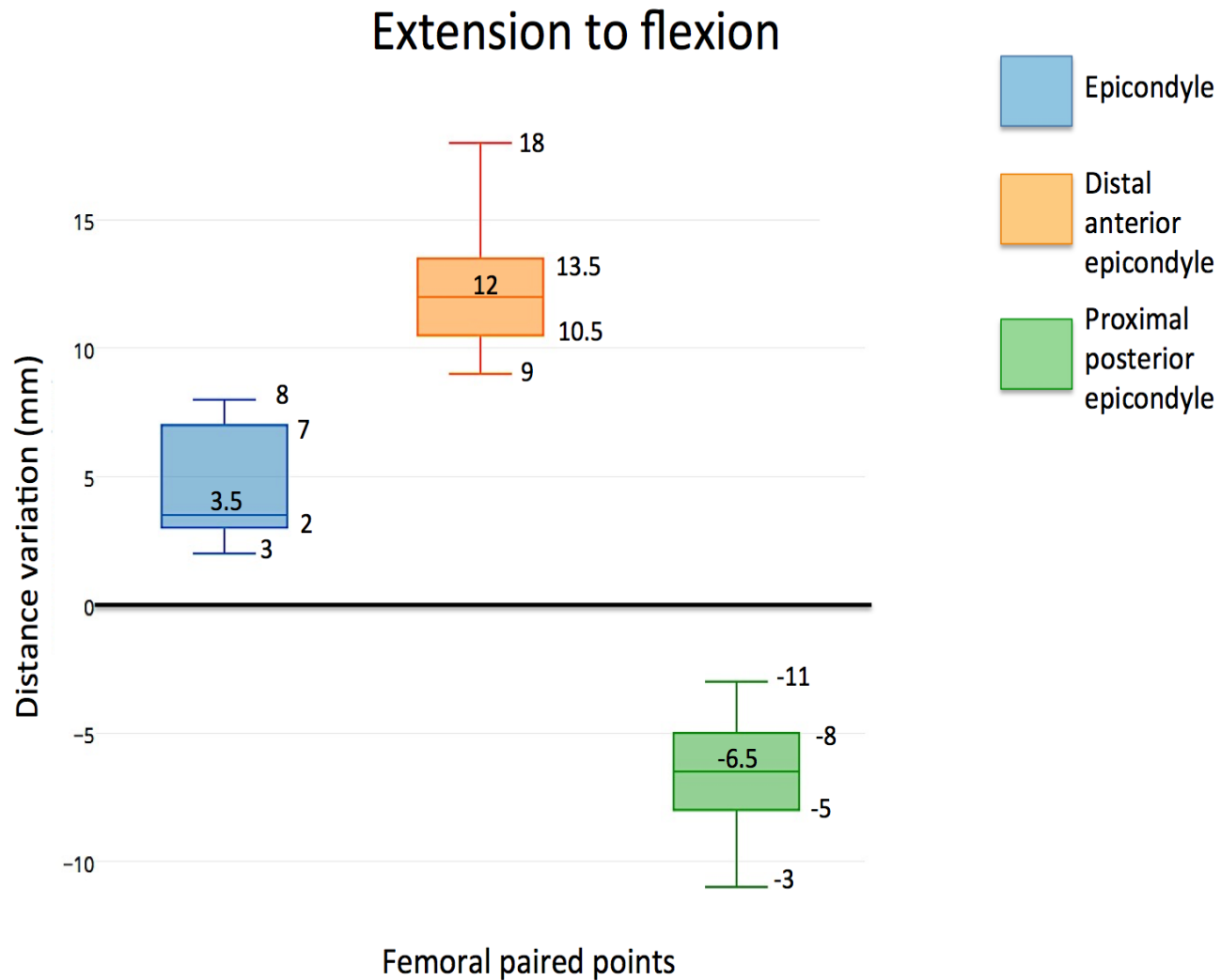
Biomechanics of ALL



Courtesy
 Dr Imbert
 Dr Lutz

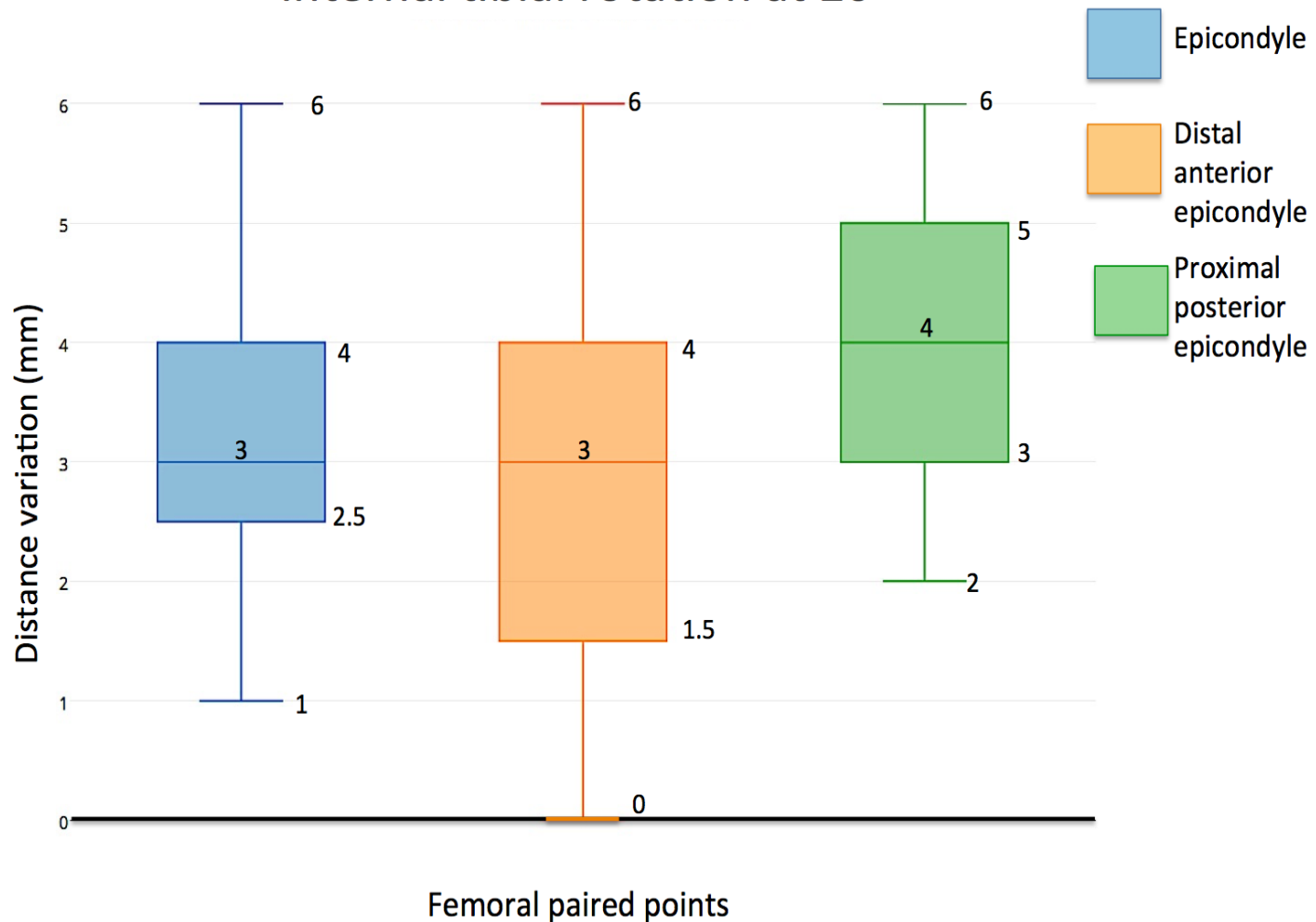


Biomechanics of ALL

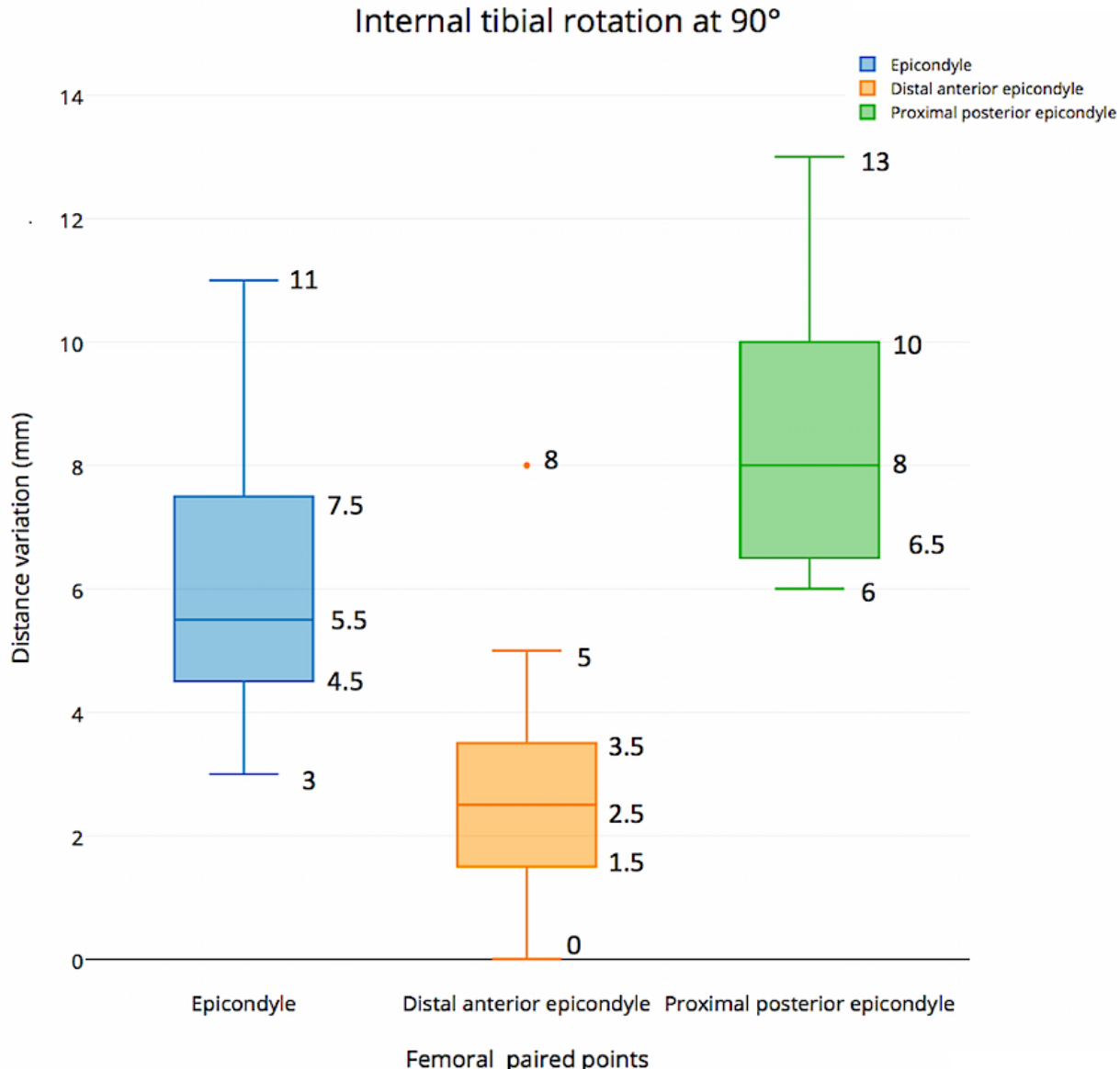


Biomechanics of ALL

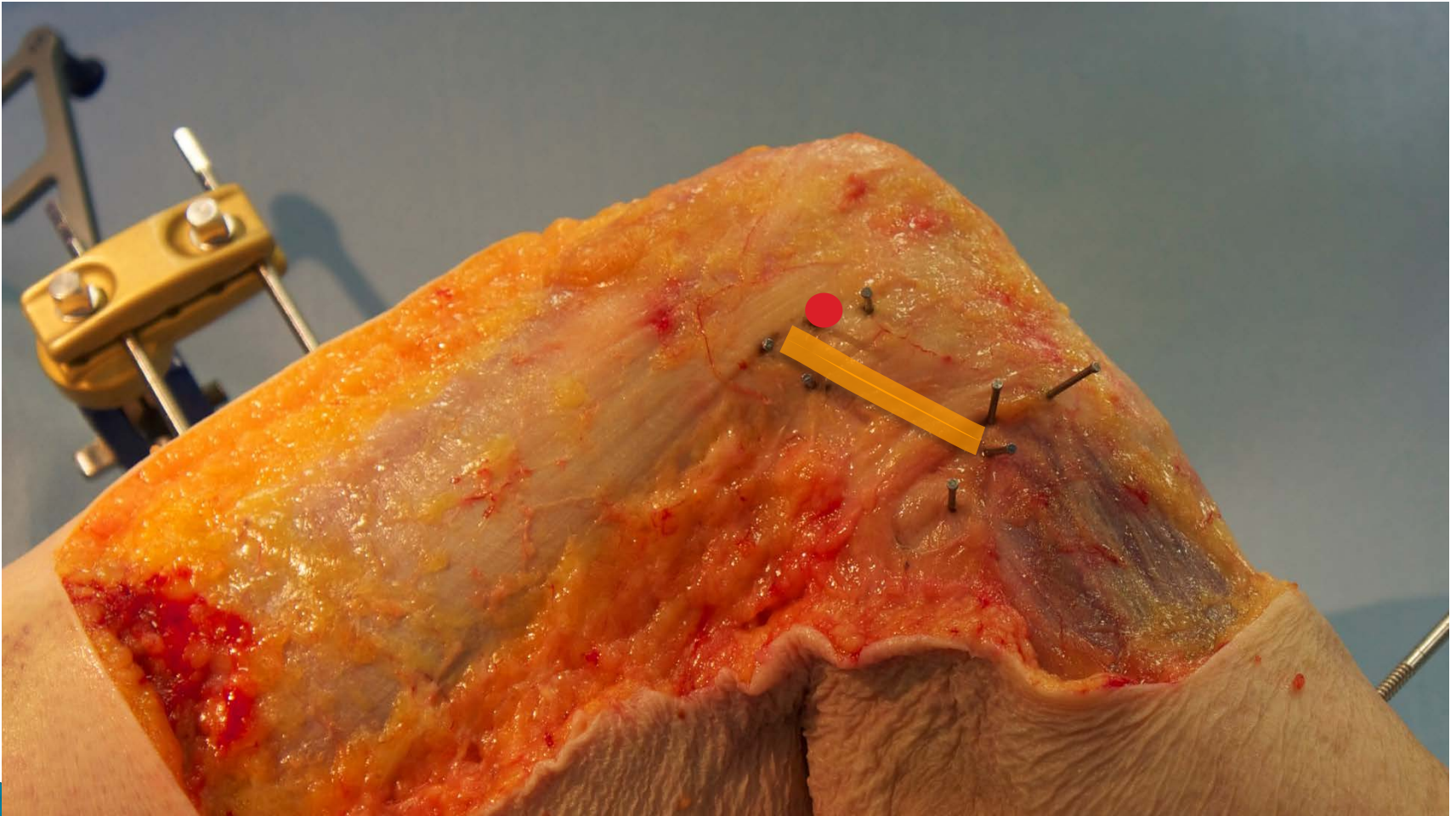
Internal tibial rotation at 20°



Biomechanics of ALL

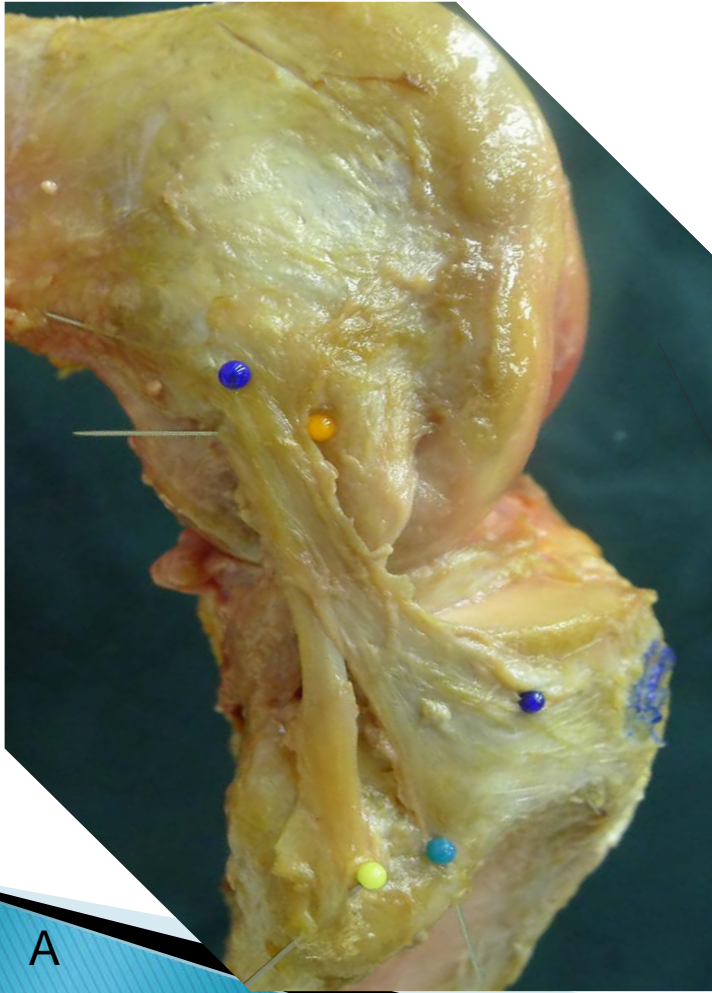


Surgical Technique



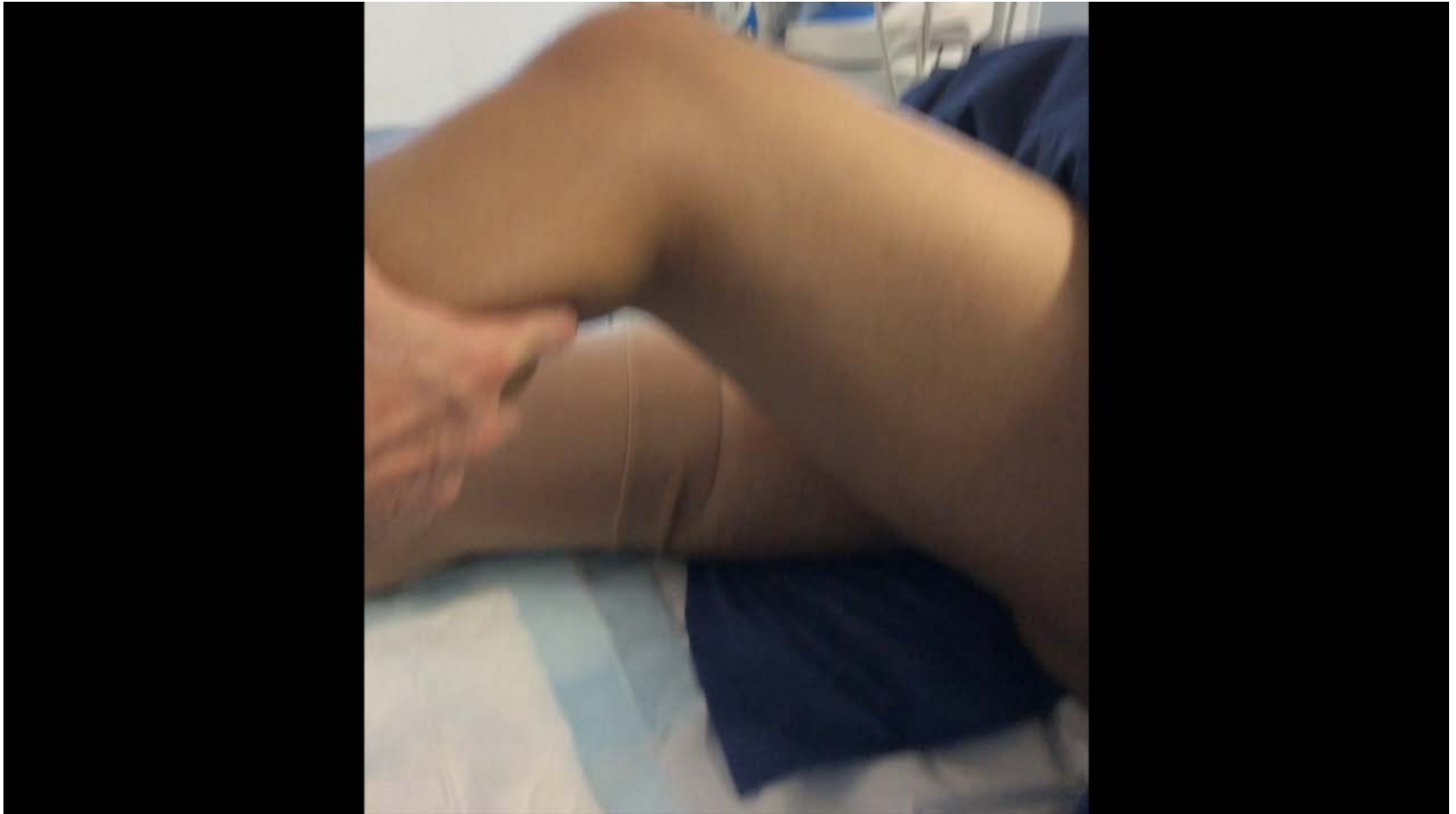
Surgical Technique

Courtesy Dr Claes



Courtesy Dr Chassaing

Surgical Technique



Anterolateral Ligament



Anterolateral Ligament

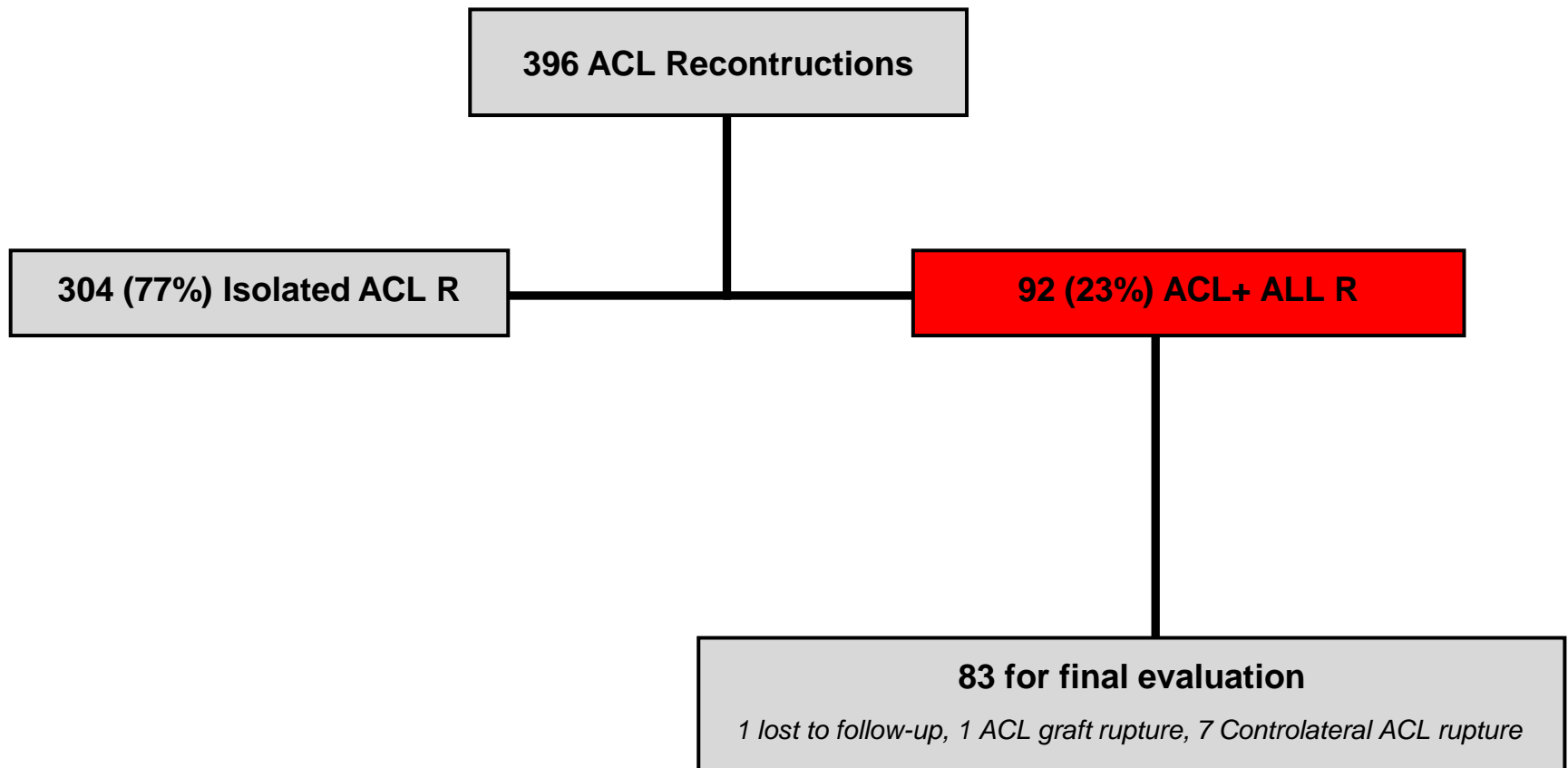


ACL + ALL reconstruction

- From January 2011 to January 2012
- 396 primary ACL reconstructions
- At minimum 2 years
- 92 ACL + ALL reconstruct
 - IKDC objective & subjective
 - Tegner, Lysholm
 - Instrumented laxity: Rolimeter
 - Complications



ACL + ALL reconstruction



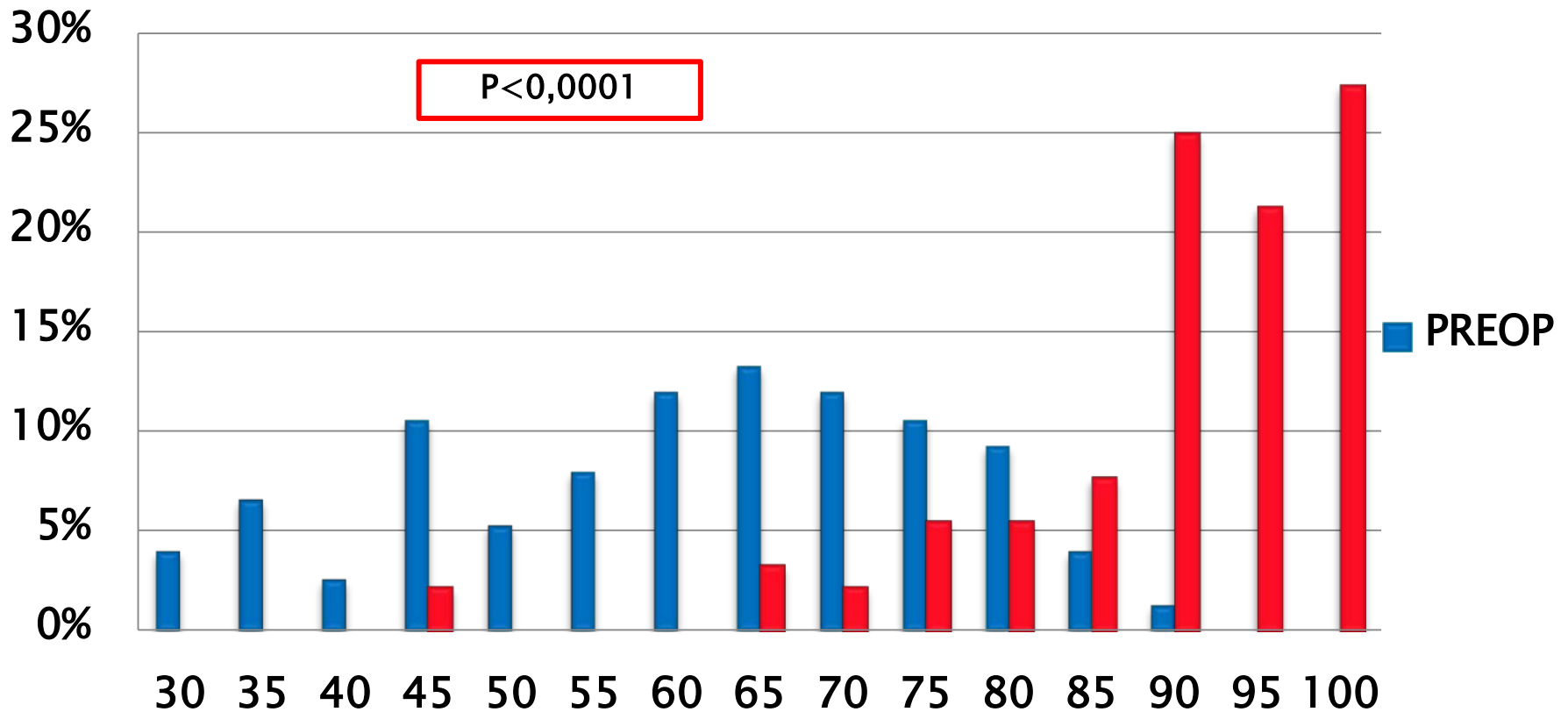
ACL + ALL reconstruction

- Indications
 - Pivoting Sport
 - High Level
 - Pivot Shift ++
 - Chronic ACL
 - Lateral notch X-rays
 - Second fracture

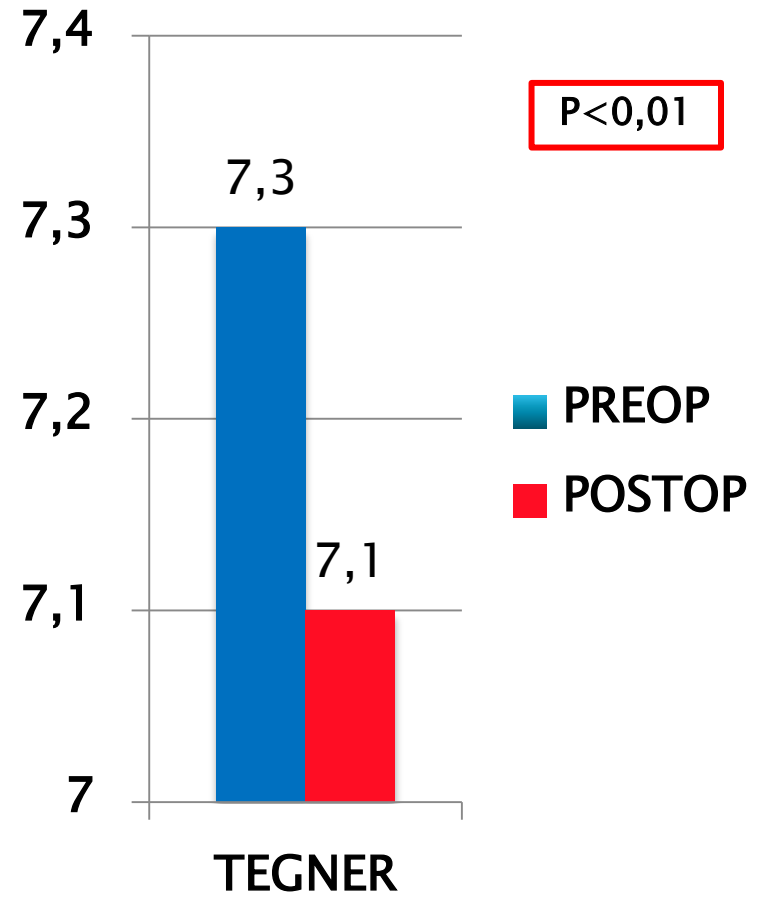
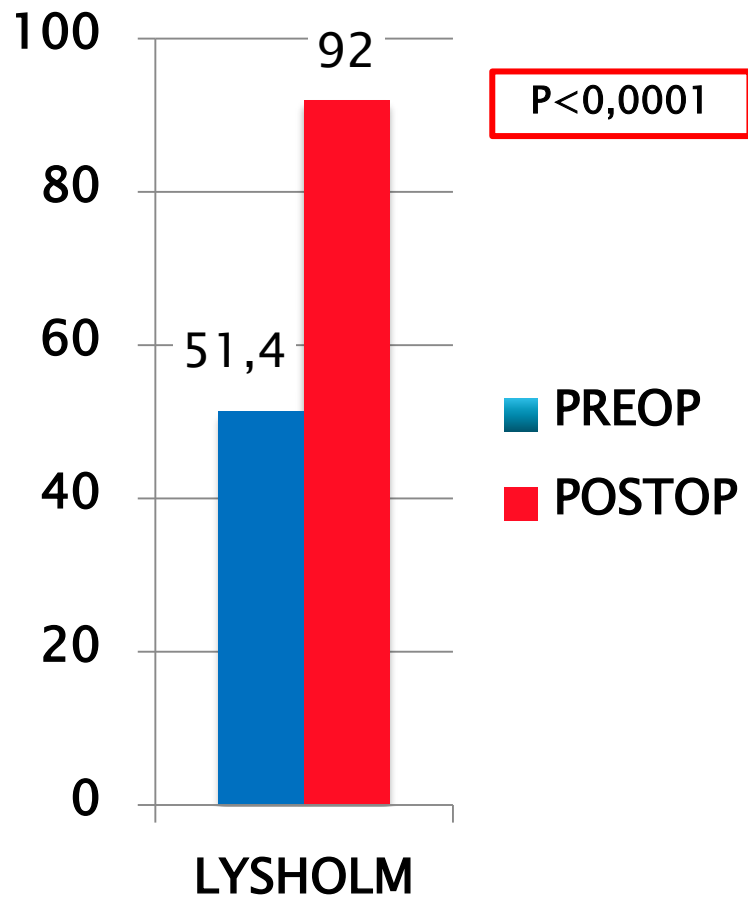


ACL + ALL reconstruction

Subjective IKDC

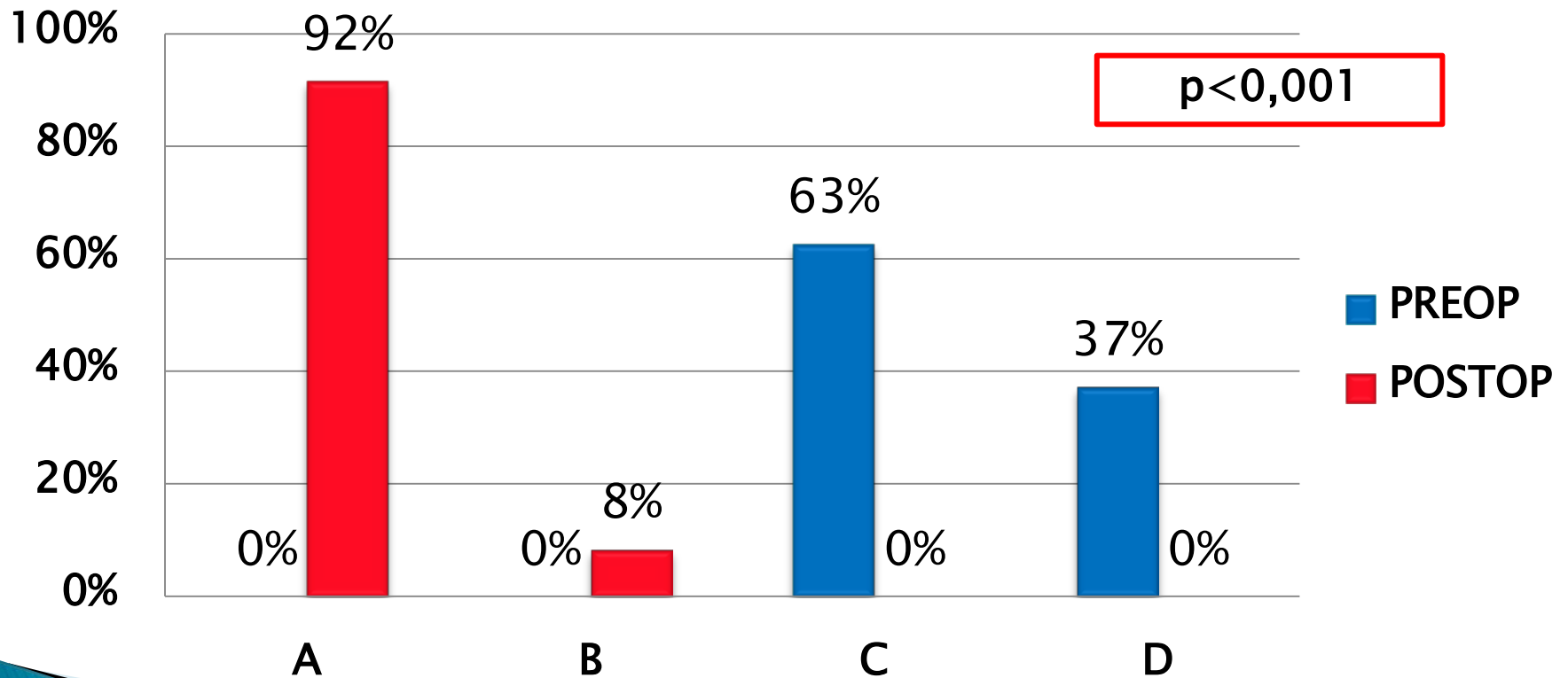


ACL + ALL reconstruction



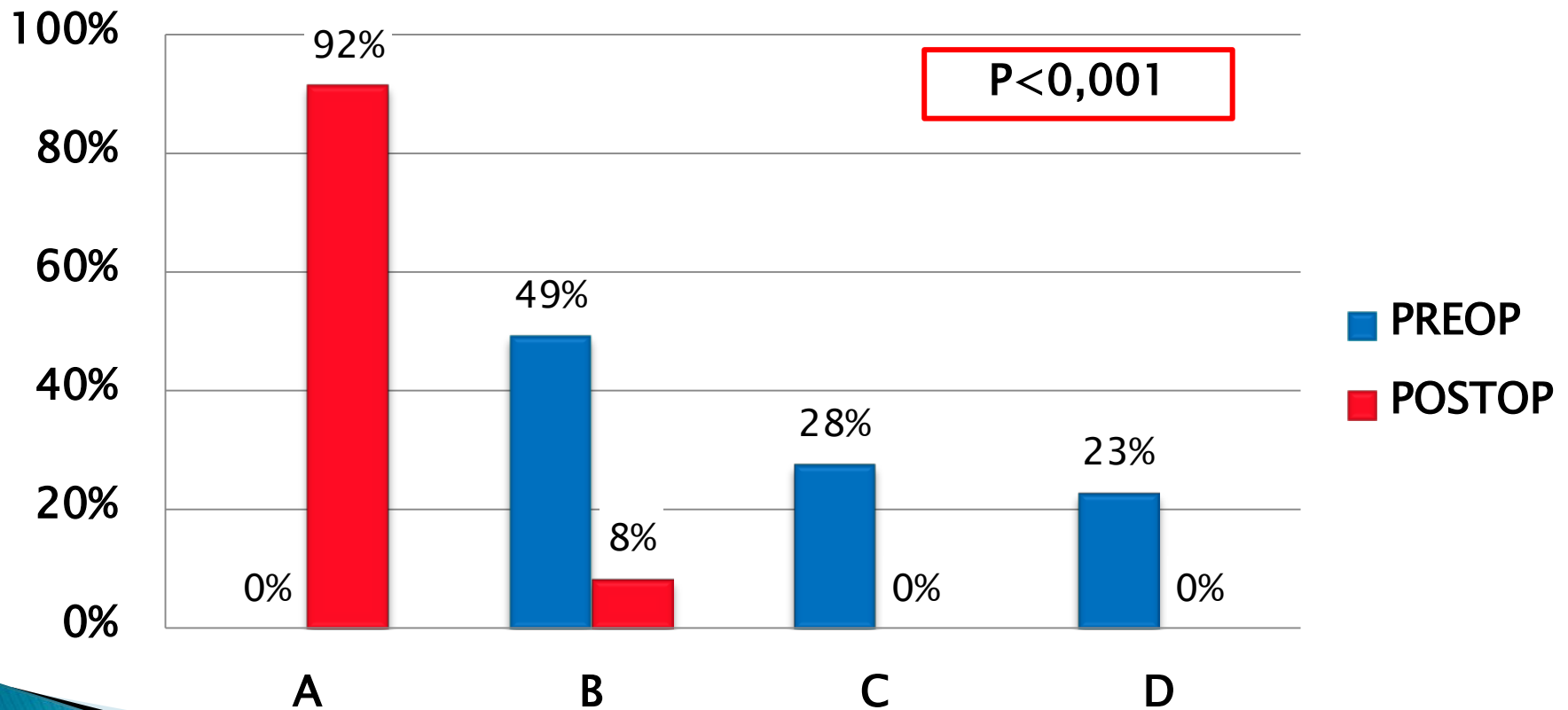
ACL + ALL reconstruction

Objective IKDC



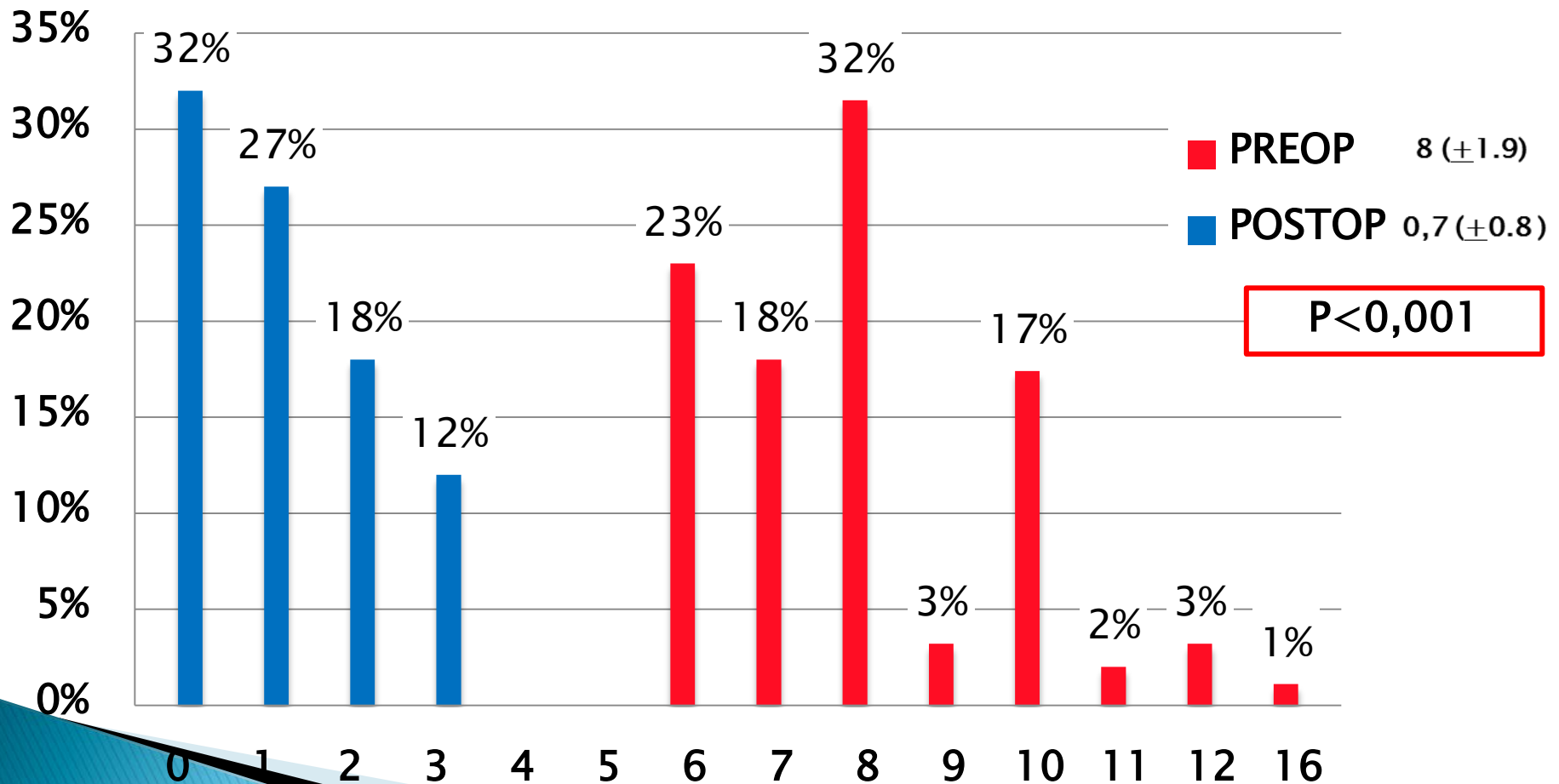
ACL + ALL reconstruction

Pivot shift



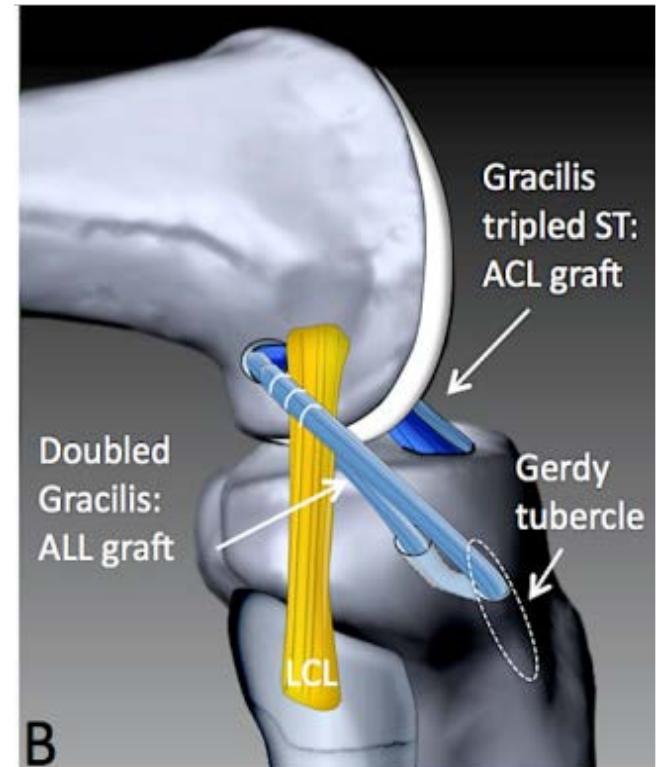
ACL + ALL reconstruction

Instrumented AP laxity side-to-side (mm)



ACL + ALL reconstruction

- No specifics complications :
 - 6 failures of meniscal suture
 - 1 cyclop syndrome
- **Full ROM +++**



ACL + ALL reconstruction

Number of patients included 92

Men/Women 68/24

Age at surgery 24 (\pm 9)

BMI 24 (\pm 2.7)

Mean follow-up (month) 32,4 (\pm 3.9)

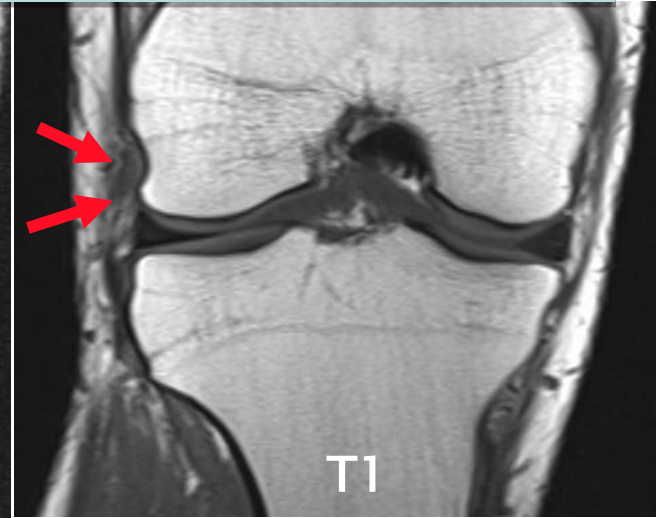
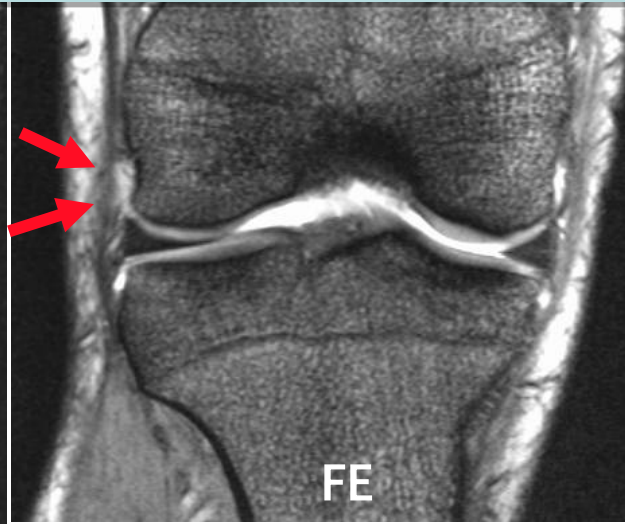
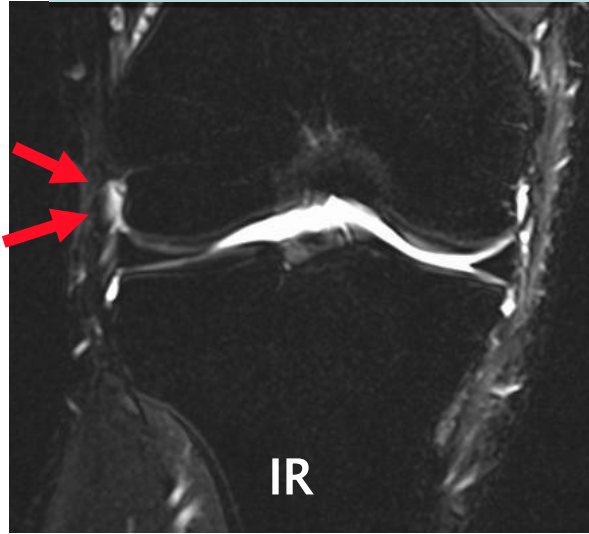
Lost for Follow-up 1

Graft rupture during the study period 1

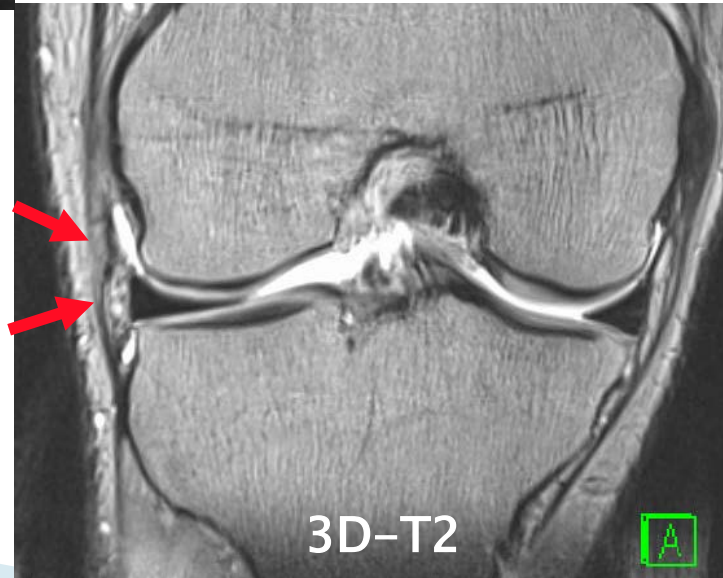
Contralateral ACL rupture 7

Number of patient for final evaluation 83

Imaging of ALL



Koichi Muramatsu MD,
Watanabe Hiroki MD,
Yudo Hachiya MD



ALL is visualized
more clearly
on **3D-T2 image**

Conclusions

- ▶ ACL R alone is not sufficient to control the rotational instability in all cases
- ▶ Double-bundle ACL reconstruction emerged in an attempt to minimize persistent rotational laxity, but to date evidence for clinical efficiency is mixed
- ▶ Increased interest for secondary restraints of the knee in particular ALL
- ▶ Debate anatomy/ isometry

« ALL needs more work to confirm »

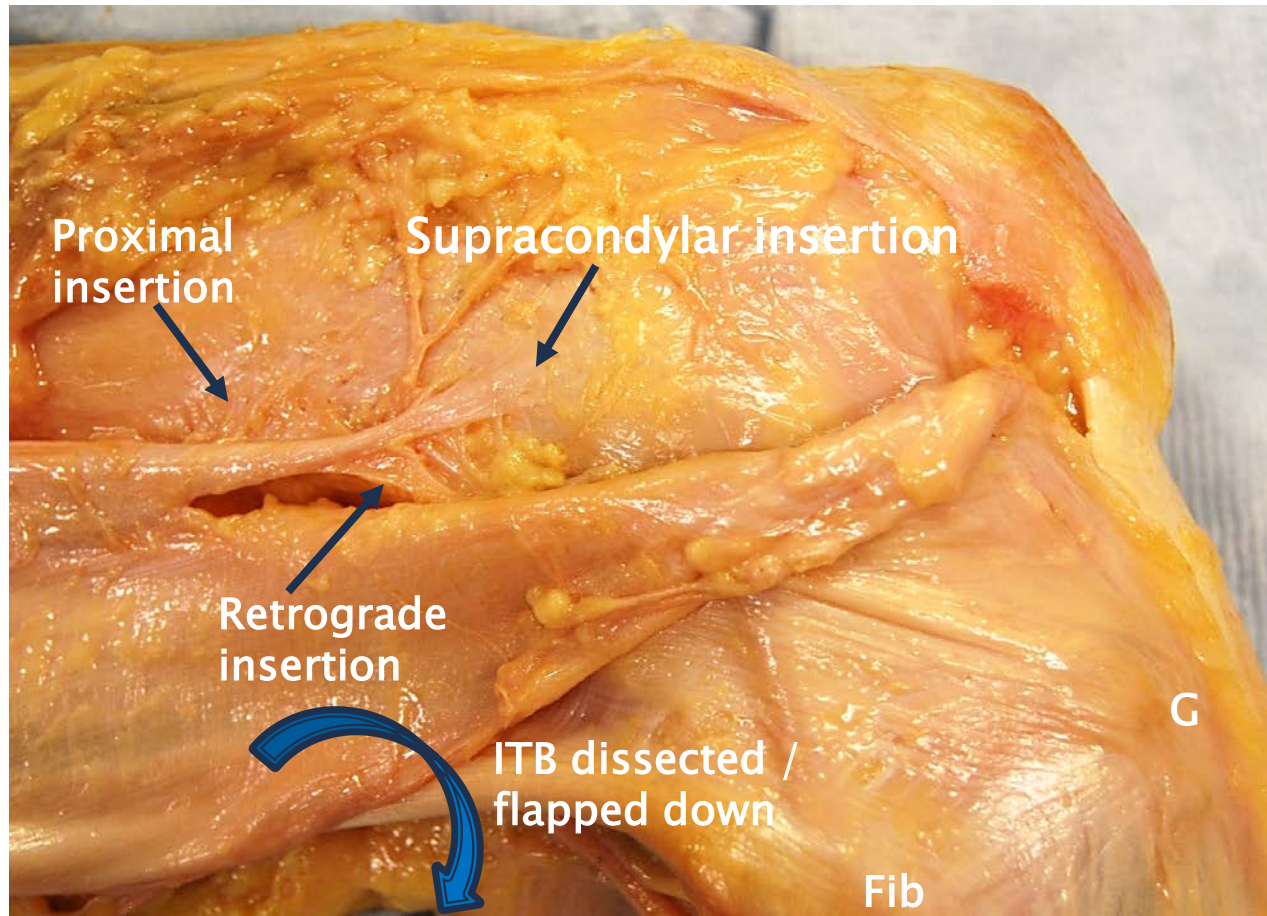
Thank you

www.centre-orthopedique-santy.com



and Welcome to Lyon

Anterolateral Structures



Courtesy

Andy Williams, Christophe Kittl, Andrew Amis