Detailed Anatomy of the Meniscotibial Ligament and Clock Face Position of Meniscal Attachments in the Tibia

Keiichi Yoshida, M.D., Ph.D.[1,2], Jun Tomura, M.D.[1], Jun Shiozawa, M.D., Ph.D.[1], Youngji Kim, M.D., Ph.D.[1], Shinnosuke Hada, M.D., Ph.D.[1], Haruka Kaneko, M.D., Ph.D.[1,2,3], Yoshitomo Saita, M.D., Ph.D.[1], Mitsuaki Kubota, M.D., Ph.D.[1,2], Muneaki Ishijima, M.D., Ph.D.[1,2,3]

[1] Department of Orthopaedics, Juntendo University Faculty of Medicine, Tokyo, Japan

[2] Department of Medicine for Orthopedics and Motor Organ, Juntendo University Graduate School of Medicine, Tokyo, Japan

[3] Sportology Center, Juntendo University Graduate School of Medicine, Tokyo, Japan

The 15th Biennial ISAKOS Congress COI disclosure

Presenter : Keiichi Yoshida

I have no financial relationships with commercial interests to disclose.

Contents lists available at ScienceDirect

The Knee

journal homepage: www.elsevier.com/locate/thekne

Detailed anatomy of the meniscotibial ligament and clock face position of meniscal attachments in the tibia

Keiichi Yoshida [a,b,*], Mitsuaki Kubota [a,b], Haruka Kaneko [a,b,c], Jun Tomura [a], Jun Shiozawa [a], Youngji Kim [a], Shinnosuke Hada [a], Yoshitomo Saita [a], Muneaki Ishijima [a,b,c]

[a] Department of Orthopaedics, Juntendo University Faculty of Medicine, Tokyo, Japan
[b] Department of Medicine for Orthopedics and Motor Organ, Juntendo University Graduate School of Medicine, Tokyo, Japan
[c] Sportology Center, Juntendo University Graduate School of Medicine, Tokyo, Japan

(Knee 2025)

Background : Meniscotibial Ligament (MTL)

- ✓Contribution to joint stability *(KSSTA 2015)*
- ✓Meniscal extrusion retracted by MTL *(Arthritis Res Ther 2017)*
- ✓Surgical methods (repair, centralization) *(Arthroscopy Tech 2018, 2021)*

detailed anatomy is still unclear

Purpose

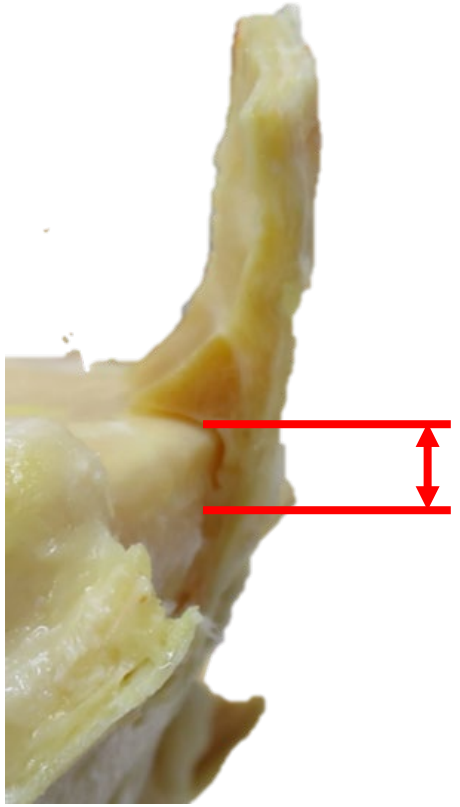
To investigate the anatomy of MTL and represent a novel method of clock face position.

Methods

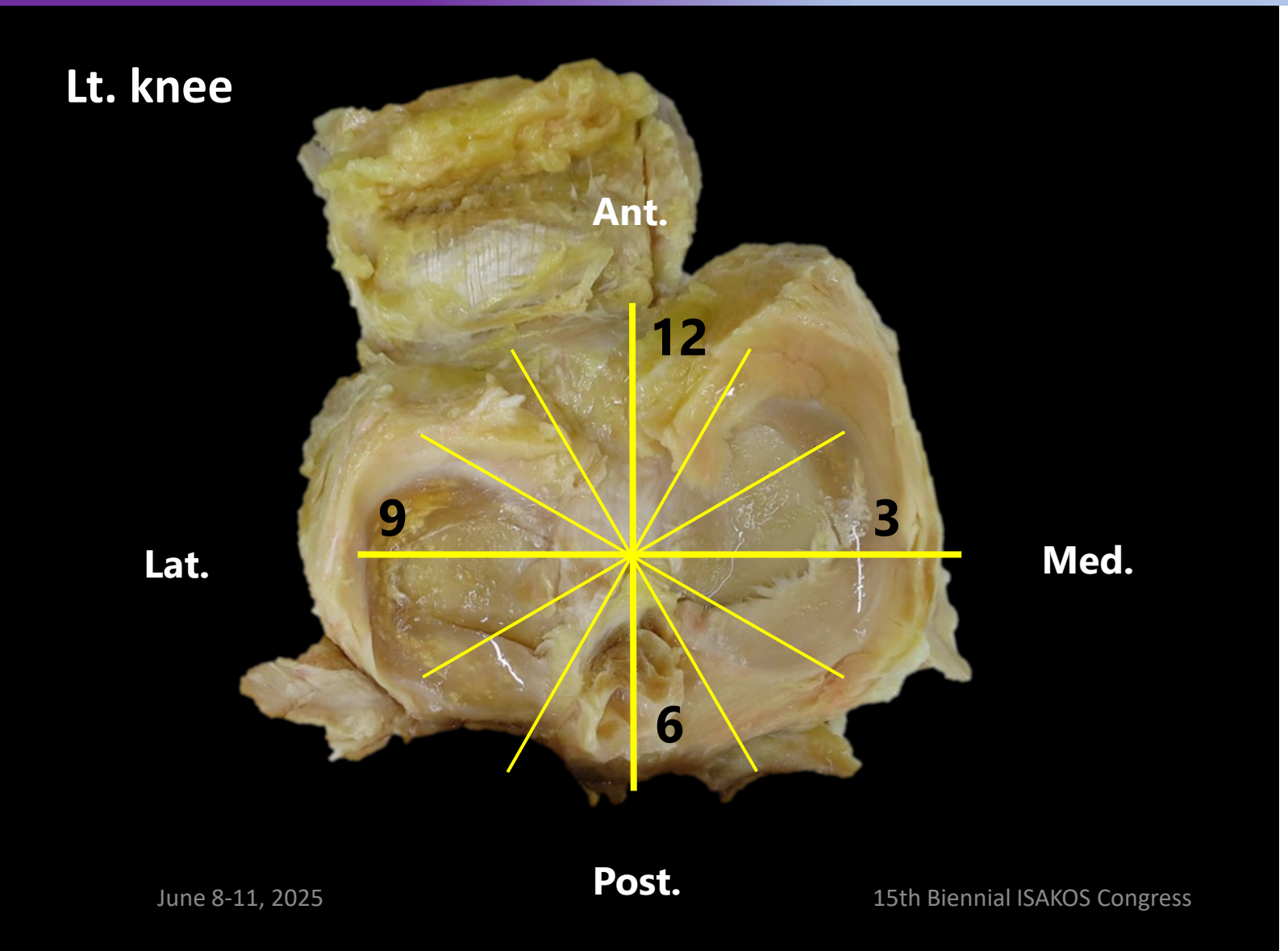
✓20 knees of the embalmed cadavers (mean 77.4 y.o.)

✓Dissection and evaluation of the MTL attachment for each clock face position (Described later)

✓Calculation of the distance from articular surface to the MTL attachment

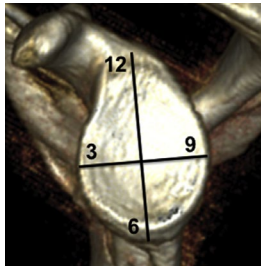


Clock Face Position



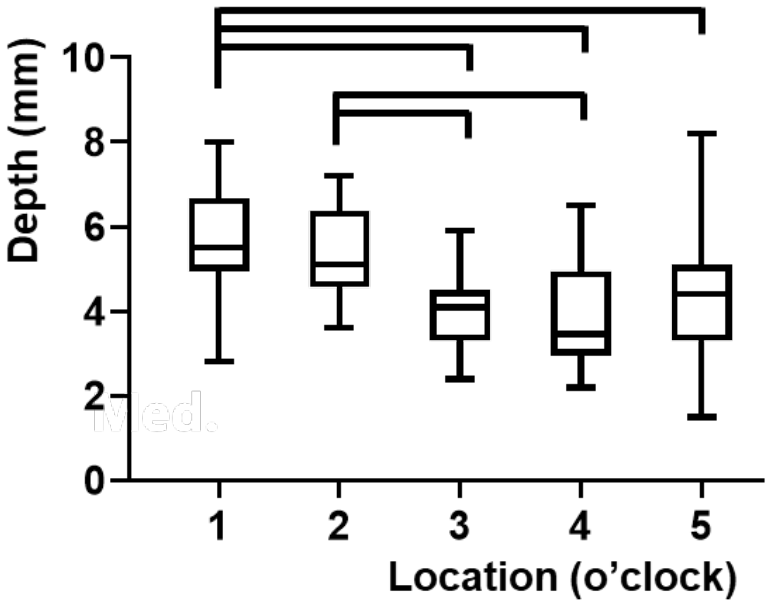
- ✓AP: Akagi Line
- ✓ML: maximum diameter
- ✓We defined the clock face position (as shown) applying the shoulder surgery.

(Arthroscopy 2015)

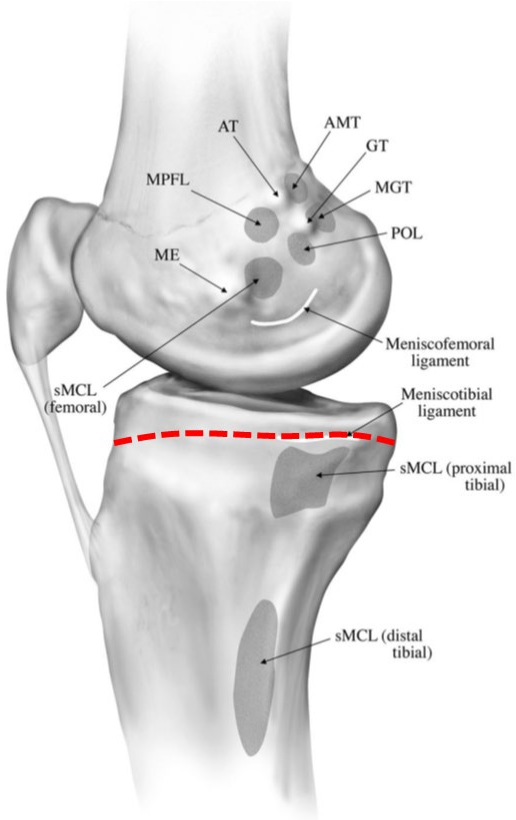


Results

Medial MTL



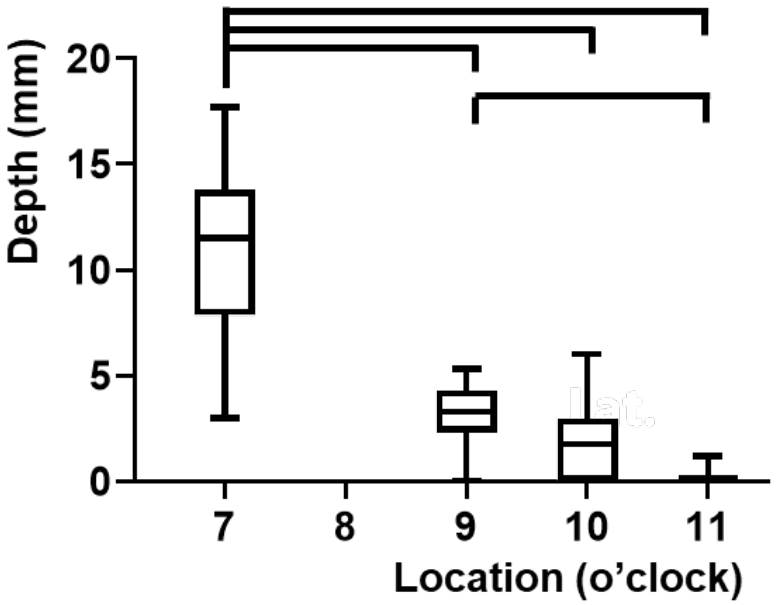
(one-way ANOVA, $p<0.05$)



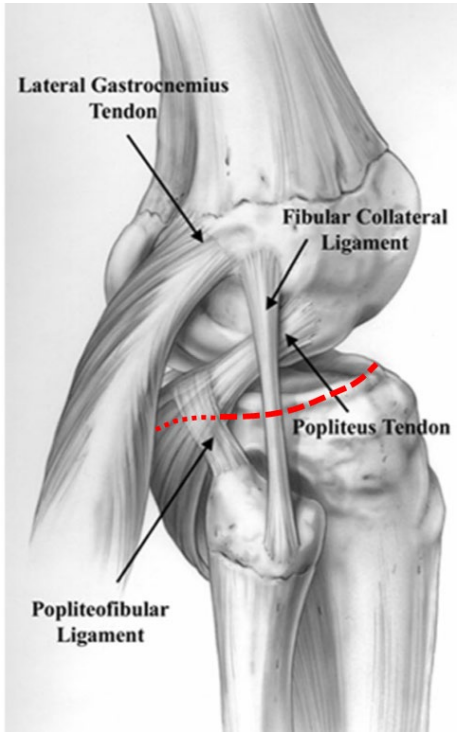
- ✓1 o'clock position was the furthest to the joint surface
- ✓4 o'clock position was the closest to the joint surface
- ✓At all time position, the medial MTL were attached to the side wall

Results

Lateral MTL



(one-way ANOVA, p<0.05)



- ✓7 o'clock position was the furthest to the joint surface
- ✓11 o'clock position was the closest to the joint surface
- ✓MTL attached on the edge or surface at the 9, 10, 11 o'clock positions
- ✓No attachment was seen due to the popliteal fossa at 8 o'clock position

Discussion

✓Previous report about MTL anatomy

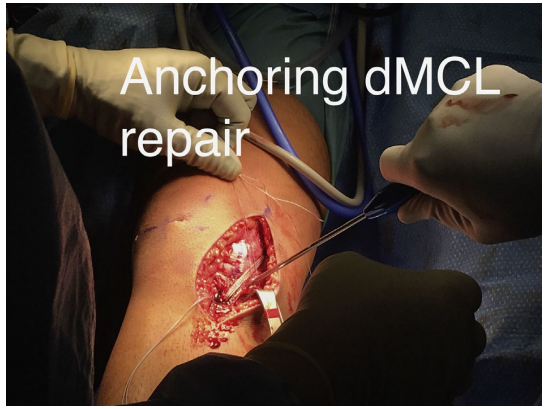
- attached just distal to the edge of the articular cartilage of the tibial plateau *(Am J Sports Med 2014)*
- a fibrous band that originates in the tibia and is inserted in the lower portion of the menisci *(Rev Bras Orthop 2023)*

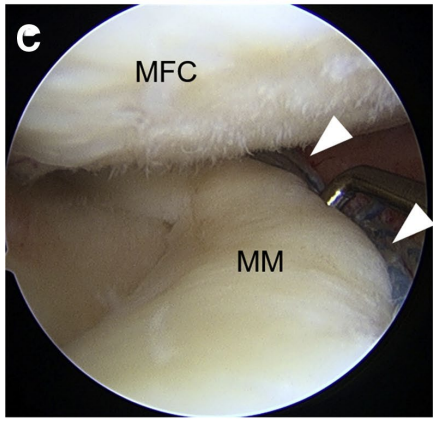
No precise anatomy has been reported before this study

Discussion

✓Surgical modalities for MTL

- MTL repair *(Arthroscopy Tech 2018)*
- Centralization *(Arthroscopy Tech 2021)*





"Anchors should be inserted at the edge of the medial tibial plateau"

The results of this study suggest that Anchors inserting the side wall of the tibial plateau (especially in the medial) could be more anatomical

Limitation

- ✓cadaveric study
- ✓clinical verification should be needed
- ✓limited sample size
- ✓advanced age population

Conclusion

- ✓This study examined the detailed anatomy of the MTL and introduced a method known as the clock face position.
- ✓The medial MTL was not attached to the articular surface, whereas the lateral MTL was more anteriorly attached to the articular surface.

References

Hada, Arthritis Res Ther 2017;19:201.
Peltier, Knee Surg Sports Traumatol Arthrosc 2015;23:2967–73.
Black, Arthrosc Tech 2018;7:e1215–9.
Koga, Arthrosc Tech 2021;10:e639–45.
Akagi, Clin Orthop Relat Res 2005;436:172–6.
Itoigawa, Arthroscopy 2012;28:1628–33.