

Ramp Lesion : Bomechanics

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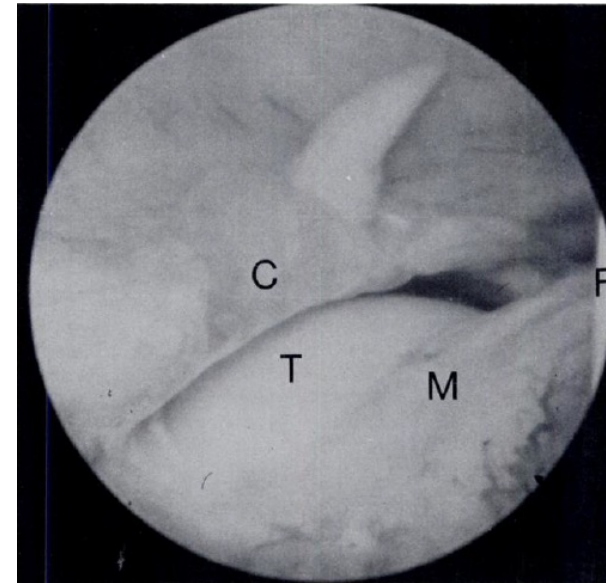
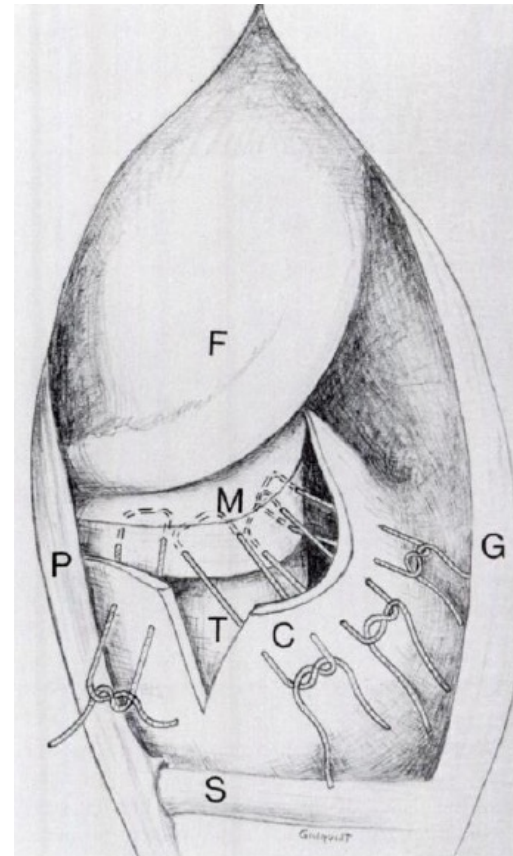
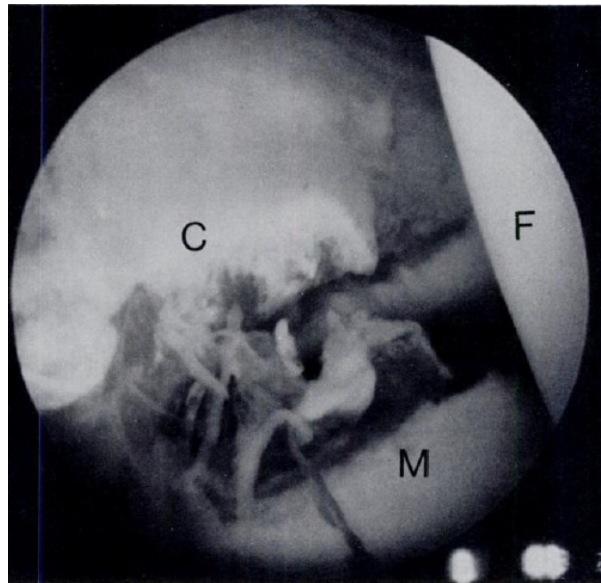
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Ramp : History

Hamberg P, Gillquist J, Lyholm J, JBJS 1983



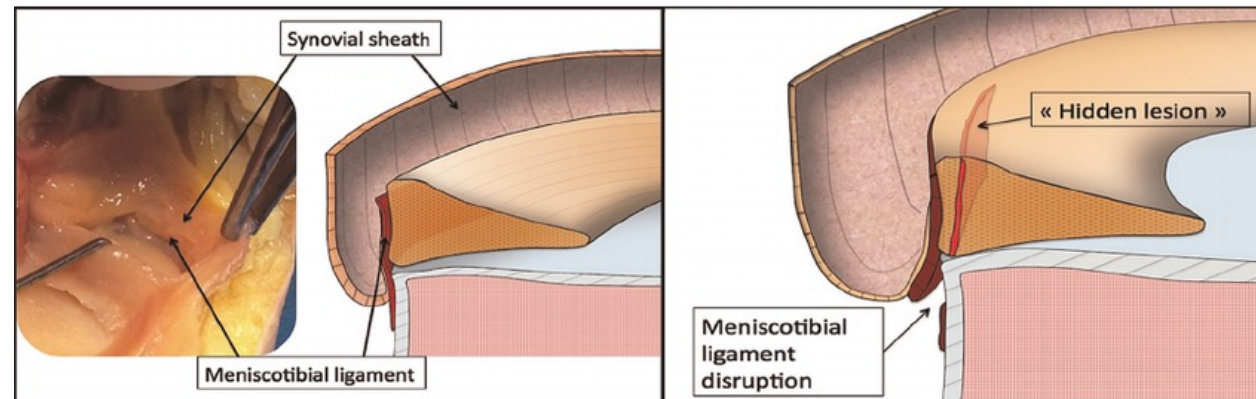
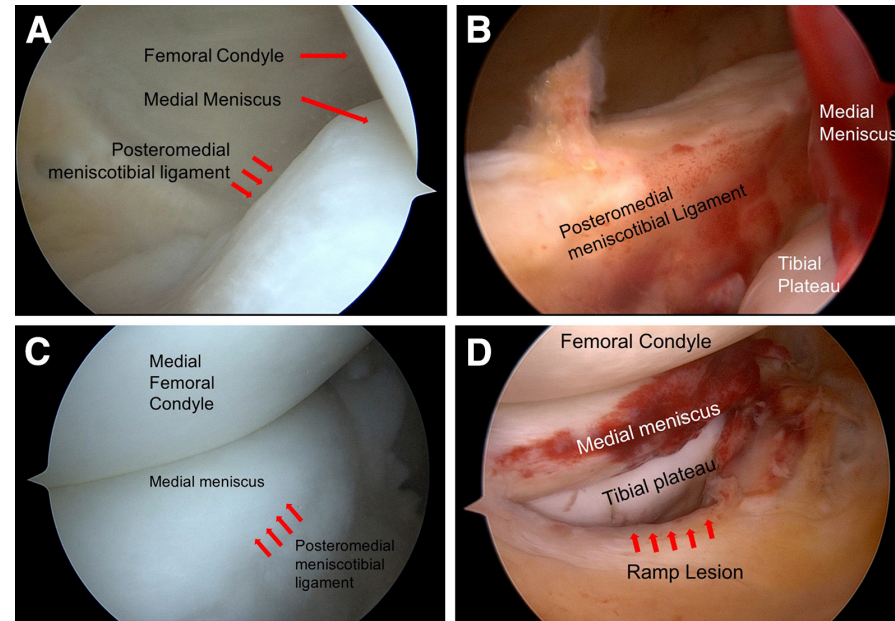
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Suture of New and Old Peripheral Meniscus Tears

BY PER HAMBERG, M.D.*, JAN GILLQUIST, M.D., PH.D.*, AND JACK LYSHOLM, M.D., PH.D.*, LINKÖPING, SWEDEN

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Meniscal Ramp Lesions - posterior horn tear?



How common are ramp lesions?

- Bollen et al
 - 183 consecutive ACLR
 - **9.3%**
- Liu et al
 - 868 consecutive ACLR
 - **16.6%**
- More common in **chronic ACL, age < 30, contact injury**



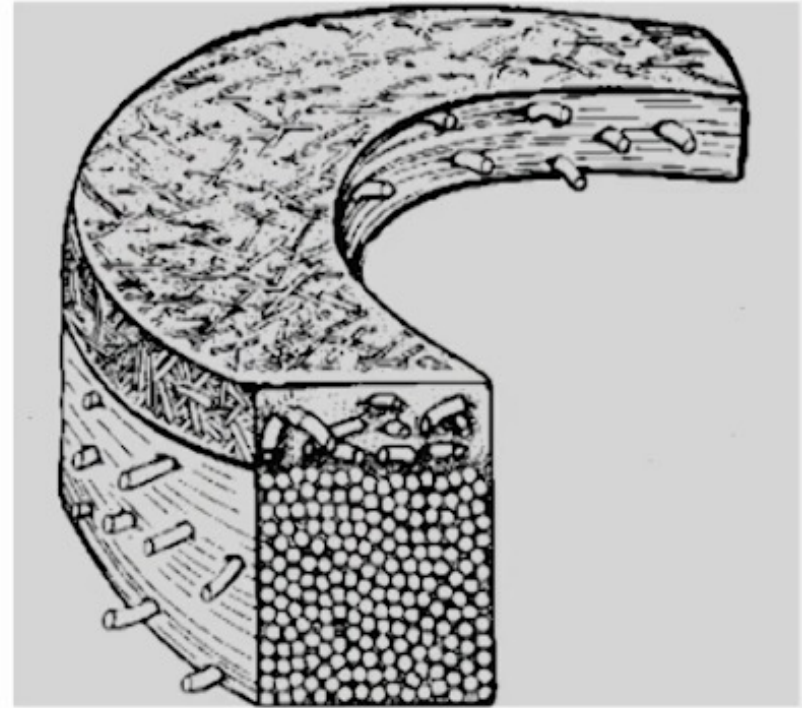
Frequency of anterolateral ligament tears and ramp lesions in patients with anterior cruciate ligament tears and associated injuries indicative for these lesions—a retrospective MRI analysis

Nikolaus Stranger¹, Christian Kaulfersch², Georg Mattiassich², Jürgen Mandl³, Peter A Hausbrandt³, Dieter Szolar⁴, Helmut Schöllnast^{5 6}, Manfred Tillich⁴

- Reviewed MRI of 164 ACL tear
- ALL tears and RL combined were detected in 28 patients (17.1%)
- ALL tears in 48 patients (29.3%)
- RL in 54 patients (32.9%)

Why are these important?

- Meniscus is an important shock absorber
- **Secondary stabilizer**
- ACL injury increases MM forces **200%**
- MM deficiency increases ACL forces by **33-50%**



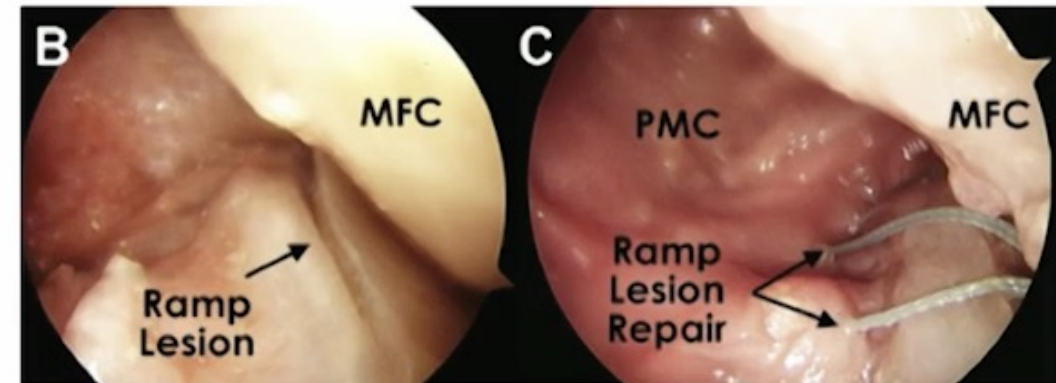
Effect of Meniscocapsular and Meniscotibial Lesions in ACL-Deficient and ACL-Reconstructed Knees

A Biomechanical Study

Nicholas N. DePhillipo,^{*†} MS, ATC, OTC, Gilbert Moatshe,^{†‡§} MD, PhD, Alex Brady,[†] MSc, Jorge Chahla,[†] MD, PhD, Zachary S. Aman,[†] BA, Grant J. Dornan,[†] MS, Gilberto Y. Nakama,[†] MD, Lars Engebretsen,^{†§} MD, PhD, and Robert F. LaPrade,^{*†||} MD, PhD

The American Journal of Sports Medicine
2018;46(10):2422–2431
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- Meniscocapsular lesions of posterior horn MM increased anterior tibial translation, IR, ER and pivot shift in ACL-def knees
- Pivot shift not restored with ACLR alone
- Restored with ACLR+MM repair



Biomechanics of Ramp Lesions ?

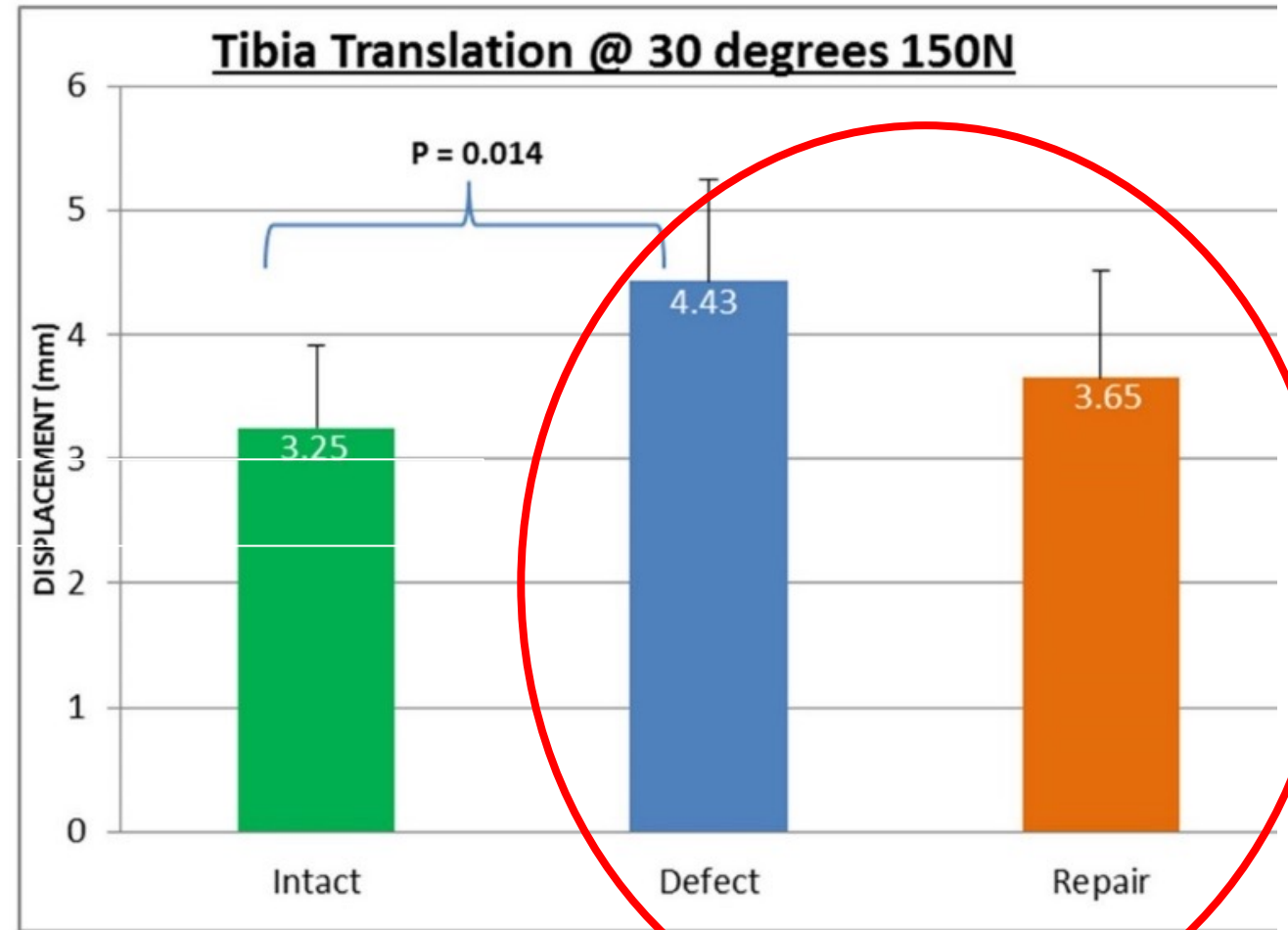
Ahn JH et al. *AJSM* 2011

Cory Edgar, Robert Arciero et al. *AAOS* 2015

A Peltier, T Lording, S Lustig et al. *KSSTA* 2015

JM Stephen et al. *AJSM* 2016

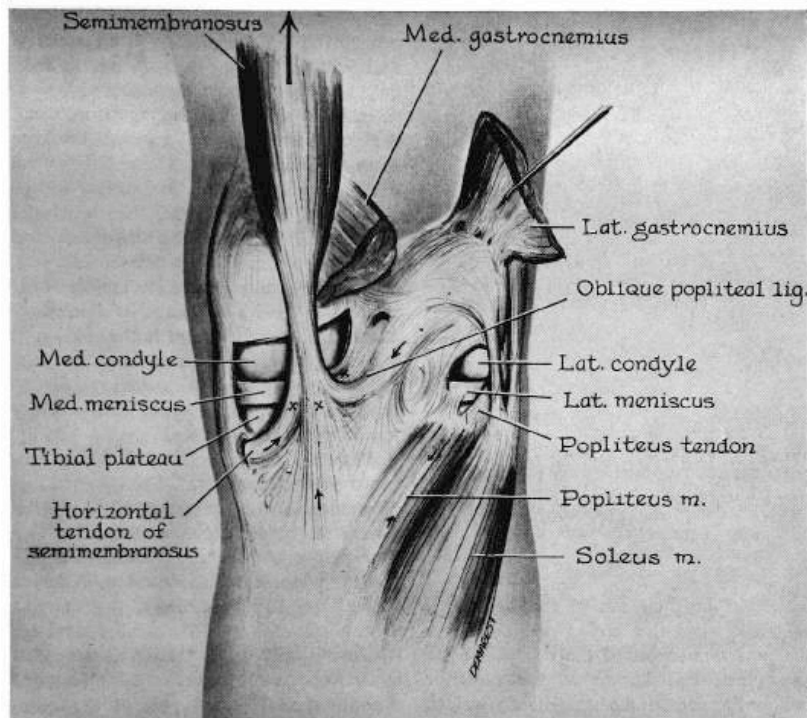
DePhillipo NN et al. *AJSM* 2016



Biomechanics of Ramp = Postero-medial Instability

Some Aspects of Functional Anatomy of the Human Knee Joint

EMANUEL B. KAPLAN, M.D.*

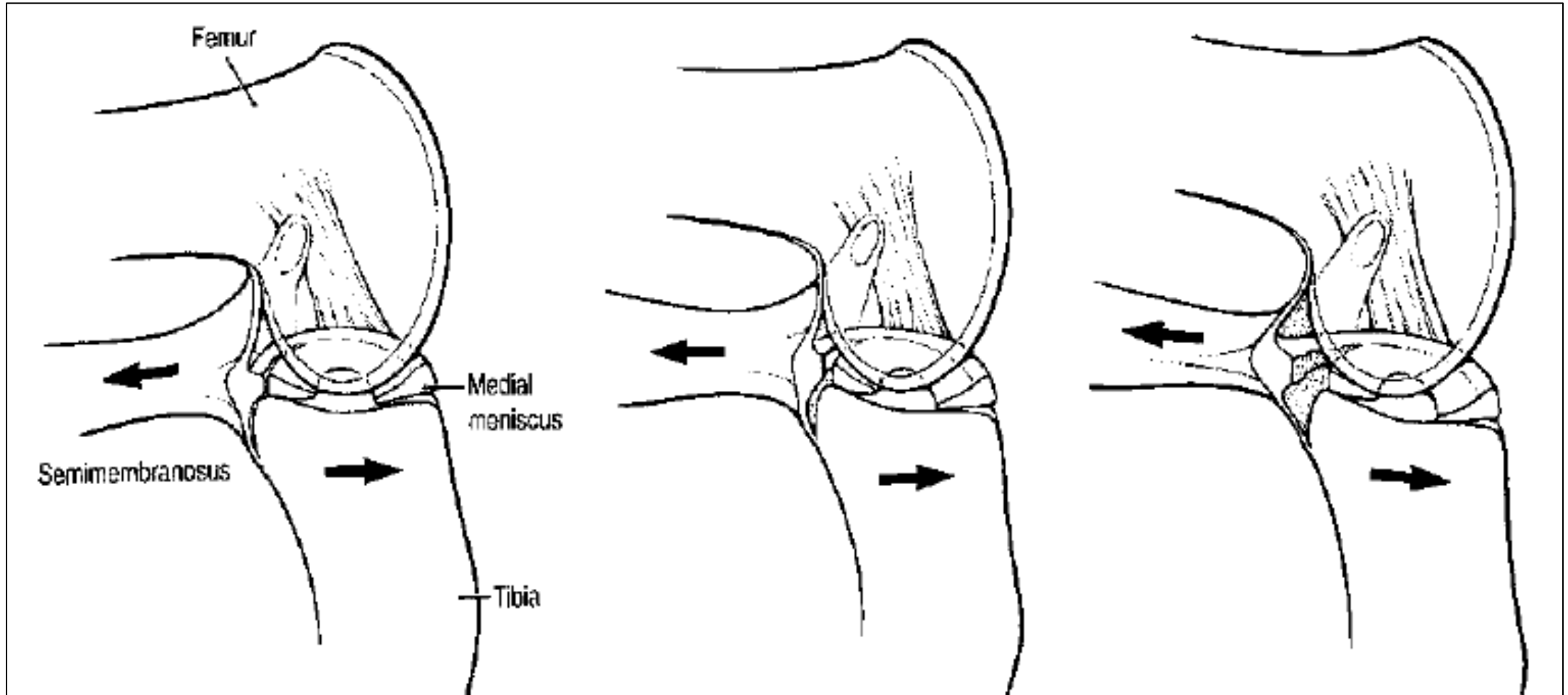


This experiment confirmed the experiments on anatomic material and proved that the semimembranosus was attached posteriorly to the medial meniscus and, also, that through this attachment it produced a posterior displacement of the meniscus in flexion of the knee. Thus, it is evident that the posterior displacement of the medial meniscus is due not only to its passive displacement by the condyles of the femur but also to the active contraction and pull of the semimembranosus.

Some aspects of functional anatomy of the human knee joint.

Kaplan EB. Clin Orthop. 1962

Biomechanics of Ramp = Postero-medial Instability



Hughston JC: Knee Ligaments: Injury and Repair. St
Louis, Mosby-Year Book, 1993

Conclusion

- Medial meniscus Ramp lesion repair is key to prevent anterior Tibial translation
- Ramp lesion plays important role in postreior medial instability
- Beware of concomitant injury of ACL, Ramp lesion and ALL