

## Patellofemoral Update 2018

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## Disclosures

- The authors have nothing to disclose related to this presentation

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Non operative treatment works for most PF pain patients and about 50% of patella instability patients

- Diminish/Abolish Pain and Swelling
  - Manual Treatment
  - Taping
  - Modalities\
  - Bracing
  - Importance of time and restoration of homeostasis- DYE



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### Importance of rotational stability- TEITGE

- **Hip and core Strengthening are a must!** Poor Hip Control/Stability changes knee positioning- *Assess Hip Strength and Dynamic Knee Stability with movement/functional activities*
- Many pt's have difficulty with transverse and frontal plane control, as well as the hip's ability to eccentrically control the valgus moment at the knee produced by hip adduction and IR
  - A main focus should be on strength of Hip Abductors and ER's

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### Hip/ Pelvic Stability Examples



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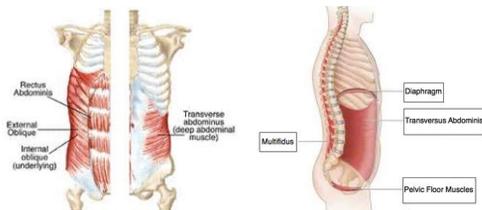
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### 5- Core Control/ Stability



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### Core Control/ Stability

- Core stability begins with good posture/alignment and diaphragmatic breathing
- Research shows that timing of firing of Traverse Abdominus muscles was a key factor in Core Stability
  - **Current research shows TA's are turn on better with hard exhalation vs. drawing the belly in toward the spine!**

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### Core Control/ Stability

- There are so many exercises for core stability, Bridges, Planks, Dead Lifts to just name a small few
  - They can be advanced with use of Bands, Balls, unstable surfaces, combination of movements, decreasing base of support, etc.




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### Patellofemoral Pain

- Exhaustive examination
- Look for the locus of pain origin
- Selective injections help
- Identify referred pain
- Look for iatrogenic medial instability
- Unload and stabilize painful articular lesion
- Release/resect painful retinacular lesion
- Don't assume it is "in their head" Chronic disability makes some people crazy

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**When exhaustive non operative measures fail**

Limited intervention arthroscopic treatment may include chondroplasty and/or lateral release for documented patella tilt and pain

Tibial tubercle transfer medially when there is a lateral tracking vector. TT-TG measurement and Q angle are helpful but should be used only in conjunction with a full understanding of the patella alignment and trochlea dysplasia

Painful distal and/or lateral patella articular lesion and lateral tracking/elevated TT-TG UNLOAD with anteromedial tibial tubercle transfer.

Slight distalization for alta >1.4 C-D ratio

MQTFL reconstruction is safer than MPFL reconstruction for medial stabilization

- Use objective measurements and careful observation to plan specific correction of pathologic factors.

**Optimize alignment, unload articular lesions and restore retinacular supports**

- Once balanced tracking and restoration of medial support are restored, trochleoplasty is rarely needed

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Before reconstruction, assure central tracking vector of the extensor mechanism



Do not add load to this!!!

Tibial tubercle transfer to get the patella aligned into the central trochlea and also to unload lateral and distal patella articular lesions

Medial tibial tubercle transfer to align only



Anteromedial tibial tubercle transfer to align and also unload painful distal patella articular lesion




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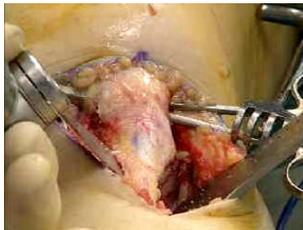
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**Anteromedial tibial tubercle transfer**

First, if needed, optimize alignment and unload distal and lateral patella articular lesions before undertaking medial side reconstruction/stabilization. Important for pain relief



Tibial tubercle transfer to align tracking

Medial reconstruction to provide support for patella




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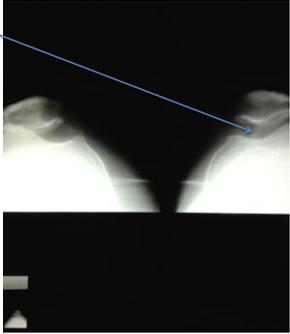
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**Left knee S/P AMZ 29 yrs**

Correct alignment before medial reconstruction. Do not use a medial reconstruction of any kind to move the patella. Medial reconstruction is appropriate only to restore support.

Tibial tubercle transfer is the best way to restore optimal PF tracking and unloading of articular lesions selectively



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**Distalization?**

We do not understand the forces involved in distalization, and while the procedure has appeal for patients with patella alta, evidence of long term efficacy and/or safety of distalization is yet to be established. Useful in very selected cases

Do not overdo this!!!



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**Distalization**

I recommend slight distalization when the Caton-Deschamps ratio is >1.3-1.4. Take C-D ratio to 1.0-1.1 NO MORE!!!!

Patellar height measurement methods

Arch Orthop Trauma Surg, 21

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**Options for medial side PF reconstruction**

**Arthroscopic Imbrication** has a place for limited needs when good trochlea support and tracking alignment is optimal. More risk of stretching out

**Open Imbrication** adds some security because the tissue to be imbricated can be evaluated for integrity and suturing may be more secure

**MPFL Reconstruction** is very reliable, properly done but has risk of patella injury or fracture

**MQTFL Reconstruction** is safer and anatomically accurate

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MQTFL originates on the femur just proximal to the MPFL at the adductor tubercle

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Anatomy of the medial knee extensor mechanism restraint reveals a major component running from the adductor tubercle directly into the medial quadriceps tendon. Medial PF anatomy is complex and variable. **IMUCH MORE THAN THE MPFL!!** This specimen and many that we have dissected, show a more prominent MQTFL! See Mochizuki, Baldwin, Smigielski, Tanaka others who have studied this anatomy  
*Tanaka et al, JBJS, July 2016*



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This is the medial retinaculum viewed from the deep side.

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**Smigielski**

Medial patellofemoral complex (MPFC)



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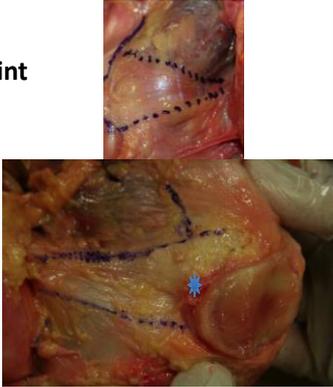
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**Tanaka's Point**

Midpoint of the MPFC

JBJS, July 2016,



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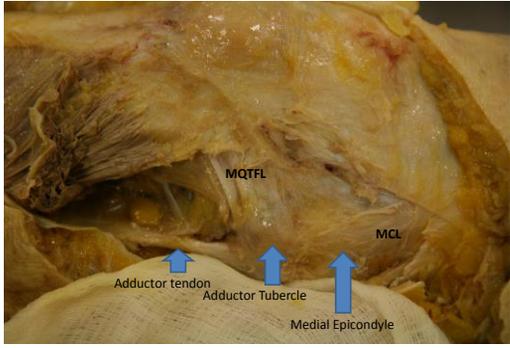
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**Femoral fixation site must be correct**

Bollier, Tanaka, Servien, Parikh, Lattermann and others have reported numerous problems including patella fractures, failed MPFLR, and patella articular destruction from inaccurate femoral fixation



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All reconstructions must be anatomically accurate

Make incisions as large as necessary to assure full understanding of the anatomy

Adductor tendon is the guide to success, not xray

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Adductor longus tendon insertion isolation



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**MQTFL RECONSTRUCTION:** The graft is secured at the anatomic MQTFL origin just off the adductor tubercle, adjusting the length to reproduce anatomic tracking of the patella centrally in the trochlea, after balancing alignment by tibial tubercle transfer when appropriate



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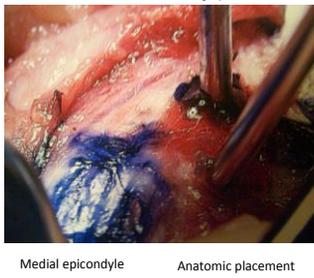
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**Beware of radiographic criteria for femoral socket**

We have found that radiographic criteria for femoral MPFL/MQFL socket location are usually off from precise anatomic localization of the best socket location (average 8 mm). Sanchis Alfonso has proven this. Radiographic criteria are helpful to identify the region for socket location, but anatomic criteria are imperative for consistent precise placement of the femoral socket for MPFL or MQTFL graft. ZIEGLER (2016 AJSM)



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**Do not rely on radiographic criteria alone for femoral fixation location**

- “None of the standard radiologic methods allowed a precise anatomic femoral placement. Conventional radiographic identification of the femoral graft placement site is only an approximation and should not be the sole basis for femoral attachment location” (Sanchis Alfonso KSSTA 2015)

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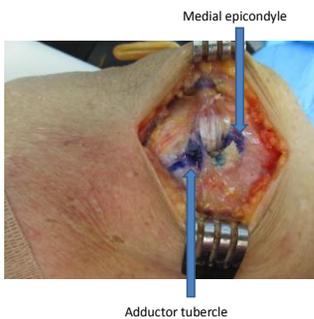
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**Femoral side fixation**

Graft secured on femoral side with anchor posterior to graft



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**Anatomic alternative to MPFL Reconstruction**

The graft is pulled up **under the VMO** and passed directly into the distal quadriceps tendon where it is sutured securely to vastus intermedius to reconstruct the MQTFL. No patella drilling and anatomic



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**The graft is secured through and into the distal medial quadriceps tendon just above the patella**



Graft tensioned to maintain patella in central trochlea throughout flexion and extension (monitor arthroscopically) and then sutured into place securely with Ultrabraid sutures (Smith and Nephew, Andover, MA) which make softer and more secure knots when compared to alternative products (such as fiberwire)

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**Data on isolated MQTFL Reconstruction for recurrent subluxation and patella dislocation (June 2014)**

- Average age 19.5
- 29 patients >1year, 22 patients >2 years.
- Average 38 month follow up
- This group had normal alignment and no indication for tubercle transfer
- 100% no redislocation >2 years, 14% experienced mild instability/subluxation
- 93% satisfaction, 90% returned to desired level of sport

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Avoid patella fracture as reported by multiple authors (Tanaka, Bollier, Cosgarea, Gomes, Parikh, Lattermann) by considering MQTFL alternative to drilling into the patella for MPFL reconstruction.



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## Rehabilitation

- 1. Rest in splint 10 days
- 2. Then start one flexion/day with goal of 90 degrees ROM at 3-4 weeks, full flexion by 6 weeks post op. I do not use CPM
- 3. WBAT, splint on 24/7 for 5-6 weeks ( if tubercle transfer, then crutches and partial weight bearing for 6 weeks)
- 4. Physical therapy at 5-6 weeks post op for further WBAT, ROM, strength, proprio, and restoration of day to day function
- 5. Light run at about 3-4 months
- 6. Full sports 6 months

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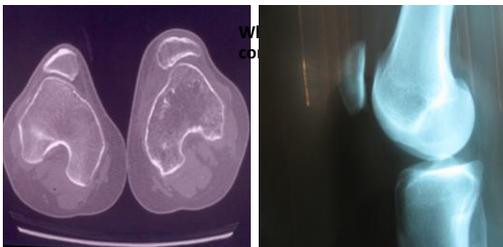
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Current literature demonstrates that trochlear deepening can effectively control patella tracking and yield stability

But should we do it?



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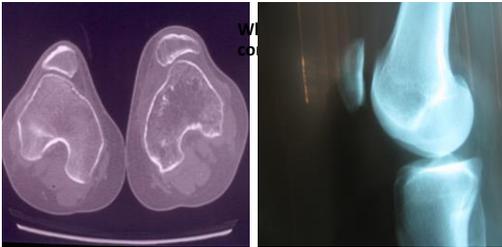
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### When to add trochleoplasty?

Rarely if ever

Jack Hughston



- “No problem so bad that we can’t make it worse”

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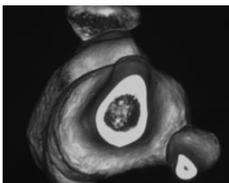
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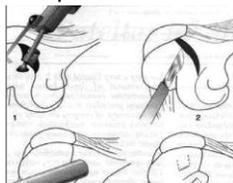
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### What happens to the subchondral bone?



Thanaout and Beaufils technique



Trochleoplasty works short term but long term consequences on cartilage?

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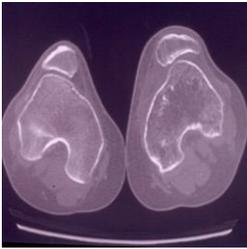
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Stabilize the patella by optimizing patella tracking and then restoring medial support as needed

Even in the face of trochlea dysplasia



Then, very selectively,

- Consider deepening, or any trochlear surgery, only when balancing by TT Transfer and medial restoration alone are insufficient for attaining sufficient stability- RARE!

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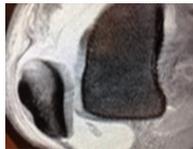
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## Trochleoplasty

The average age of my PF instability patients is 19 years old

I have done 2 trochleoplasties in my career and operate on PF instability patients almost every week

- Should be done only by very few surgeons with particular interest, training and skill in doing this procedure
- Trochleoplasty is best regarded as a salvage procedure for patients with profound trochlea problems




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## Opinions on when to do trochleoplasty from the experts

- "Trochleoplasty is primarily of academic interest" (2013)

**PHILIPPE NEYRET**  
Chairman at Lyon

**SCOTT DYE**

- "Trochleoplasty is a procedure that is so inherently dangerous and so little needed"

**DAVID DEJOUR**

"For trochlea dysplasia types B and D"

**The simple truth is that we can achieve patella stability in the vast majority of patients by selective use of PF balancing (TT Transfer) and medial support restoration**

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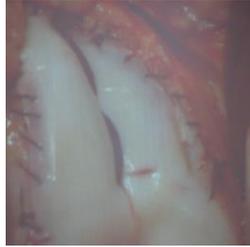
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Leave healthy cartilage alone.

**Whenever possible**

Trochleoplasty may be appropriate rarely



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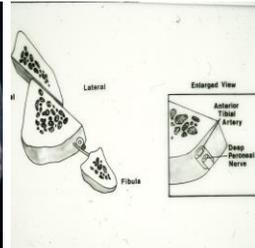
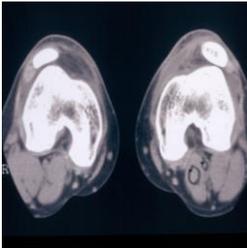
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**Alignment and unload**

Be sure alignment is optimal by TTT

Unload lateral and distal articular lesions by AMZ



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**Then stabilize by medial reconstruction**

Once you have achieved optimal patella tracking:

- Do only what is necessary to maintain medial balance, whether it be a restorative medial imbrication (better when the trochlea is more normal)
- "PRIMUM NON NOCERE" (Hippocrates)
- When the trochlea is more shallow (more dysplasia), there is more need for optimal tracking and a strong, anatomically precise medial restraint restoration using tendon graft

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Restore balanced tracking first



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