MRI findings pre and postoperatively after Arthroscopic Deepening Trochleoplasty and MPFL-reconstruction

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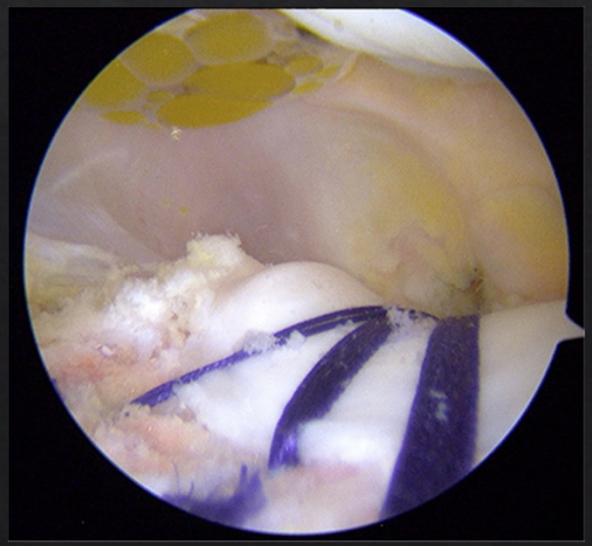
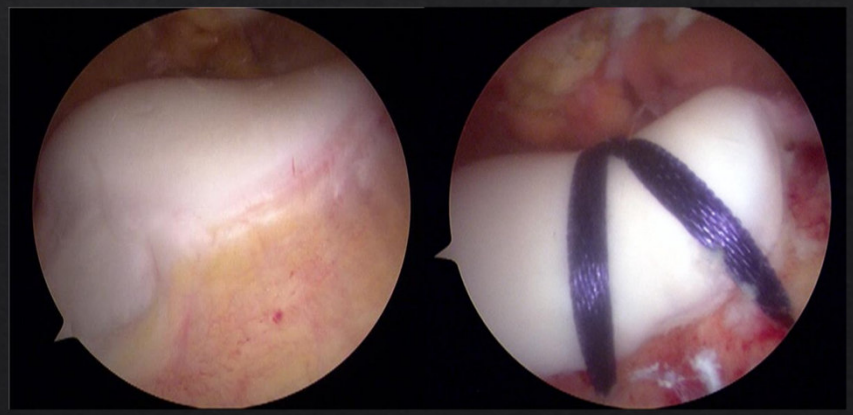


Disclosure

- Lars Blønd have a relationship with the commercial company Arthrex related directly or indirectly to this CME activity, since he is a paid consultant.
- Kristoffer W. Barfod has nothing to disclose.



Introduction

- Arthroscopic deepening trochleoplasty was introduced in 2008
- The technique is based upon mininmal invasive surgery
- Today the surgical technique have been applied in thirteen countries
- The aim is to create a more normal shape of the trochlear groove, meaning a deeper and often a more lateralized groove, providing a better engagement and stability of the patella.
- Concerns have been raised if the technique is capable of changing the trochlear groove in direction of the desired more normal shape.

Method

- Patients were included from the first author's surgical lists at Aleris Private Hospital in the period from October 2014 to December 2017.

- 15 patients (16 knees) were eligible for inclusion. They had undergone ADT and MPFL reconstruction, were Danish speaking, had available preoperative MRI scan, and had filled out preoperative patient reported outcome measures.

- Average follow-up 63.6 (23-97) month

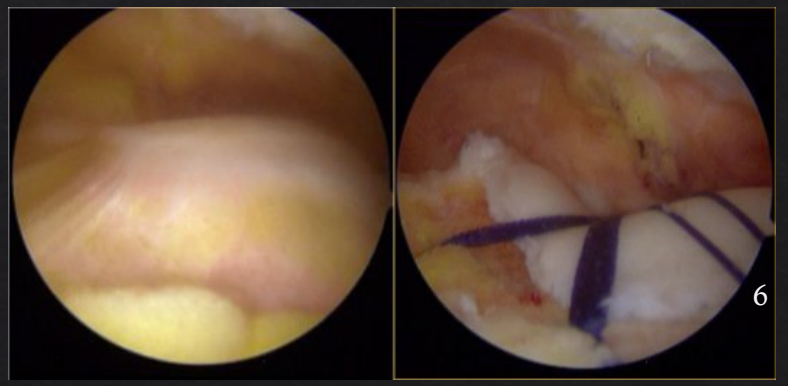
Indication

Indication for arthroscopic trochleoplasty in this serie was:

- Persistent patellar instability after failed physiotherapy
- Dynamic patella apprehension in ≥45 degrees of flexion (1)
- Trochlear dysplasia evaluated by Lateral Trochlear Inclination Angle ≤11 degrees according to Carillon et al.(2)

Technique

- Arthroscopic trochleoplasty was performed with the updated technique from Blond 2015 (3). Knees with smaller grade 3-4 lesions in the trochlear cartilage was included. Chronologic age was not regarded as a limitation for the surgery,
- MPFL reconstruction was done using double bundle Gracillis tendon attach to the patella using bone anchors and interference screw at the femoral insertion site.
- Through two standard anterior arthroscopic portals and two extra suprapatellar portals, a cartilage flap was released by shaver burrs, and the trochlea groove was deepened and lateralised. At the end the cartilage flap was re-fixated by absorbable tapes and sutures



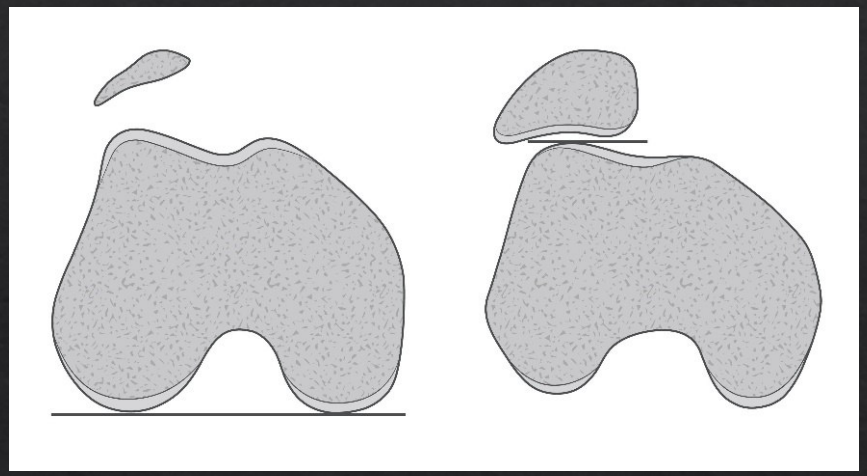
MRI scans

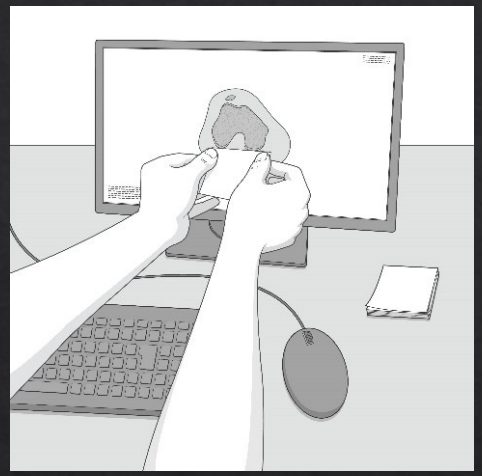
- MRI was performed pre- and postoperatively on 1.5 tesla imaging systems. The preoperative scans were acquired retrospectively and were performed on different systems at outside facilities prior to referral to our center. The post-operative MRI scans were performed on a GE MR SIGNA Voyager.
- Measurements were obtained as an average of measurements from two orthopaedic surgeons specialized in patellofemoral surgery who independently performed the measurements (the two authors). In the pre-study period several collaborate training sessions were performed to reduce inter-observer variability.
- The measurements were performed at the four most proximal axial slices visualizing trochlear cartilage. Each of those four slices represent level 1 to level 4, with level 1 most proximal.
- Following measures was recorded pre and postoperatively, lateral trochlear inclination angle(LTI), trochlear depth, trochlear asymmetry, anterior-posterior/width and patella tilt

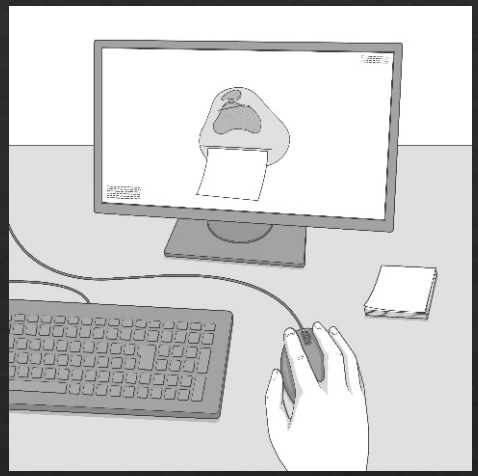
Patient related outcome - The patients self-perceived function was evaluated pre- and postoperatively with the Banff Patella Instability Instrument 2.0 (BPII 2.0), the KOOS score and the Kujala

Results (pre and postoperatively - median values)

Lateral trochlear inclination angle – LTI
Two-image technique by Joseph et al. (4)



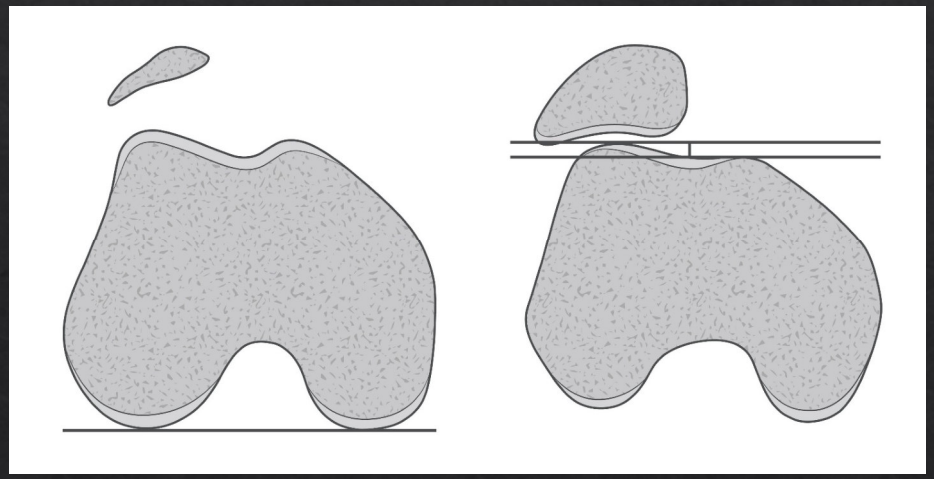




	Pre	Post	
Level one:	1.3˚	to 10.7˚	P<0.001
Level two:	3.6˚	to 11.9˚	P<0.001 P<0.001 P<0.001
Level three:	5.0˚	to 13.5˚	P<0.001
Level four:	8.5˚	to 14.2˚	P<0.0011

Results (pre and postoperatively - median values)

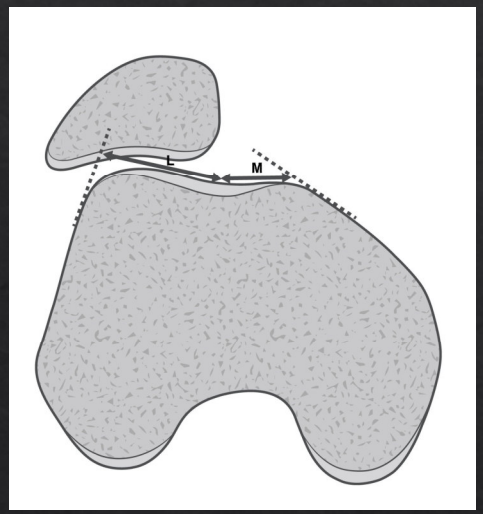
Trochlear depth



	Pre	Post	
Level one:	0.00 mm	3.23 mm	P<0.001
Level two:	0.38 mm	4.03 mm	P<0.001
Level three:	1.73 mm	4.93 mm	P<0.001
Level four:	2.95 mm	4.83 mm	P<0.001

Results (pre and postoperatively - median values)

Trochlea facet asymmetry

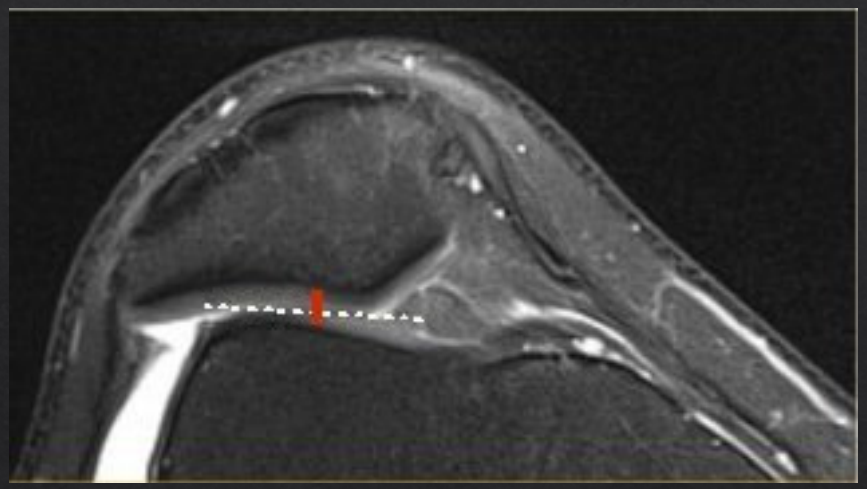


Medial facet/lateral facet < 36% = Trochlear Dysplasia
M/Lx100 = facet ratio in percentage

	Pre	Post	
◈ Level one:	4.55 %	17.8 %	P=0.0029
◈ Level two:	11.2 %	35.9 %	P=0.0131
◈ Level three:	24.5 %	45.9 %	P=0.0014
◈ Level four:	40.1 %	49.2 %	P=0.0038

Results (pre and postoperatively - median values)

Cartilage thickness (centrally on lateral trochlea facet)



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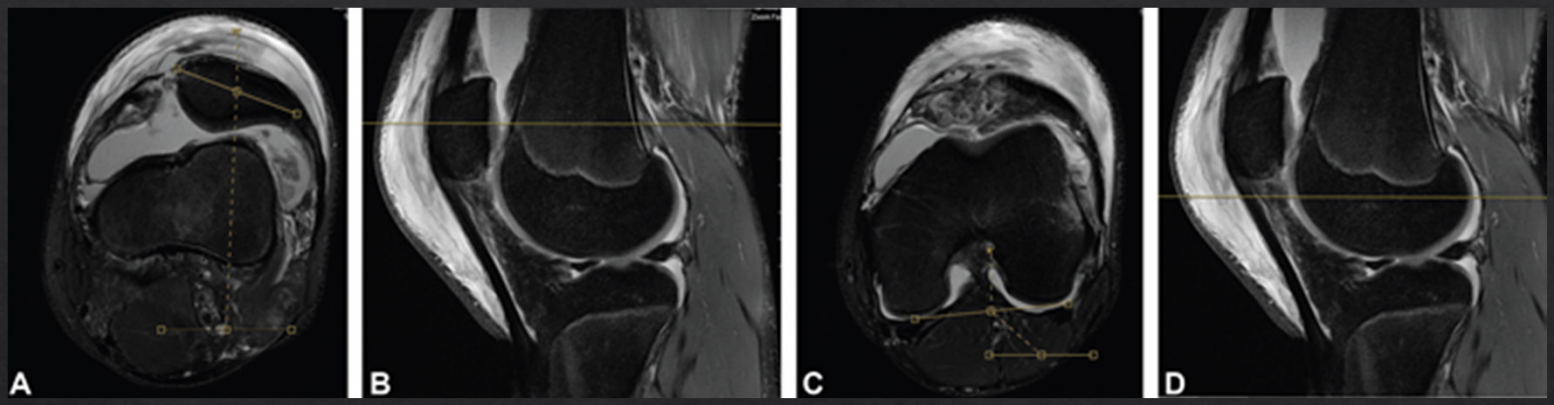
◈ Level three:	24.5 %	45.9 %	P=0.0014
◈ Level four:	40.1 %	49.2 %	P=0.0038

Results (pre and postoperatively - median values)

Patella tilt Lateral patella inclination angle - two-images technique (5)



Pre 22.7˚ Post 14.2˚

Patient related outcome BPII Pre 37.2 Post 74.3

Conclusion:

Combined ADT and MPFL reconstruction led to statistically significantly and clinically relevant improvements of standardized MRI measurement that characterize TD and in patient reported outcome. No significant reduction in cartilage thickness was seen.

References

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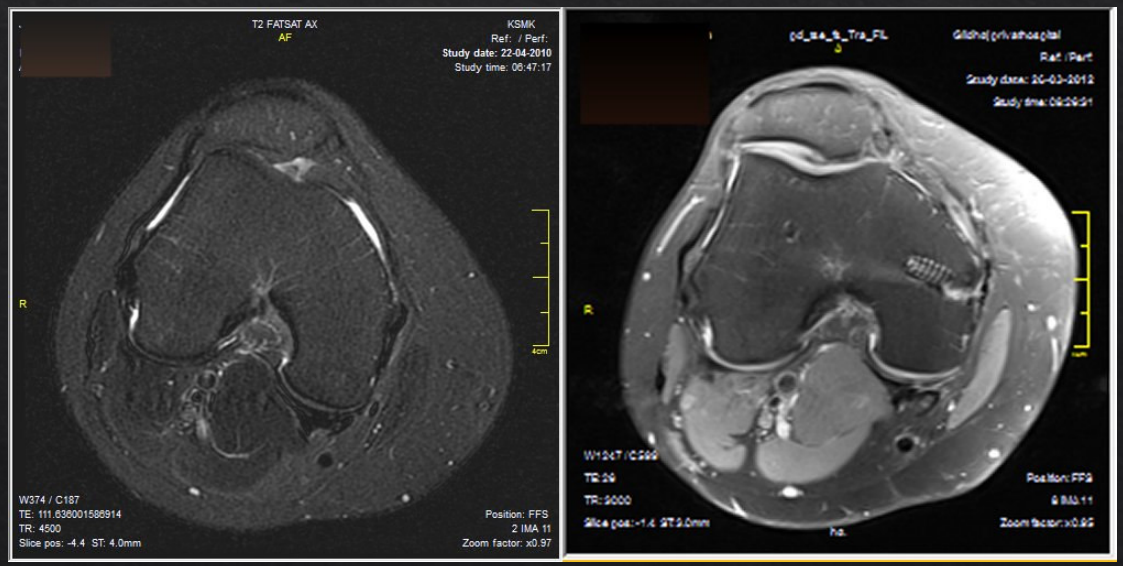
Pre



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