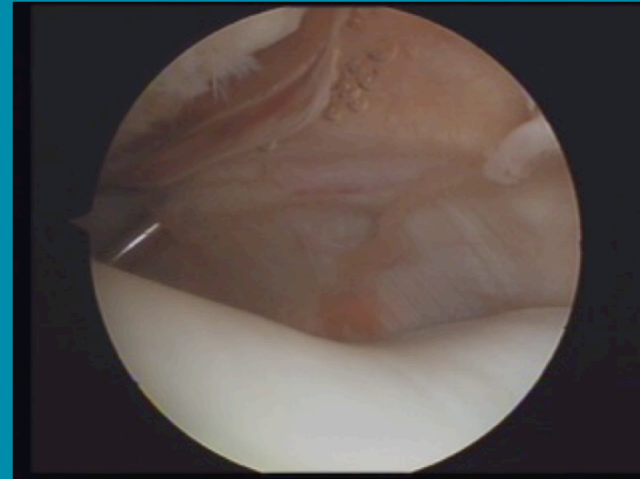


Patellofemoral Instability in the Pediatric and Adolescent Patient



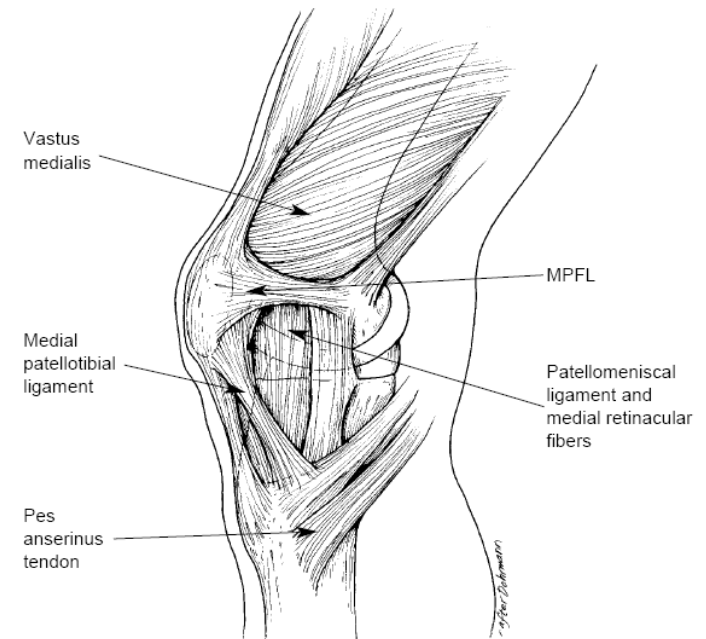
Michael Saper, DO, ATC, CSCS

Assistant Professor, Orthopedics and Sports Medicine

Updated April 25, 2019

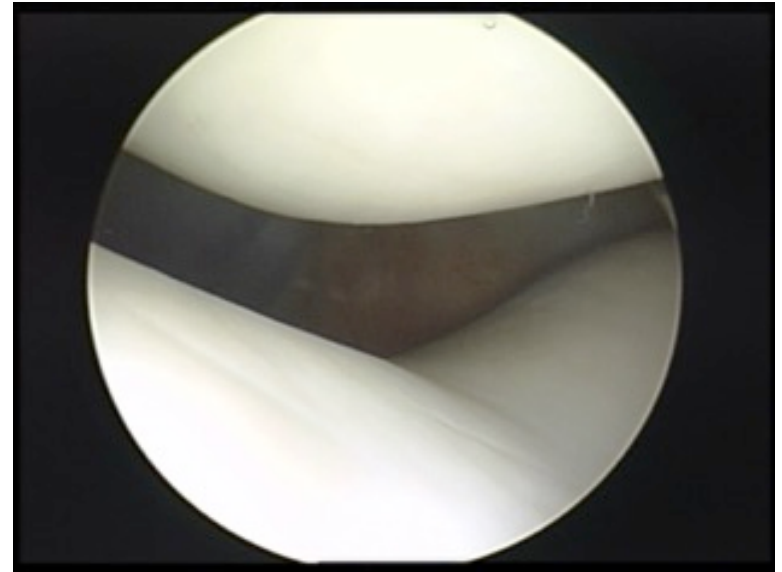
Anatomy- Trochlea

- Patella = “knee cap”
- Trochlea = “groove”
- Cartilage on surface of bones
 - Often injured with dislocation
- MPFL = main stabilizing ligament
 - Torn/stretched with dislocation



Normal relationship between knee cap and groove

- The MPFL prevents the knee cap from dislocating during the first 30 degrees of knee bend
- By **45 degrees**, the knee cap is **contained** in the groove
- Changes in normal anatomy can lead to instability



Altered Anatomy– Increased Femoral Anteversion



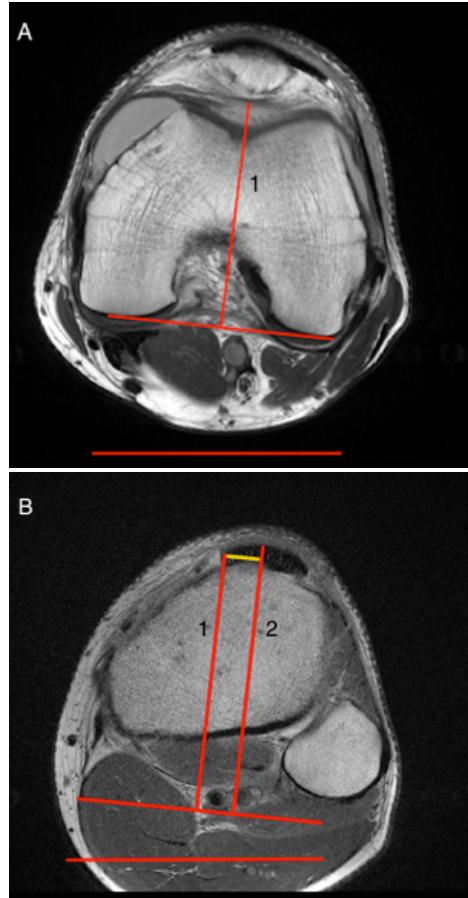
- Attachment of patella tendon too far to the outside of leg.
- As thigh muscles straighten leg, knee cap is pulled to the side out of the groove.

Altered Anatomy– Genu Valgum (knock knee alignment)



- Attachment of patella tendon too far to the outside of leg.
- As thigh muscles straighten leg, knee cap is pulled to the side out of the groove.

Altered Anatomy– Increased TT-TG distance



- Attachment of patella tendon too far to the outside of leg.
- As thigh muscles straighten leg, knee cap is pulled to the side out of the groove.
- Risk higher if distance > 16 mm



Altered Anatomy– Patella Alta

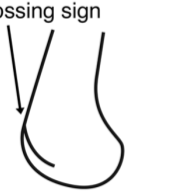

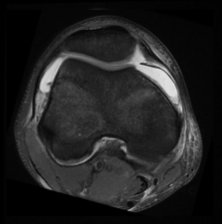



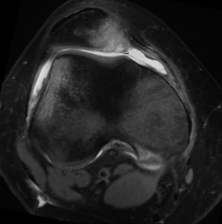



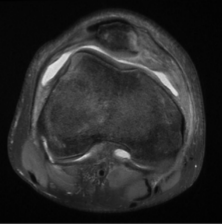
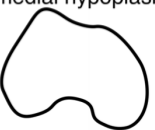
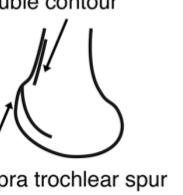

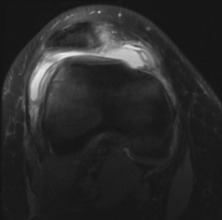



Normal

Alta

- Knee cap too high
- More knee bend required to get knee cap in the groove

Altered Anatomy– Trochlea Dysplasia (flat groove)

	Radiographic Dejour		MRI Dejour	
Type A	crossing sign 			shallow trochlea >145° 
Type B	supra trochlear spur 			flat trochlea 
Type C	double contour 			lateral convexity medial hypoplasia 
Type D	double contour supra trochlear spur 			cliff 

- Varying severity
- Groove not deep enough to contain knee cap



Risk for Recurrence After First Dislocation Without Surgery

Jaquith and Parikh *JPO* 2017

- Trochlea dysplasia
- Patella Alta (CDI > 1.45)
- Skeletal Immaturity
- Contralateral dislocation

4/4 = 88%

3/4 = 75%

2/4 = 30%

1/4 = 14%

Lewallen et al. *AJSM* 2013

- 38.4% overall recurrence
- Open physes + dysplasia = 69% failure of non-op treatment

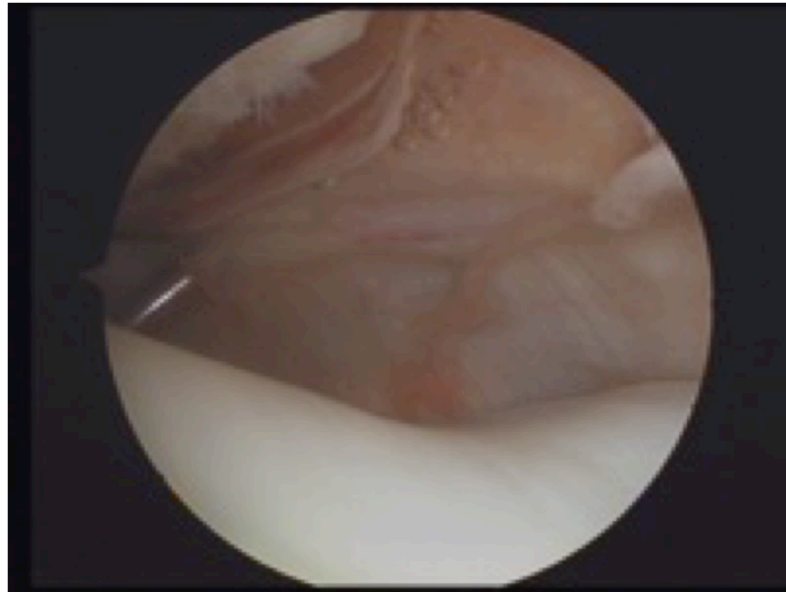
Treatment Algorithm – Step # 1

- **Correct malalignment (if needed)**
 - Guided growth vs. osteotomy



Treatment Algorithm – Step # 2

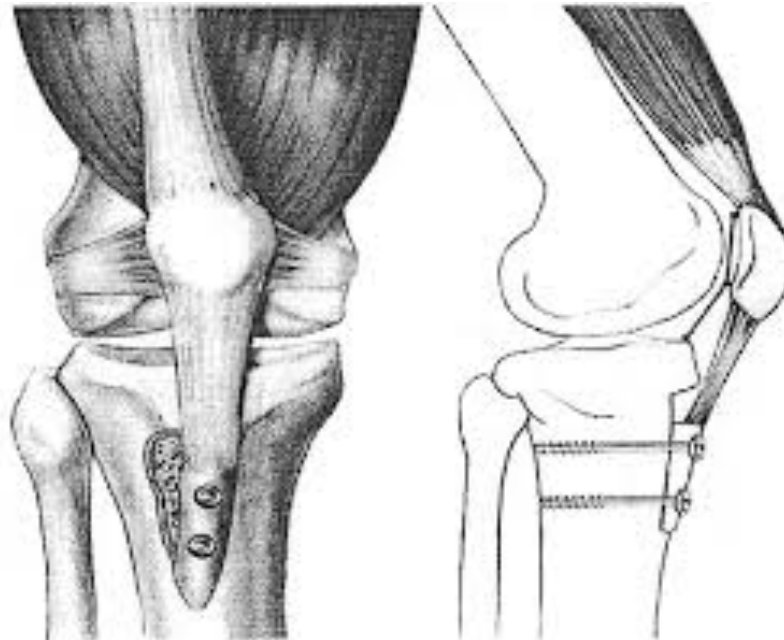
- **Arthroscopic evaluation**
 - Address chondral/osteochondral injury



Treatment Algorithm – Step # 3

- **Patella Realignment**

- Lateral release with repair to get knee cap in center of groove
- Tibial tubercle transfer (if needed)



My Preferred Technique– Step # 3

A Modified Osteotomy for Anteromedialization of the Tibial Tubercle

Michael G. Saper, D.O., Benjamin A. Cox, D.O., and David A. Shneider, M.D.

[https://www.arthroscopytechniques.org/article/S2212-6287\(17\)30088-9/addons](https://www.arthroscopytechniques.org/article/S2212-6287(17)30088-9/addons)

Treatment Algorithm – Step # 4

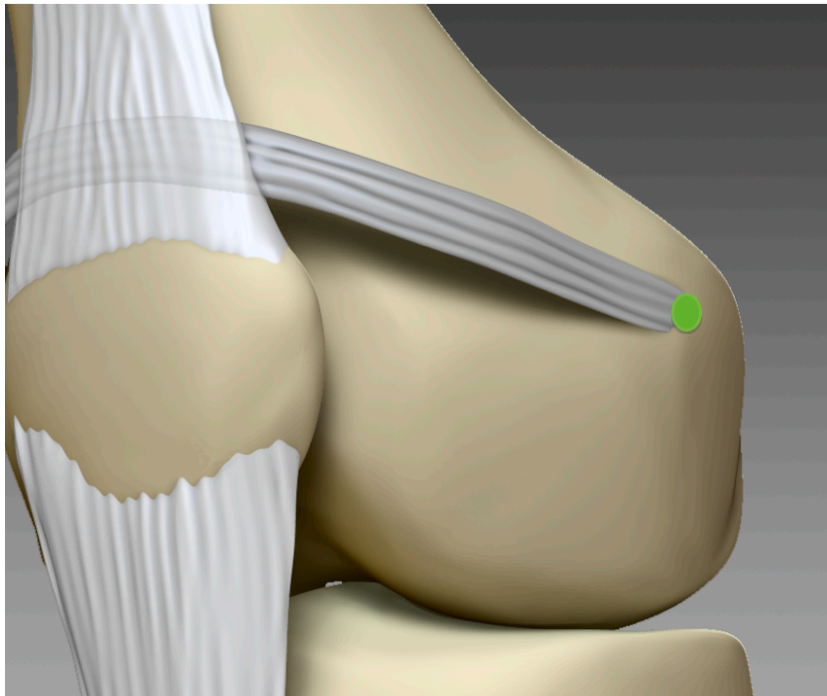
- Trochleoplasty (if needed)
 - Deepen the groove



Treatment Algorithm – Step # 5

- **Stabilize Patella**

- MPFL reconstruction vs. medial plication (in very young patients)



- Cadaver hamstring (allograft) tendon is used to replace the torn MPFL

Rehabilitation

-
- WBAT or TTWB
 - Knee brace until adequate quad strength regained
 - Usually 6 weeks
 - Encourage **range-of-motion** exercises
 - **Healing** typically at **3 months**
 - **High-loading / return to sport activities at 6-12 months**

Rehabilitation and Return to Sports

Return-to-Sport Testing After Medial Patellofemoral Ligament Reconstruction in Adolescent Athletes

Michael G. Saper,^{*†‡} DO, ATC, CSCS, Peter Fantozzi,[§] Viviana Bompadre,[†] PhD, Mimi Racicot,^{||} PT, DPT, SCS, and Gregory A. Schmale,^{†‡} MD

Investigation performed at the Department of Orthopedics and Sports Medicine, Seattle Children's, Seattle, Washington, USA

May need **prolonged rehab** programs **beyond 8 months**

Conclusions

- Goals = remove diseased tissue, stabilize knee cap, preserve the joint
- Surgery results in improved outcomes
- Treatment of underlying risk factors is key
- Slow, progressive rehabilitation
- Return to sports (6-12 months)

Contact:

www.sapersportsmed.com

@DrMichaelSaper