

Treatment of chondral and meniscal lesions during ACL injury and reconstruction

Nicolas PUJOL

Chairman of the Department of Orthopedic
Surgery

Centre Hospitalier de Versailles
France

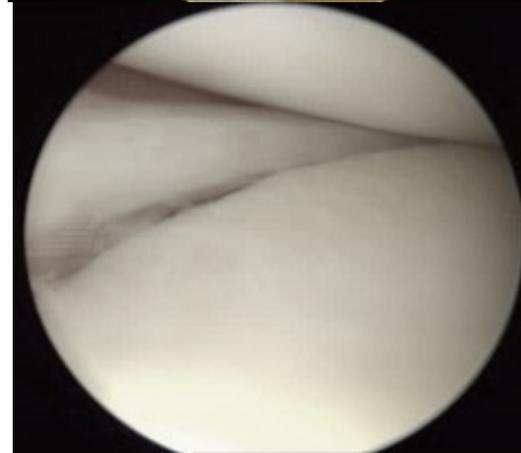
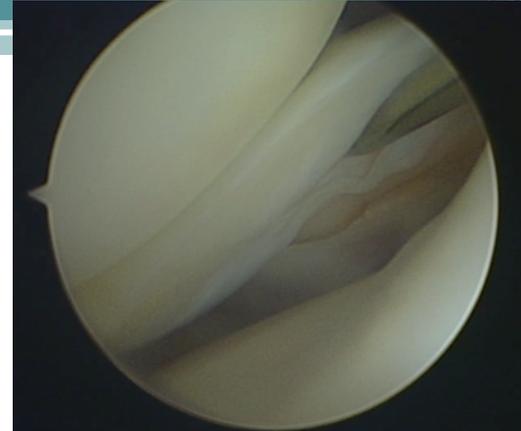
npujol@ch-versailles.fr

Versailles
Arthroscopie
Orthopédie



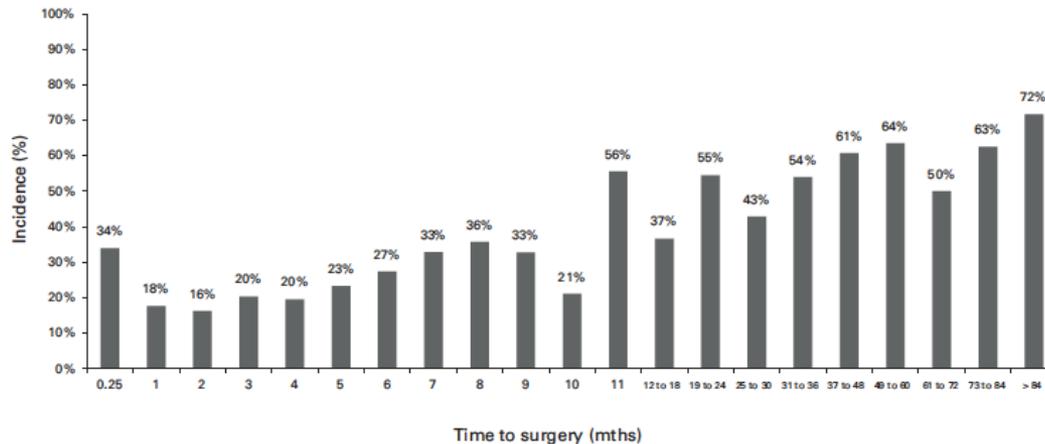
Incidence

- Meniscal lesions and ACL injury
- 16 to 82%
- *Shelbourne KD, Gray T. Am J Sports Med. 1997*
- *Bellabarba C. Am J Orthop. 1997*
- *Cipolla M. Knee Surg Sports Trauma Arthrosc. 1995*
- Acute: ML > MM
- Chronic: MM > ML



Incidence

- Meniscal lesions and ACL injury
- Different lesions, increasing with time



The incidence of secondary pathology after anterior cruciate ligament rupture in 5086 patients requiring ligament reconstruction

Bone Joint J 2013;95-B:59–64.

K. Sri-Ram,
L. J. Salmon,
L. A. Pinczewski,
J. P. Roe



Incidence

- Potential of spontaneous healing +++
- 50 to 60%

Ihara Clin Orthop 1994

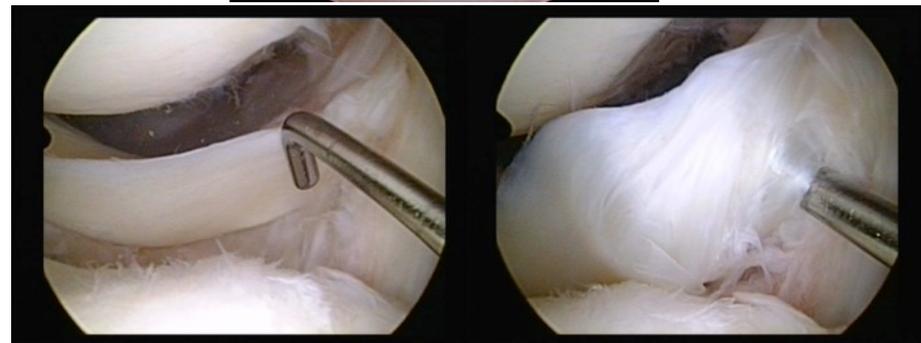
Weiss J Bone Joint Surg Am 1989

Han KSRR 2015



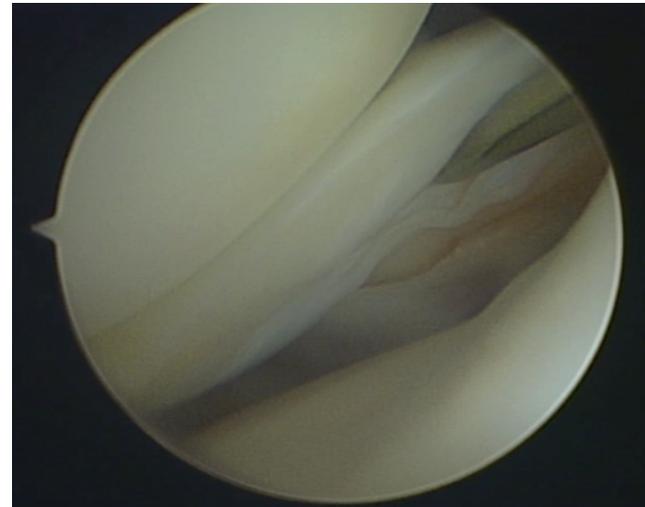
Different meniscal lesions: Focus on some lesions

- Small lesions
- Ramp
- Root



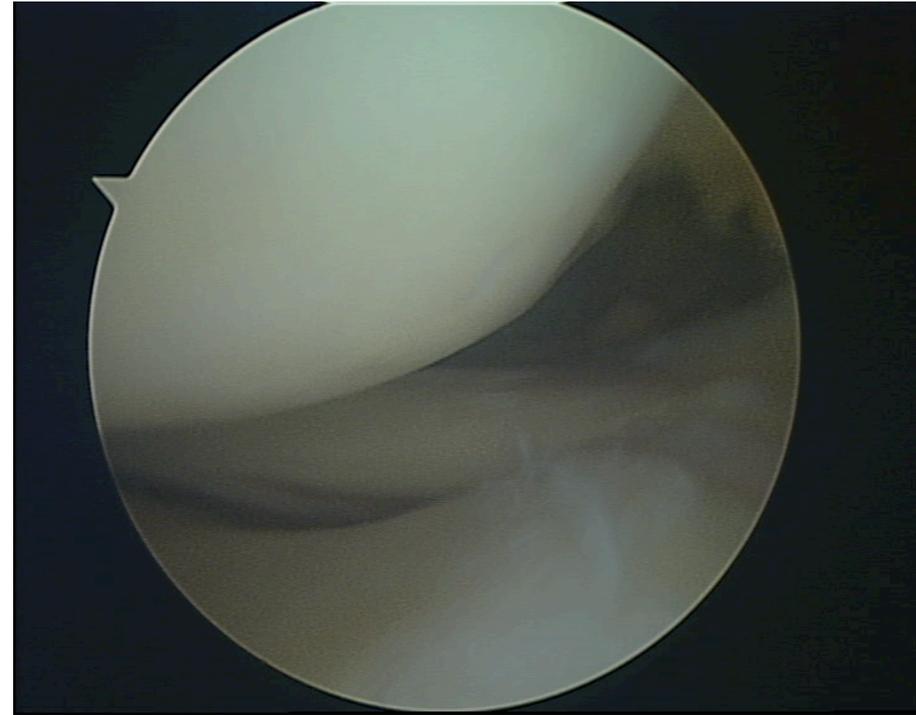
Different meniscal lesions: Focus on some lesions

- Small lesions
- Ramp
- Root



« Lateral meniscus? »

- Small lesions, <1.5-2 cm++
- **At risk?**
- 0% (!) secondary meniscectomy if small lesions left in place
- Main criteria= location posterior to the popliteal hiatus (not the stability of the lesion)

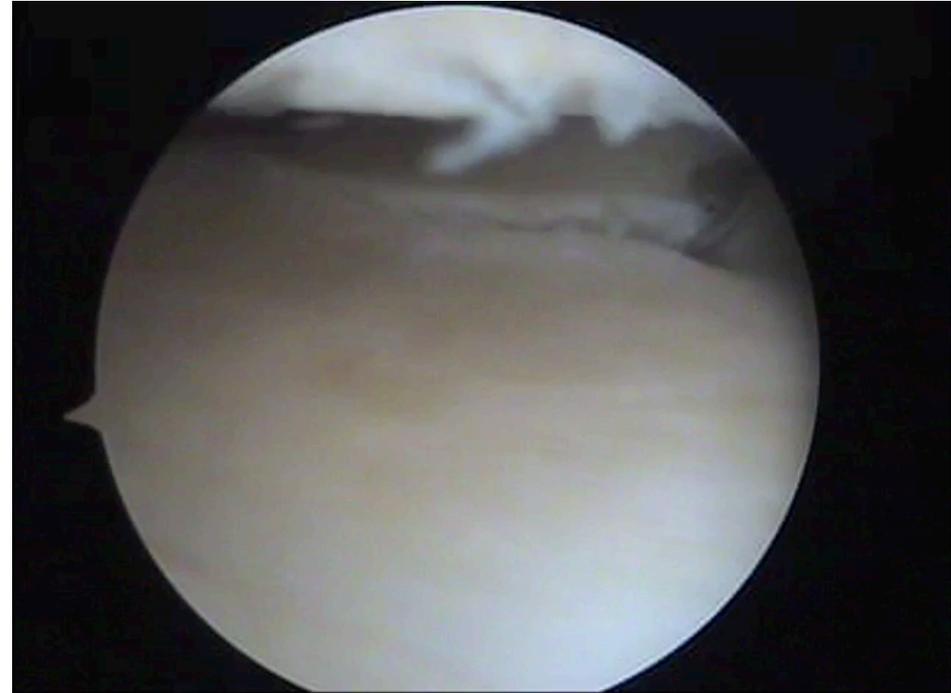


During ACL reconstruction, small asymptomatic meniscal lesions can be left untreated: a systematic review

Nicolas Pujol, Philippe Beaufils

« Medial meniscus? »

- Small lesions, <1.5-2 cm++
- **At risk?**
 - 15% secondary meniscectomy or residual pain if left alone
 - How to treat these small lesions
 - If visible by the front: **EVEN IF SMALL: REPAIR >95% success**



Knee Surg Sports Traumatol Arthrosc (2009) 17:396–401
DOI 10.1007/s00167-008-0711-y

KNEE

Healing results of meniscal tears left in situ during anterior cruciate ligament reconstruction: a review of clinical studies

Nicolas Pujol · Philippe Beaufils

Different meniscal lesions: Focus on some lesions

- Small lesions
- Ramp
- Root



« Ramp lesions or Hidden lesions »

EVEN IF STABLE LESION+++

Have a look on the posteromedial side

If full thickness lesion: REPAIR

Capsulomeniscal lesions

10 à 20% cases

Stable lesion

Need to repair?

Success >93%



ASPM Preview, published on February 24, 2014 as doi:10.1177/0363546514522384

Hidden Lesions of the Posterior Horn of the Medial Meniscus

A Systematic Arthroscopic Exploration of the Concealed Portion of the Knee

Bertrand Sonnery-Cottet,^{*†} MD, Jacopo Conteduca,[†] MD, Mathieu Thunat,[†] MD, François Xavier Gunepin,[†] MD, and Romain Seil,^{§||} MD, PhD
Investigation performed at the Centre Orthopédique Santy and Hôpital Privé Jean Mermoz, Lyon, France

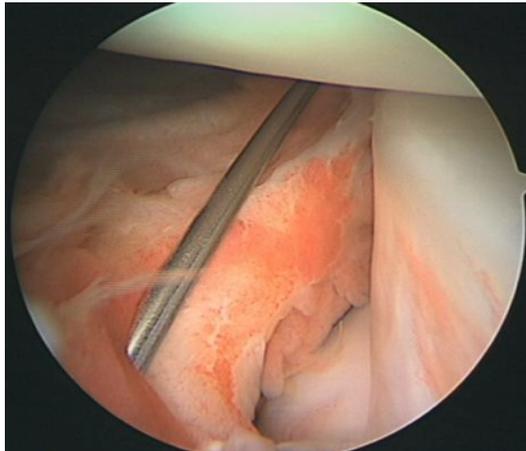
BUT...

Need always to repair them?

Liu X, Zhang H, Feng H, Hong L, Wang X, Song G. Is it necessary to repair stable ramp lesions of the medial meniscus during anterior cruciate ligament reconstruction? Am J Sports Med 2017

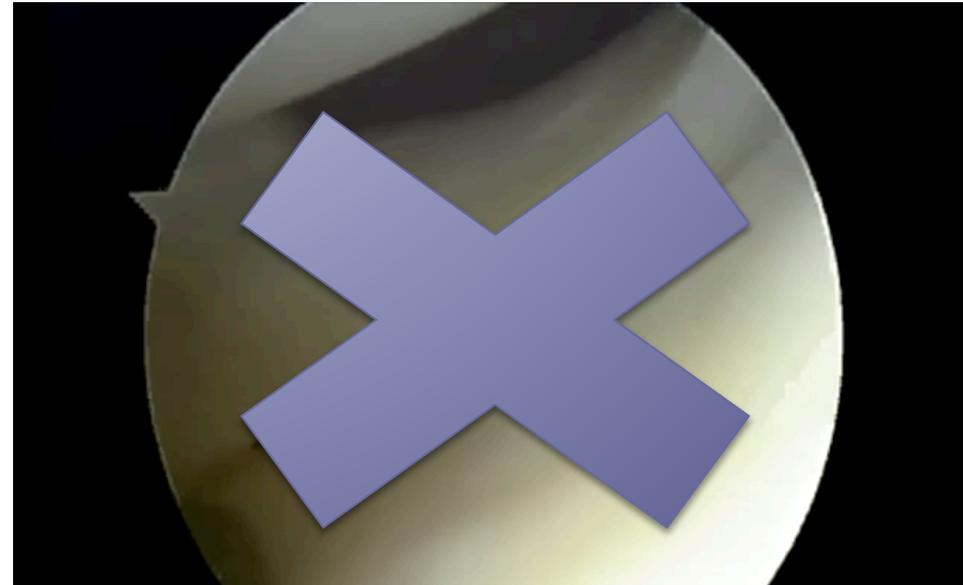
Prospective randomised study

Probably not !



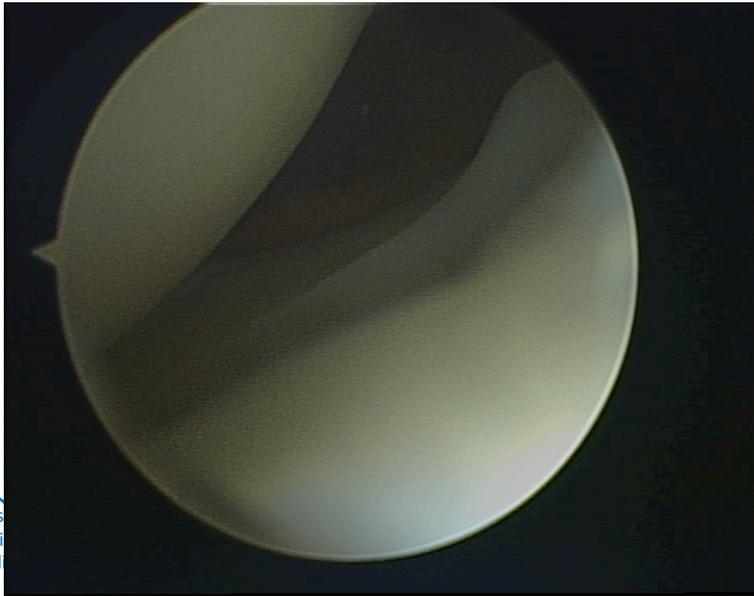
THM

- Timing from injury to MRI AND surgery tends to be shorter
- « Growing » incidence of « acute » meniscal lesions
- Don't « overtreat » your patients



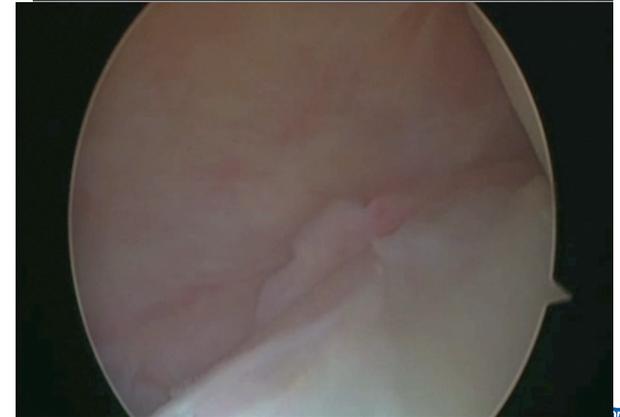
Lateral meniscus

- High « healing » potential
- First: Let alone
- Repair if large lesion



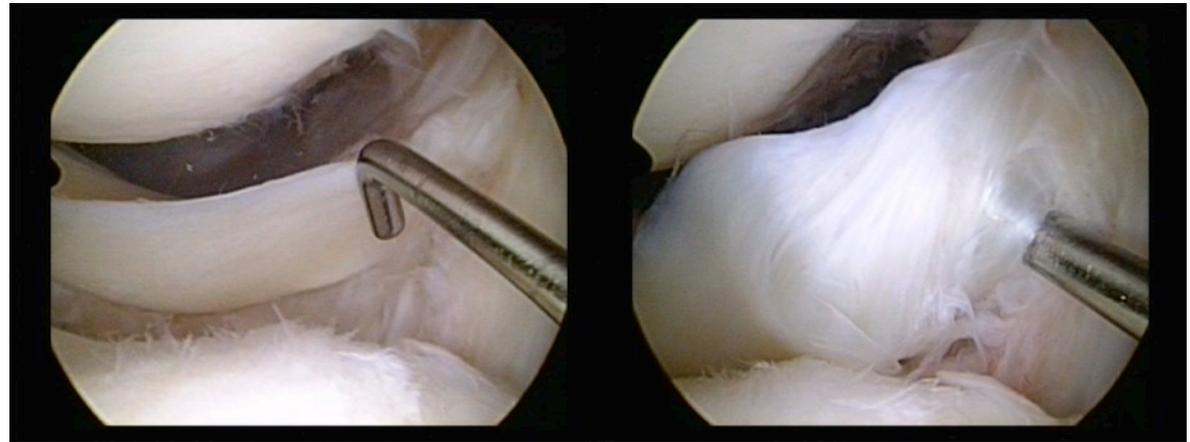
Medial meniscus

- Repair Small red-white lesions
- Few lesions to be left alone
- Question: Partial ramp lesions?
- Remaining indications for a partial meniscectomy during ACLR
- 10%-15%



Different meniscal lesions: Focus on some lesions

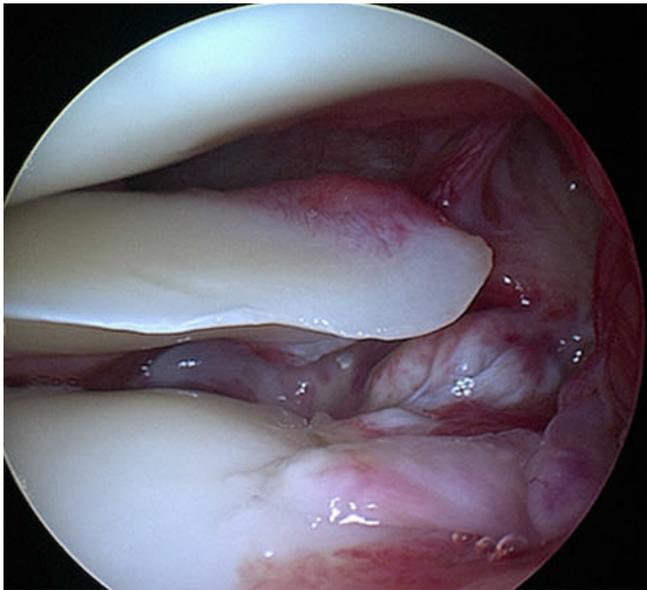
- Small lesions
- Ramp
- Root



Associated lesions and lateral meniscus

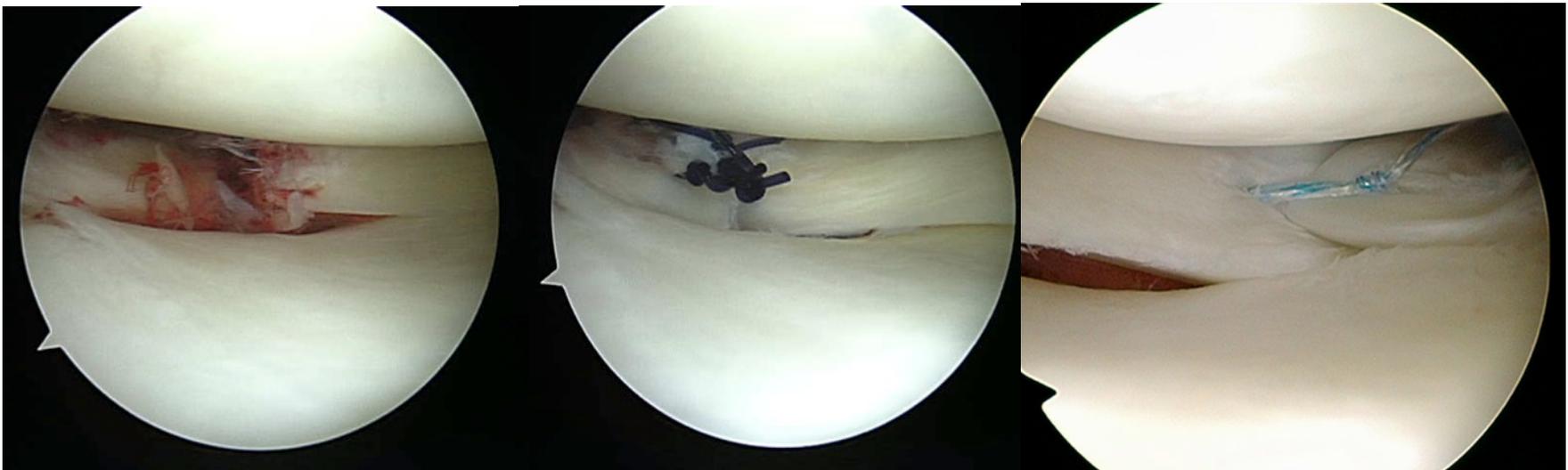
- Traumatic++
- ACL

Concomitant pathology	Total (n = 49)	Medial meniscus root tears (n = 23)	Lateral meniscus root tears (n = 26)	p value
Anterior cruciate ligament tear	29 (59 %)	8 (35 %)	21 (81 %)	0.001*
Posterior cruciate ligament tear	5 (10 %)	3 (13 %)	2 (8 %)	n.s.
Fibular collateral ligament tear	8 (16 %)	3 (13 %)	5 (19 %)	n.s.
Medial collateral ligament tear	4 (8 %)	1 (4 %)	3 (12 %)	n.s.
Chondral defect (Outerbridge grade 2 or greater)	27 (55 %)	17 (74 %)	10 (43 %)	0.021*



Posterior radial tears (type 4)

- If far enough from the root (1cm): Side-to-side sutures



Arch Orthop Trauma Surg (2014) 134:237–255
DOI 10.1007/s00402-013-1873-8

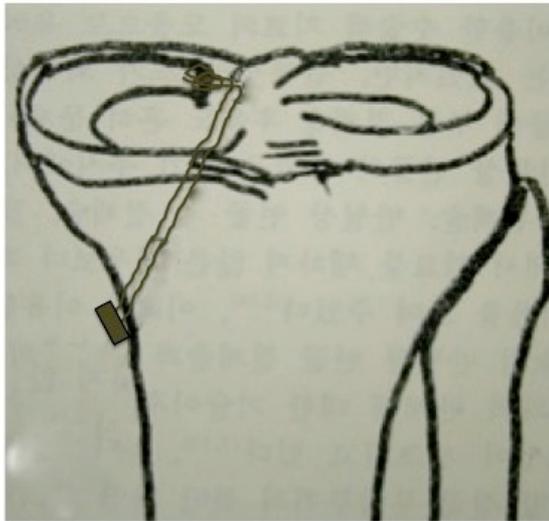
ARTHROSCOPY AND SPORTS MEDICINE

Posterior root tear of the medial and lateral meniscus

Wolf Petersen · Philipp Forkel · Matthias J. Feucht ·
Thore Zantop · Andreas B. Imhoff · Peter U. Brucker

Complete posterior root lesions (Type 2)

- If close to the root:
- Pull out suture

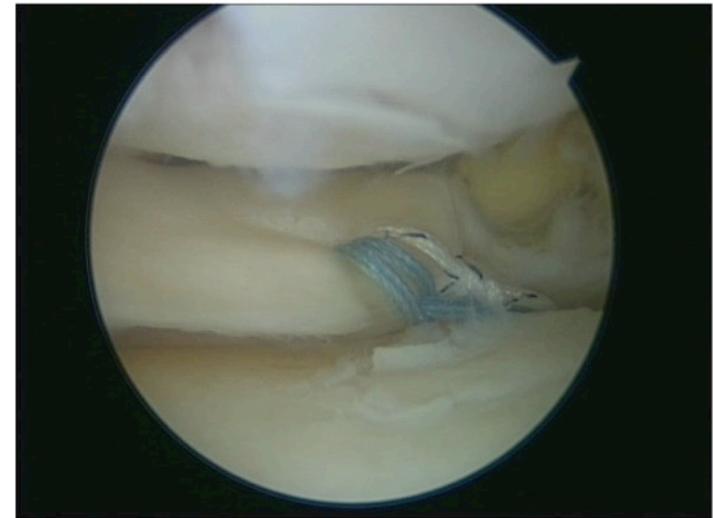


Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-014-2904-x

KNEE

Posterior root tears of the lateral meniscus

Matthias J. Feucht · Gian M. Salzmann ·
Gerrit Bode · Jan M. Pestka · Jan Kühle ·
Norbert P. Südkamp · Philipp Niemeyer



Partial root lesions (Type 1)

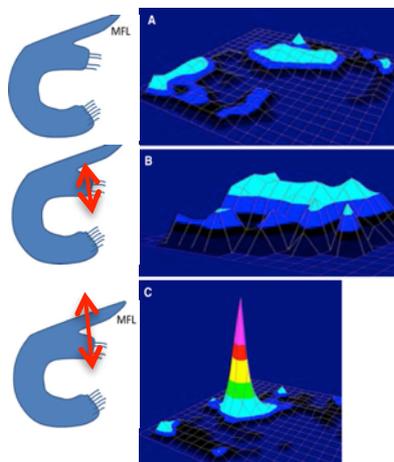
Long-term Evaluation of Posterior Lateral Meniscus Root Tears Left In Situ at the Time of Anterior Cruciate Ligament Reconstruction

K. Donald Shelbourne, Troy A. Roberson and Tinker Gray

Am J Sports Med 2011 39: 1439 originally published online March 14, 2011

DOI: 10.1177/0363546511398212

- Frequency: high++
- Underestimated?
- Stable if PMFL intact
- No Symptoms?
- Don't overtreat your patients+++



Forkel Arch Orthop trauma surg 2013

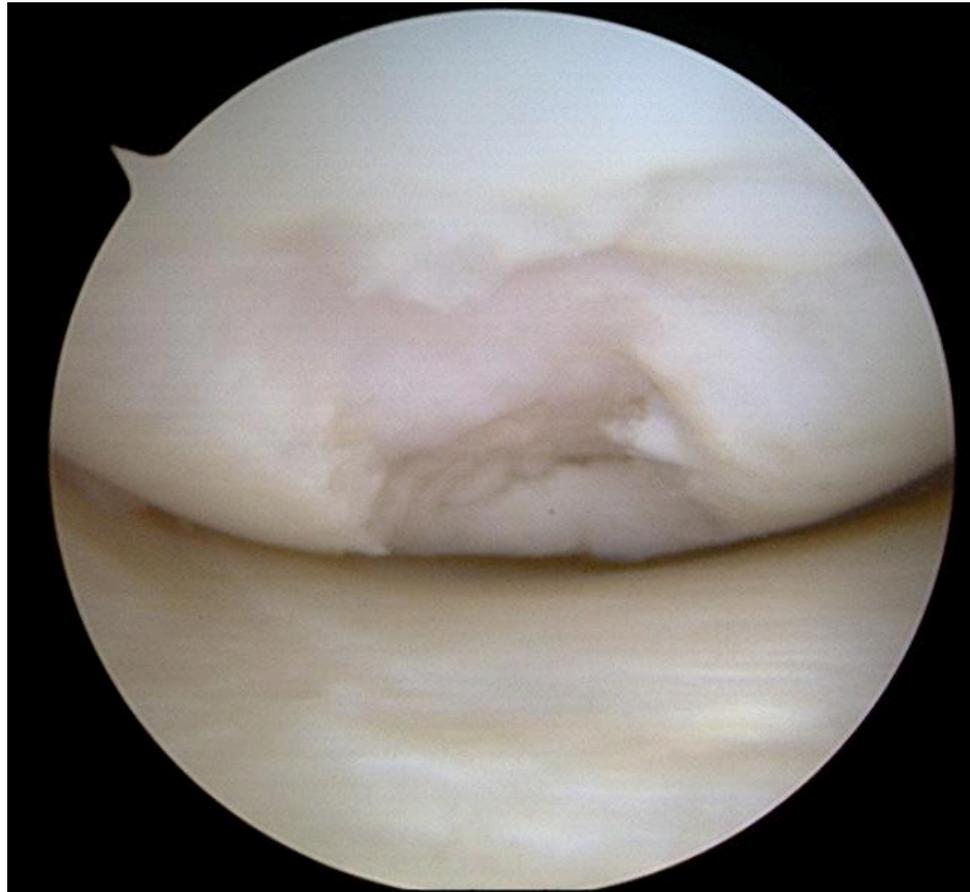


Conclusion meniscus lesions:

- Adress all lesions
- Treat accordingly
- Avoid meniscectomy

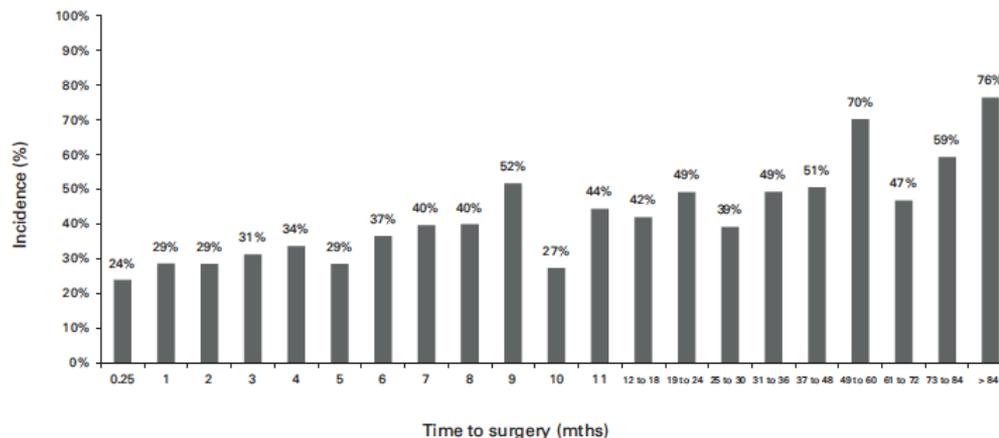


Chondral lesions and ACL



Incidence

- Chondral lesions and ACL injury
- M and C: Same profile
- Increasing with time (1y)
- Age >25



The incidence of secondary pathology after anterior cruciate ligament rupture in 5086 patients requiring ligament reconstruction

Bone Joint J 2013;95-B:59-64.

K. Sri-Ram,
L. J. Salmon,
L. A. Pinczewski,
J. P. Roe



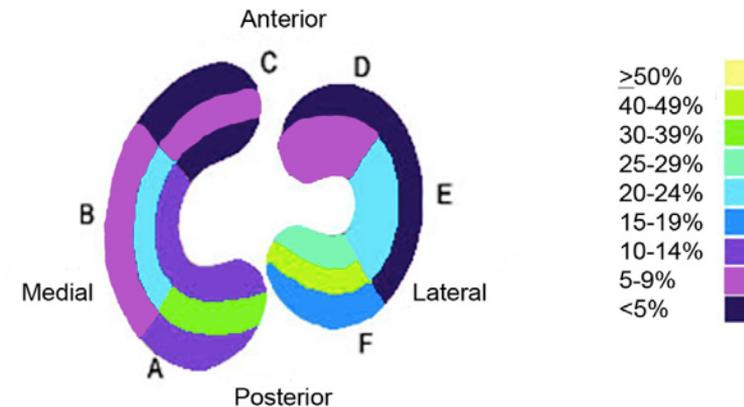
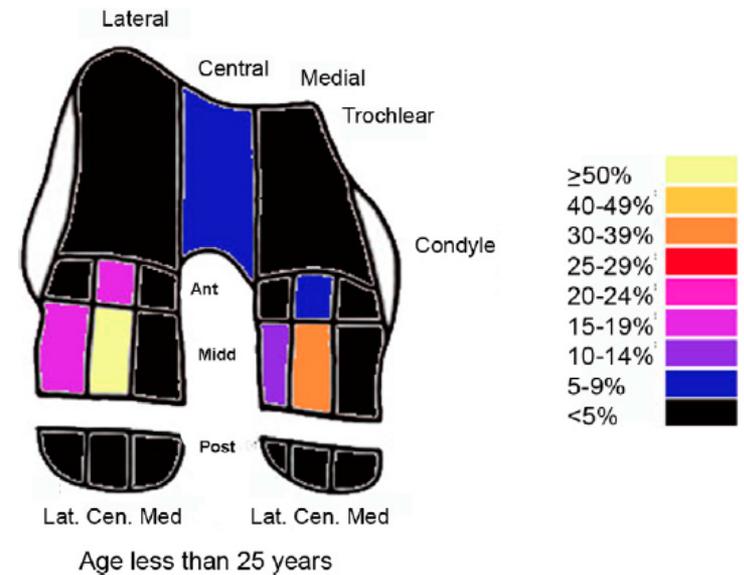
Incidence

COPYRIGHT © 2009 BY THE JOURNAL OF BONE AND JOINT SURGERY, INCORPORATED

Geographic Mapping of Meniscus and Cartilage Lesions Associated with Anterior Cruciate Ligament Injuries

By James R. Slauterbeck, MD, Petteri Kousa, MD, Blake C. Clifton, MD, Shelly Naud, PhD, Timothy W. Tourville, MEd, ATC, Robert J. Johnson, MD, and Bruce D. Beynon, PhD

- Incidence: 43%!
- Risk factors:
- Male
- Age > 35
- Delay before surgery > 1 year
- Meniscal lesions



Prevalence

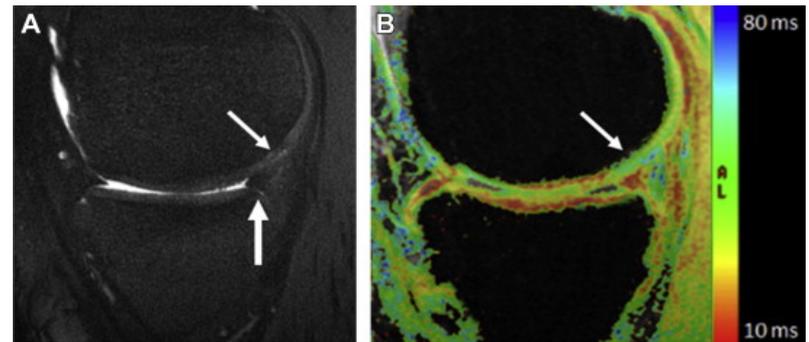
Intra-articular Findings in Primary and Revision Anterior Cruciate Ligament Reconstruction Surgery:

A Comparison of the MOON and MARS Study Groups

James R. Borchers, MD, MPH^{†,†}, Christopher C. Kaeding, MD[†], Angela D. Pedroza, MPH[†],
 Laura J. Huston, MS[‡], Kurt P. Spindler, MD[‡], and Rick W. Wright, MD[§] on behalf of the
 MOON Consortium and the MARS Group^{||}

Am J Sports Med. 2011 September ; 39(9): 1889–1893.

Intra-articular Injury	Primary
New medial meniscal tear	40.35
New lateral meniscal tear	45.87
Lateral femoral condyle lesion ^a	4.72
Medial femoral condyle lesion ^a	10.43
Lateral tibial plateau lesion ^a	2.95
Medial tibial plateau lesion ^a	0.79
Patellar lesion ^a	6.50
Trochlear lesion ^a	2.76



Different chondral lesions

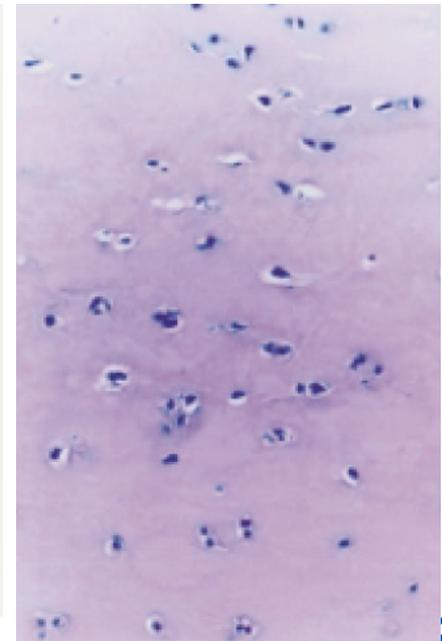
- Impaction
- Fractures
- Flaps
- Degenerative
- OCD

- Underlying bone bruise



Bone bruise= chondral lesion?

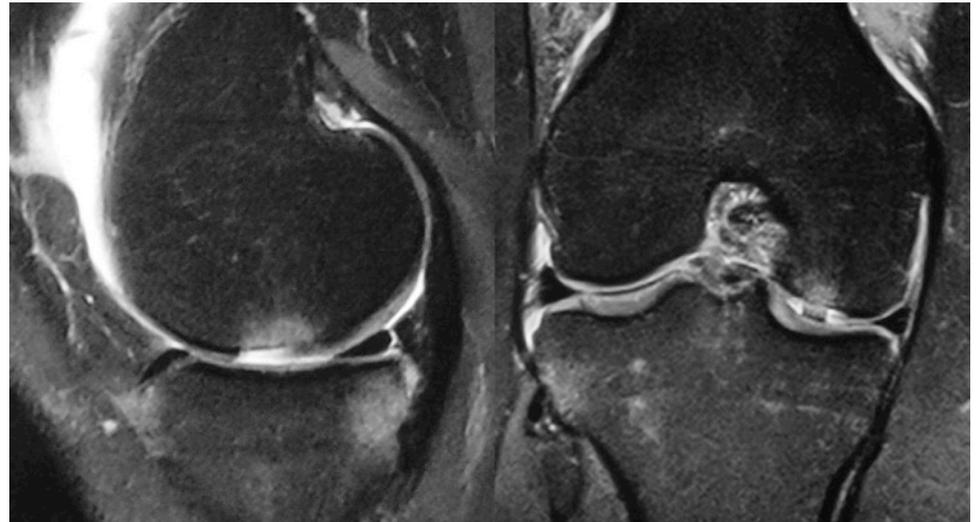
- Early chondrocyte apoptosis
- Bad prognosis factor



Johnson DL, Urban WD, Caborn DNM, et al. Articular cartilage changes seen with magnetic resonance imaging-detected bone bruise associated with anterior cruciate ligament tears. *Am J Sports Med* 1998; 26: 409-15

Chondral lesions and ACL

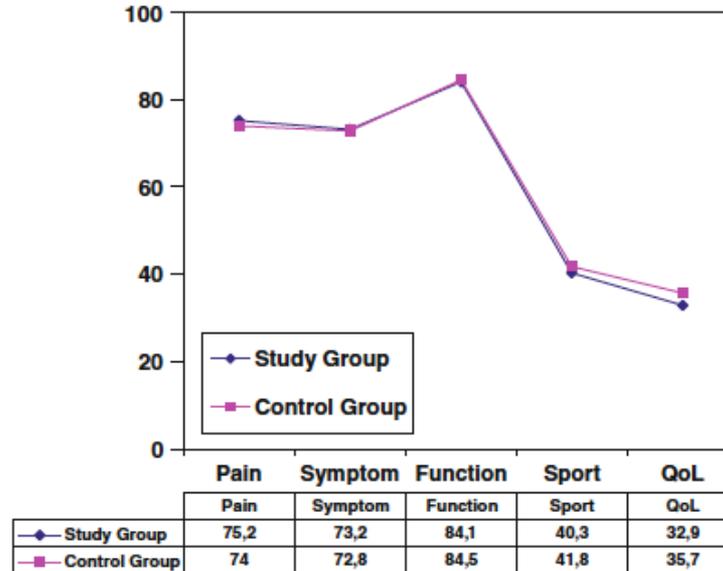
- Frequent
- What to do?
- When?
- Why?



Consequences? After injury and Before surgery?

Full-thickness cartilage lesion do not affect knee function in patients with ACL injury

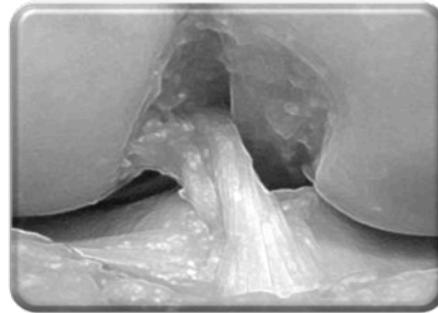
Vegar Hjermundrud · Tonje Kvist Bjune ·
May Arna Risberg · Lars Engebretsen ·
Asbjørn Årøen



- No difference of function at the time of ACLR
- Often asymptomatic
- No preoperative criteria of any treatment

Long-term results: ACLR at 10 and 20 y

Nicolas GRAVELEAU, Christophe
HULET
(SOFCOT)



Incidence of OA (Grade 3-4) after ACLR

10 y

20 y

ACLR and chondral lesions

38%

ACLR and chondral lesion and meniscectomy 45%



Guidelines for treatment?

- Frequent
- Deterioration with time
- Lack of guidelines: treat or not? Which specific treatment? Which patients?
- Lot of controversies
- EBM?

Metaanalysis: Any incidence on the result?

Knee Surg Sports Traumatol Arthrosc (2017) 25:3061–3075
DOI 10.1007/s00167-016-4097-y



KNEE

Do cartilage lesions affect the clinical outcome of anterior cruciate ligament reconstruction? A systematic review

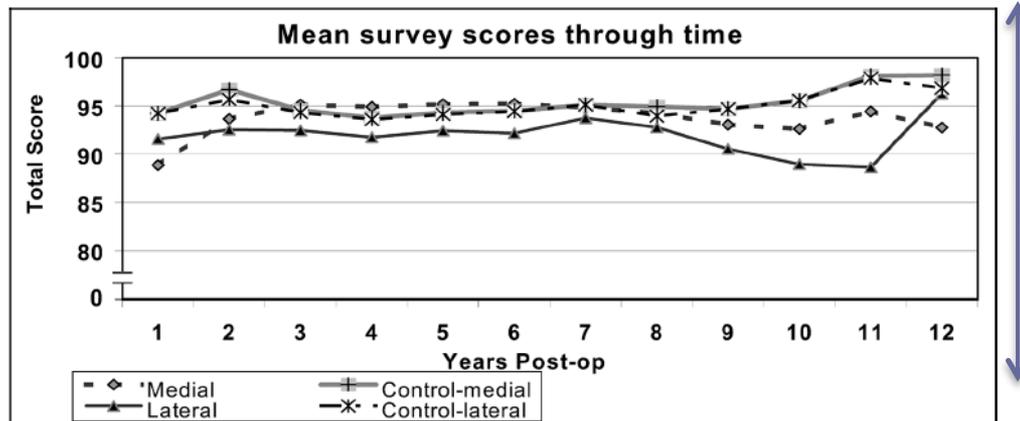
Giuseppe Filardo¹ · Francesca de Caro¹ · Luca Andriolo¹  · Elizaveta Kon^{1,2} · Stefano Zaffagnini¹ · Maurilio Marcacci¹

- YES
- BUT:
- No evidence of any better treatment or treatment algorithm

OUTCOME OF UNTREATED TRAUMATIC ARTICULAR CARTILAGE DEFECTS OF THE KNEE

A NATURAL HISTORY STUDY

BY K. DONALD SHELBOURNE, MD, SANJIV JARI, BSC(HONS), MBCHB,
FRCS(ENG), FRCS(TR & ORTH), AND TINKER GRAY, MA, ELS



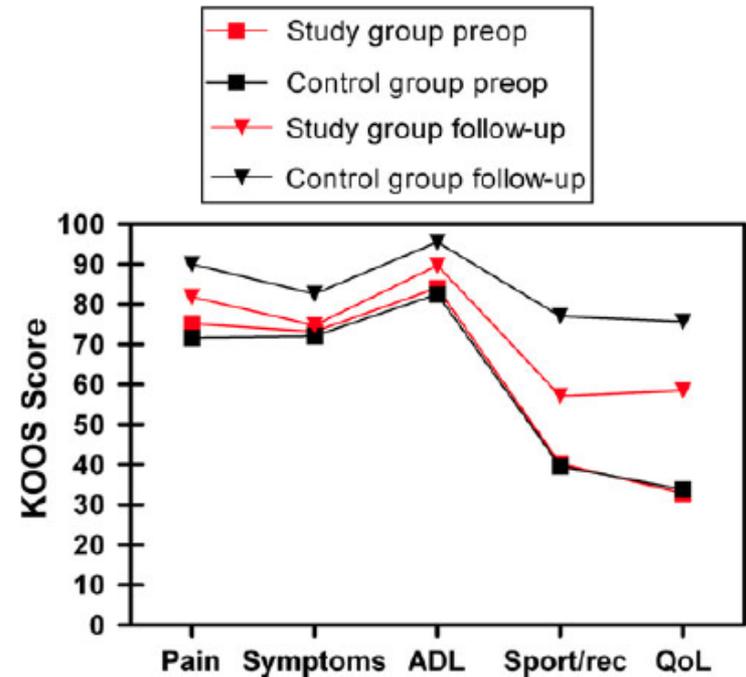
- Focal lesions
- Grade 3-4
- Mean 1.7 cm²
- N= 52, mean 6.5 years
- Noyes score
- Lateral compartment++, but same activity level

Patients with focal full-thickness cartilage lesions benefit less from ACL reconstruction at 2–5 years follow-up

Jan Harald Røtterud · May Arna Risberg ·
Lars Engebretsen · Asbjørn Årøen

Consequences After surgery?

- Results quite good
- BUT: Deterioration with time
- N=29, ICRS 3-4
- 4 debridements
- 3 microfractures
- 23 left in place



Consequences After surgery?

Knee Surg Sports Traumatol Arthrosc (2017) 25:1482–1488
DOI 10.1007/s00167-016-4163-5



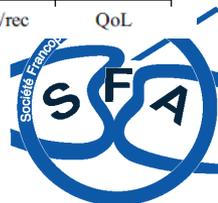
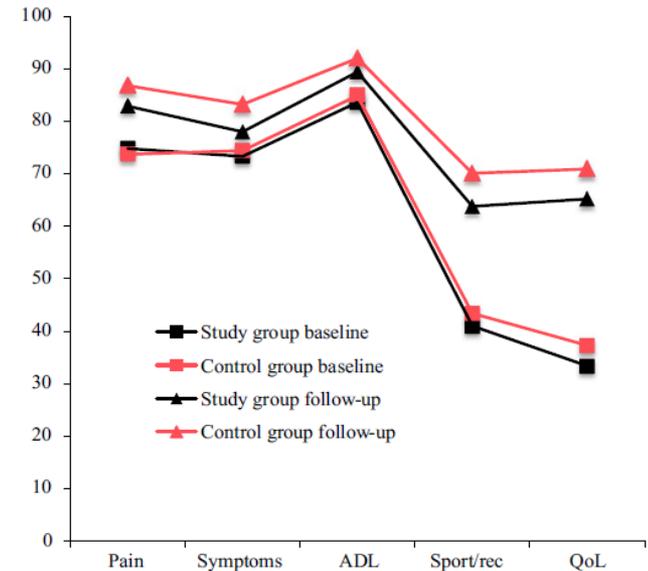
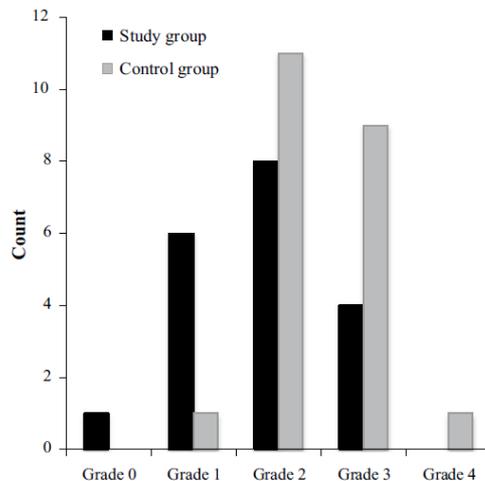
KNEE

No negative effect on patient-reported outcome of concomitant cartilage lesions 5–9 years after ACL reconstruction

Svend Ulstein^{1,3} · Karin Bredland² · Asbjørn Årøen^{1,3,4} · Lars Engebretsen^{2,4} · Jan Harald Rotterud¹

- Results quite good
- BUT: Radiographic changes

++



Microfracture?

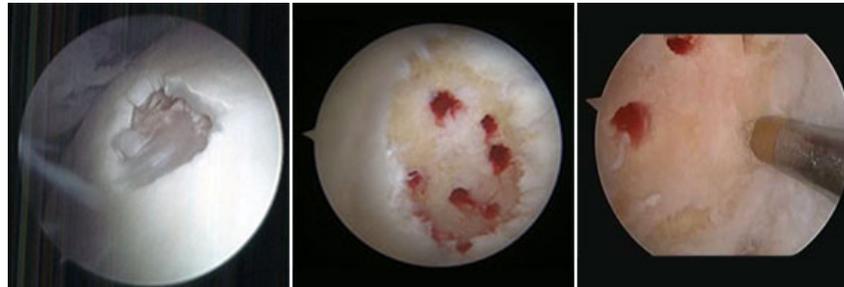
Am J Sports Med. 2016 Feb;44(2):337-44. doi: 10.1177/0363546515617468. Epub 2015 Dec 11.

Effect on Patient-Reported Outcomes of Debridement or Microfracture of Concomitant Full-Thickness Cartilage Lesions in Anterior Cruciate Ligament-Reconstructed Knees: A Nationwide Cohort Study From Norway and Sweden of 357 Patients With 2-Year Follow-up.

Røtterud JH¹, Sivertsen EA², Forssblad M³, Engebretsen L⁴, Årøen A⁵.

Negative results if MF when compared to let alone

At 2 years



Comparative studies

Good results five years after surgical management of anterior cruciate ligament tears, and meniscal and cartilage injuries

Leonardo Osti · Rocco Papalia · Angelo Del Buono ·
Cirino Amato · Vincenzo Denaro · Nicola Maffulli

- Grade 2: radiofrequency. N=25
- Grade 3-4: microfracturing. N=25
- Good subjective outcomes >5 years
- BUT radiographic Degenerative changes

	Group 1		Group 2	
	2 years	5 years	2 years	5 years
Lysholm score (Median, range)	89 (81–100)	83 (78–98)	91 (85–100)	87 (82–100)
IKDC score, 0–100 (Median, range)	88 (79–100)	81 (71–95)	90 (84–100)	88 (79–98)
Tegner activity score (Median, range)	7 (4–8)	6 (2–6)	7 (4–9)	7 (4–8)
WOMAC index (Median, range)		81 (73–85)		90 (85–100)

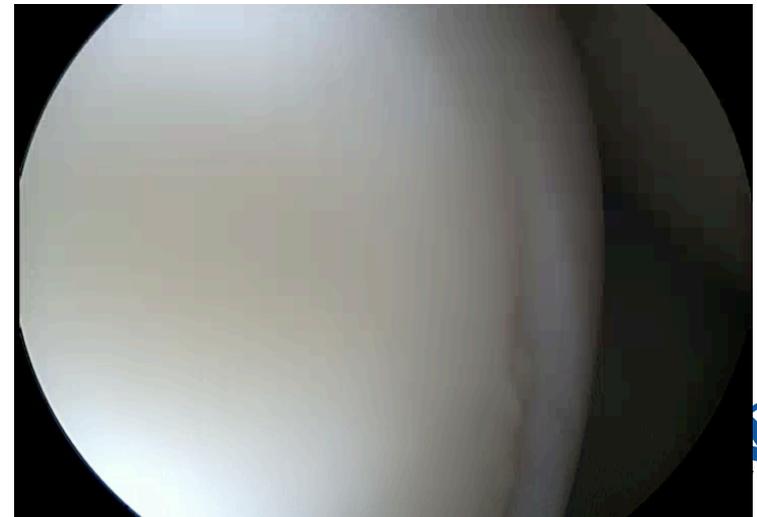
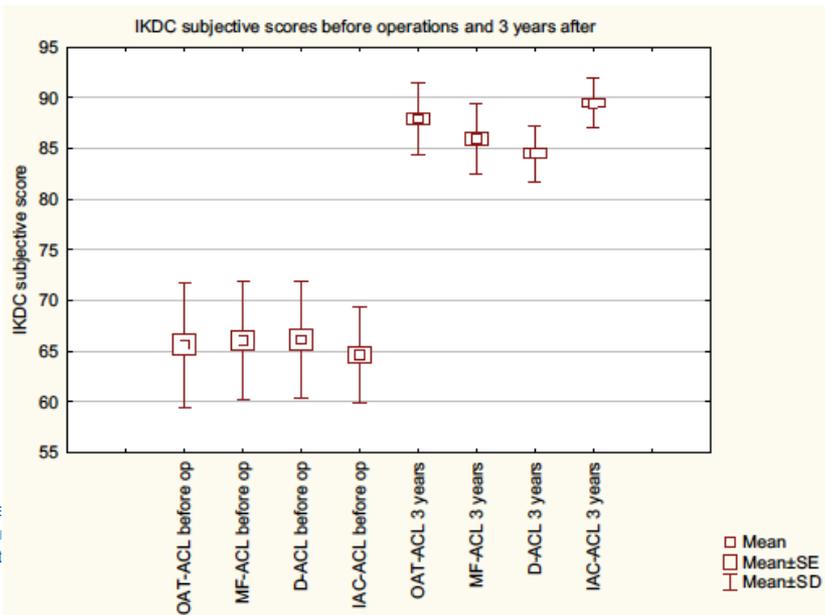
Comparative studies (2)



Comparison of Osteochondral Autologous Transplantation, Microfracture, or Debridement Techniques in Articular Cartilage Lesions Associated With Anterior Cruciate Ligament Injury: A Prospective Study With a 3-Year Follow-up

Rimtautas Gudas, M.D., Ph.D., Agnė Gudaitė, Tomas Mickevičius, M.D., Nerijus Masiulis, Ph.D., Rasa Simonaitytė, M.D., Emilis Čekanauskas, Ph.D., and Albertas Skurvydas, Ph.D.

- Arthroscopy 2013
- Comparison 4 groups (n=34X4)

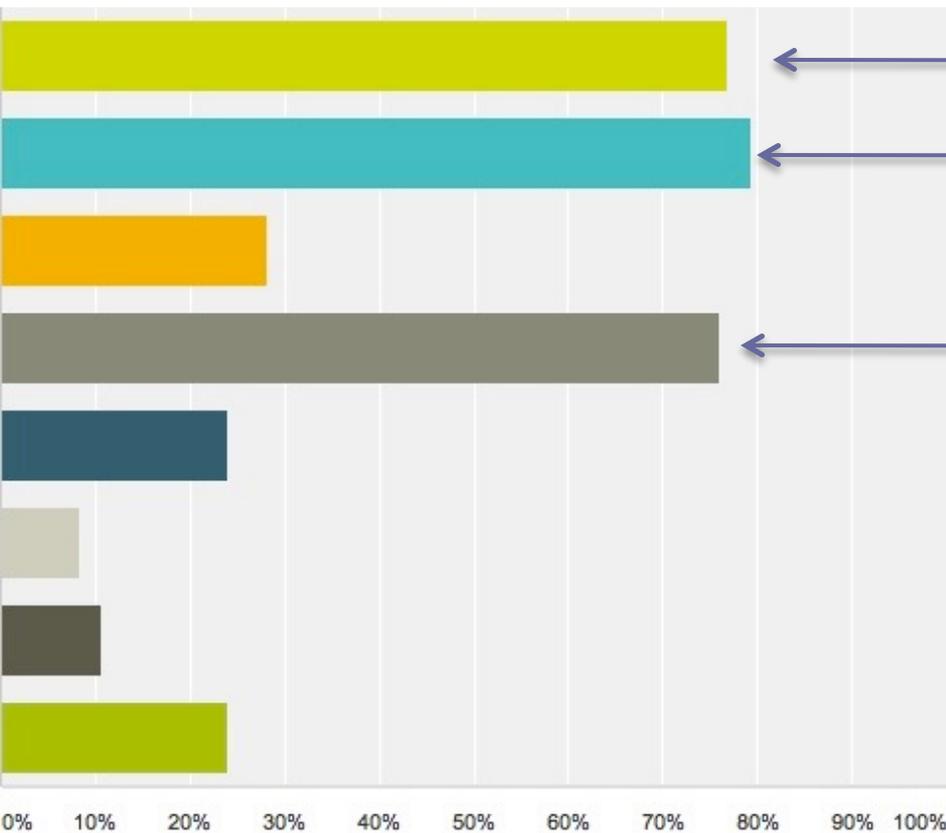


French Survey

- French Arthroscopic Society members
- Questionnaire
- N= 125
- > 50 ACLR/year 63%
- Experience > 10 years 61%
- French phylosophy?



Main criteria for treating an osteochondral lesion of the femoral condyle during ACLR



- Size of the lesion
- Symptoms related to cartilage
- Bone bruise
- Location: Weightbearing area
- Medial > lateral
- Lateral > medial
- Sports
- Kissing lesions

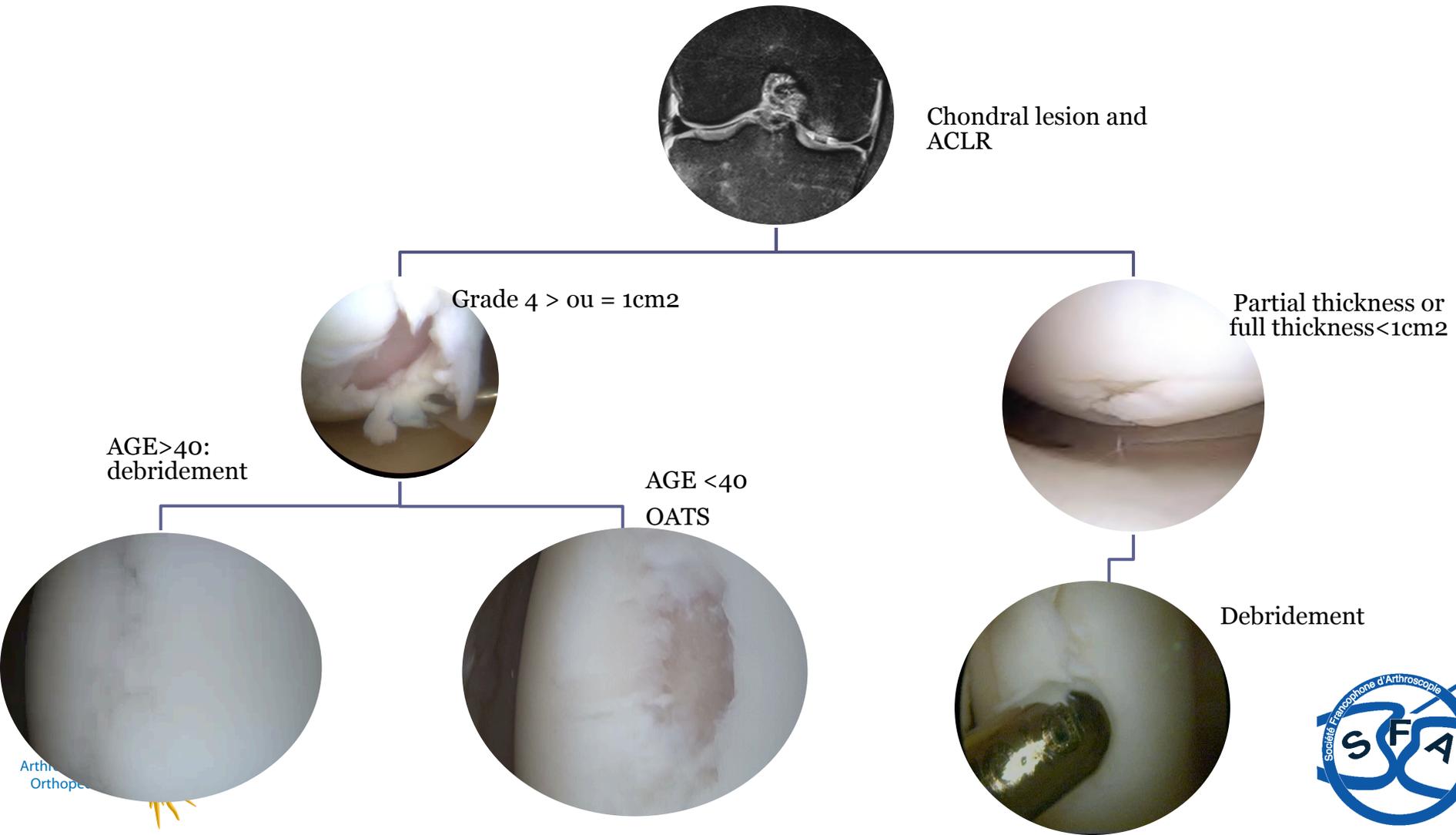
Conclusions

- High prevalence of chondral lesions at time of ACLR
- Good mid-term functional outcomes
- Risk of Degenerative lesions
- Appropriate treatment? Unknown!

- Need for comparative studies, multicentric studies?
- And long-term FU



Personal algorithm of treatment



Conclusions:

- Meniscus and cartilage and ACL: Same history
- No structured guidelines of treatment!!!!
- Need to do :-)



Ar
C

2019
The Meniscus BOLOGNA 4th International Meeting
31 January to 2 February
Royal Hotel Carlton

ESSKA