

WHEN THE MENISCUS IS GONE TO THE DOGS...
WHAT OPTIONS REMAIN?

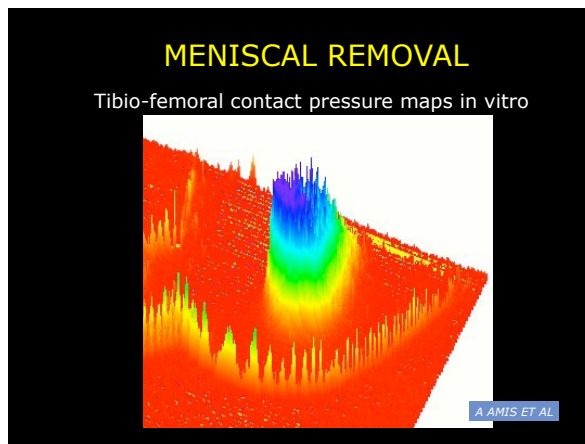
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Stabilizing role of the meniscus

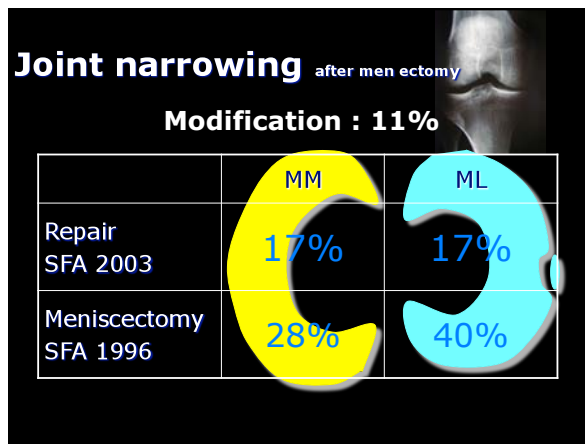
Lerat et al. Lyon

Triangular form when cut Stabilising role



PAIN AFTER M ECTOMY

	MM	ML
REPAIR SFA 2003	22%	14%
Meniscectomy SFA 1996	40%	52%



OA (10 years)

Meniscus preservation 4 - 10 %

Efficient ACL reconstruction
Dejour, Lerat, Pierrard

Meniscectomy 45 %

Osteoarthritis following Meniscectomy on stable knee :
20 % MM (NEYRET), 24 % MM / 40 % ML (SFA)

400.000 cases of meniscus surgery in Europe/year

majority

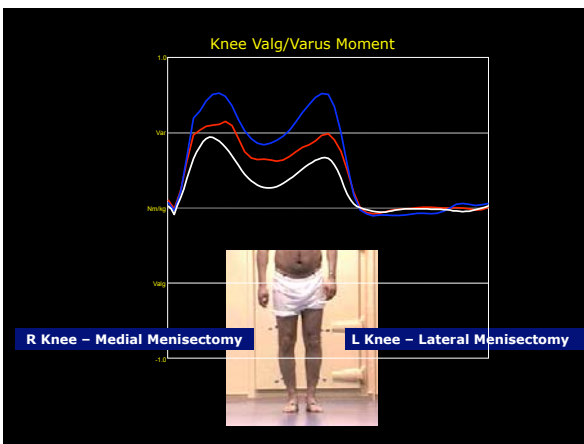
Meniscus lesions

- After resection
 - decreased capacity to distribute load
 - higher peak stress on cartilage
 - cartilage degeneration

• APPROX 4% CARTILAGE VOLUME LOSS PER YEAR¹
 • MORE LOSS LATERAL THAN MEDIAL²

1. Ciuttini FM J Rheumatol. 2002 Sep;29(9):1954-6.
 2. Chatain F et al Arthroscopy. 2003 Oct;19(8):1842-9

GAIT ANALYSIS



IF WE ARE MISSING IT

CAN WE EVER GET BACK THE ORIGINAL?

Men TX OR Men Implant

A DIFFERENT APPROACH ?

TREATMENT POSSIBILITIES AFTER IRREPARABLE MENISCAL INJURIES

Meniscal IMPLANT



MENISCAL IMPLANT


Indication

- Younger patient
- **Previous partial meniscectomy**
- Moderate to severe postmeniscectomy pain
- Cartilage status ideally limited degeneration
- Not old enough to be considered for TKA
- Good alignment → corrective osteotomy
- Stable joint → ligament repair

The ultimate goal is to

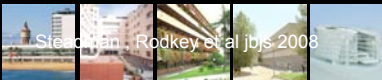
- ① prevent cartilage degeneration
- ② relieve pain
- ③ improve function

by a **meniscus substitute**






Collagen Meniscus Implant: MRI results after 4 to 7 years follow-up

Joan C. Monllau MD, PhD



Strobel, Jan., Rodkey et al. jbj.s. 2008



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Meniscal substitution

- Partial defects
- Horns & rim
- **CMI**

- Complete defects
- No meniscus rim
- **MTx**

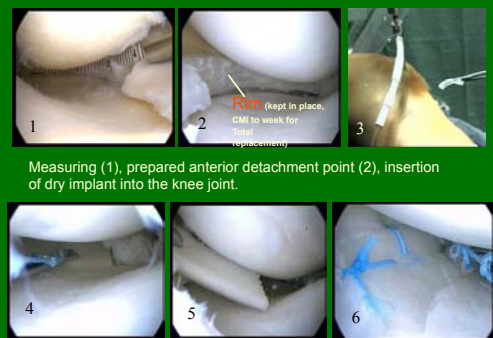
European Multicentric Trial 1997 Purpose

- To demonstrate safety and efficacy of the CMI in a wide range of population



Methods Patients demographics

- September 97 to October 2000
- 25 patients
- ranging from 18 to 48 years of age
- met inclusion criteria
 - medial meniscectomy (acute or chronic)
 - partial defect (horns and rim intact)
 - ACL stable (or stabilized)
 - well aligned knee

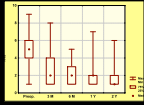


Measuring (1), prepared anterior detachment point (2), insertion of dry implant into the knee joint.

Placing first posterior horizontal suture (4), delivery of CMI into defect site (5), placing the vertical suture constructs (6).

Pain VAS (10 point scale)

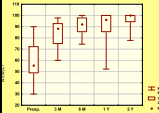
	Mean ± SD	Range
• Preop.	7.0 ± 1.8	1 - 9
• 3 Months	2.9 ± 1.8	1 - 8
• 6 Months	2.2 ± 1.3	1 - 5
• 12 Months	2.0 ± 1.4	1 - 7
• 24 Months	2.0 ± 1.6	1 - 6



Significant improvement (p < 0.002)

Lysholm (100 point scale)


	Mean ± SD	Range
• Preop.	59.9 ± 15.8	30-90
• 3 Months	83.5 ± 11.5	60-98
• 6 Months	85.1 ± 7.8	74-100
• 12 Months	87.2 ± 12.3	52-100
• 24 Months	89.6 ± 6.3	78-100



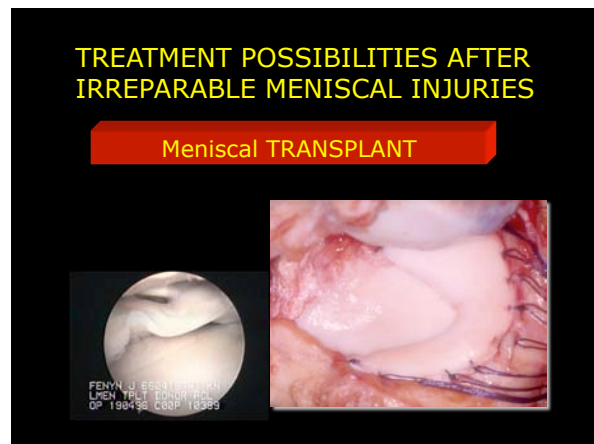
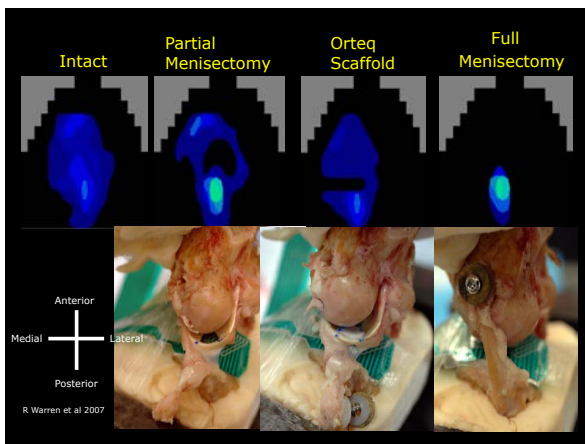
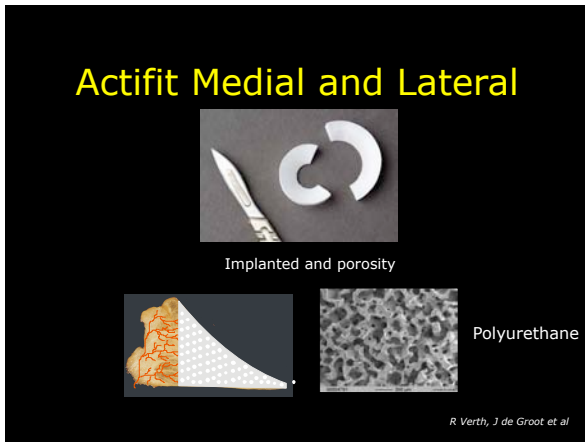
Significant improvement (p < 0.001)

Patient 12013

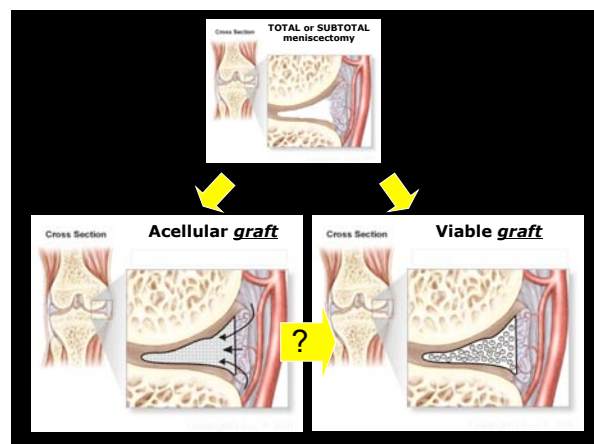
Isolated CMI reconstruction



3 years FU



- ### Indication
- Younger patient
 - **Previous total meniscectomy**
 - Moderate to severe postmeniscectomy pain
 - Cartilage status ideally limited degeneration
 - Not old enough to be considered for TKA
 - Good alignment → corrective osteotomy
 - Stable joint → ligament repair

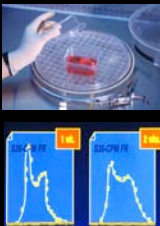


Preservation techniques for meniscal allografts

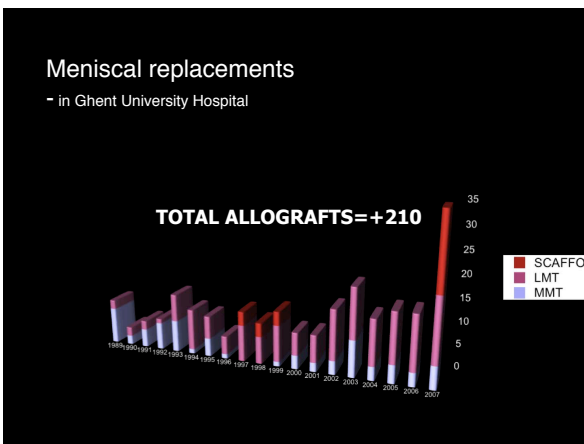
	Cells	Mechanics	Logistics
✓ Lyophilisation	ACELLULAR	↓	OK!
✓ Deep-freezing	ACELLULAR	OK!	OK!
✓ Cryopreservation	10-40%	OK!	PRICE...
✓ cultured 'VIABLE'	OK!	OK!	2W to TX

Viable meniscal allografts

- ✓ Allograft harvested < 24 h postmortem
- ✓ Culture medium: DMEM + antibiotics + L-Glut + 20 % acceptor serum
- ✓ In vitro culture for approx. 2 weeks
- ✓ Screening of donor for transmissible diseases



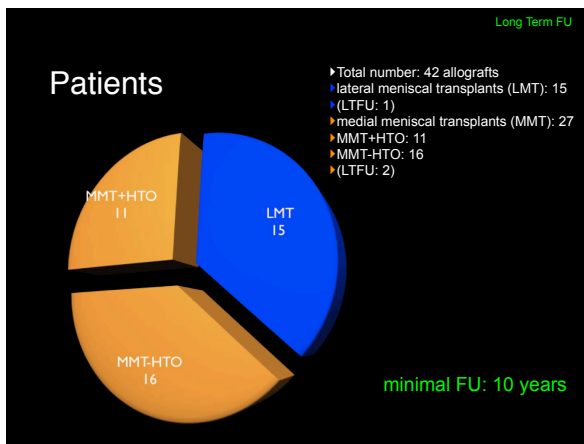
Verhagen G, Verdonk R, et al. Human meniscal proteoglycan metabolism in long-term tissue culture. Knee Surg Sports Traumatol Arthrosc. 1996;4:57-63.
Verdonk R, et al. Viable meniscus transplantation. Orthopaedics. 1994;23:153-9.

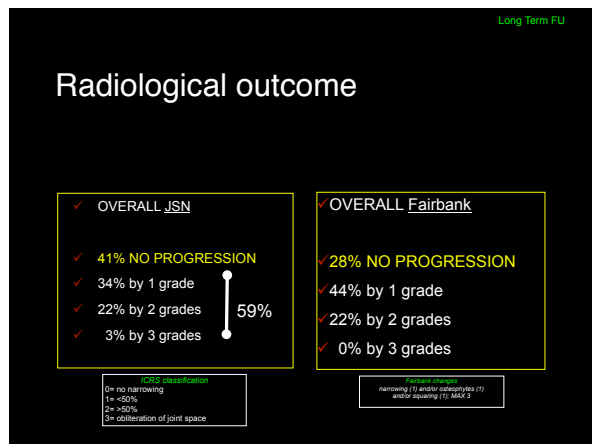
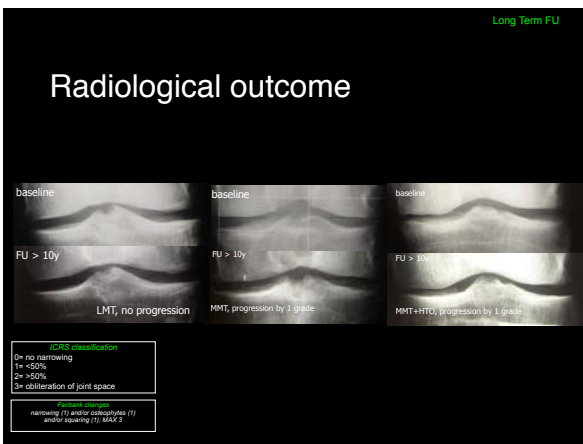
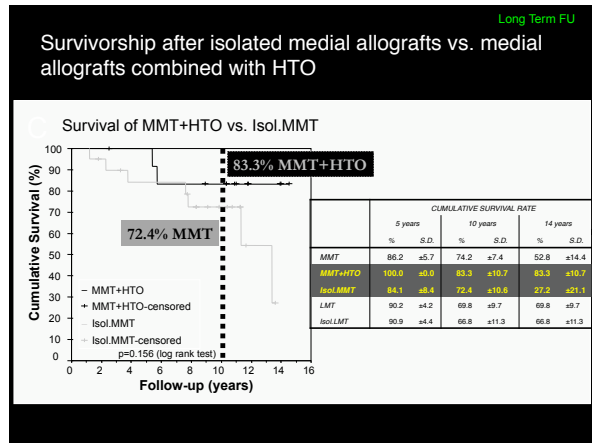
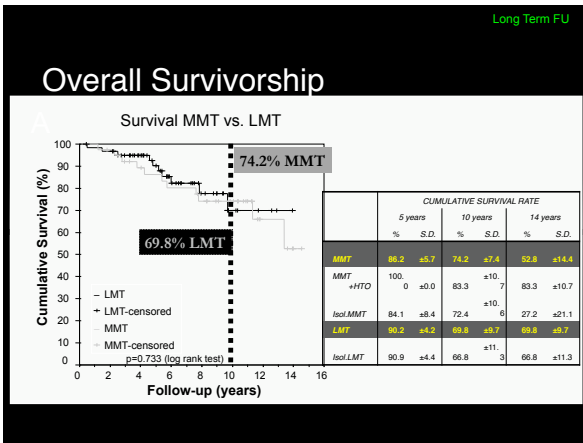
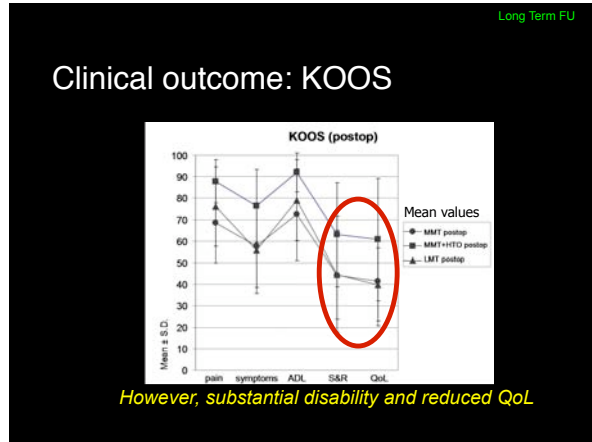
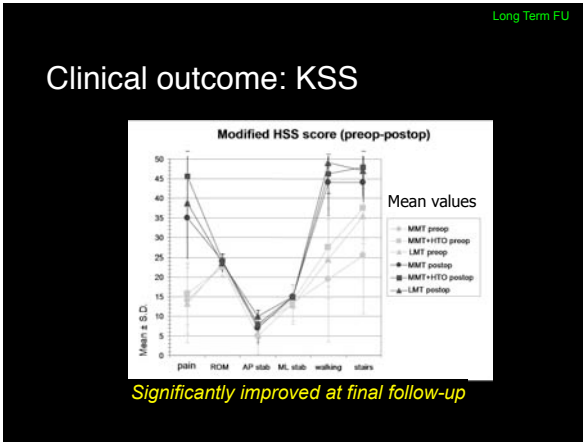


- ### Surgical technique
- ✓ Open surgery
 - ✓ MCL or LCL+Pop release by osteotomy of femoral side
 - ✓ All inside sutures
 - ✓ Fixation to meniscal rim and horns
 - ✓ Additional tag for anterior horn



Meniscal allograft transplantation:
long-term clinical results with radiological and magnetic resonance imaging correlations






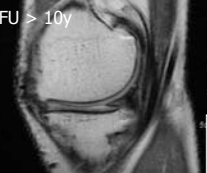
Long Term FU

MRI outcome

baseline



FU > 10y



MRI Classification cartilage

- 0= Normal
- 1= Normal contour +/- abnormal signal
- 2= Superficial fraying, erosion or ulceration of less than 50 %
- 3= Partial thickness defect of more than 50% but less than 100%
- 4= Full-thickness cartilage loss

MRI Classification meniscus

- 0= Normal
- 1= globular, not adjacent to either surface
- 2= linear within meniscus
- 3= linear extending to either superior or inferior surface

meniscus: Grade III stable
articular cartilage: no progression

MRI outcome: Cartilage

OVERALL Femoral

- 47% NO PROGRESSION
- 6% by .5 grade
- 29% by 1
- 12% by 1
- 6% by 2 g

OVERALL Tibial

- 41% NO PROGRESSION
- 18% by .5 grade

OVERALL: 35% no progression on BOTH femoral and tibial cartilage


Discussion

- Based on KSS score
 - All groups still significantly improved 10 years down the line
 - MMT+HTO tend to do better
- Based on KOOS
 - Patients adapt their lifestyle to their knee: reduced QoL

Discussion

- Does it prevent further cartilage degeneration????
 - inconclusive evidence for long-term observations
 - Wirth et al.: progression observed (lyophil+deepfrozen)
 - Hommen et al.: no progression on X-ray in 5/15 (deepfrozen)
 - Verdonk et al. (viable): some do not progress...
 - CHONDROPROTECTIVE POTENTIAL...
 - X-ray : 41% did not progress
 - MRI : 35% did not progress
 - NO CONTROL GROUPS!!! UTOPIA?

General conclusion



- ✓ reduces pain and improves function
- ✓ satisfactory clinical outcome in 70% of patients at 10 years (survival study)
- ✓ adaptation of lifestyle to the knee
- ✓ ...chondroprotective potential
- ✓ preservation techniques
 - ✓ no significant clinical difference
 - ✓ ...biological difference?

Thank you for your attention!!!

