

MENISCUS REPAIR FAILURE :

COMMON BELIEFS, HOW TO MANAGE THEM

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Many thanks to:

**P. Beaufils (*Versailles*), A. Hardy (*Paris*), C. Kajetanek (*Rennes*),
T. Noailles (*Bordeaux*)**

AND SFA



What is a failure?

- Definition of failure=
Reoperation++
- But also
- Persisting pain?
- Difficulties to return to sports?
- Disappointment, low PROMS...

Knee Surgery, Sports Traumatology, Arthroscopy (2020) 28:1177–1194
<https://doi.org/10.1007/s00167-020-05847-3>

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Management of traumatic meniscus tears: the 2019 ESSKA meniscus consensus

Sebastian Kopf¹ · Philippe Beaufils² · Michael T. Hirschmann³ · Nicolò Rotigliano³ · Matthieu Ollivier⁴ · Helder Pereira⁵ · Rene Verdonk⁶ · Nikica Darabos⁷ · Panagiotis Ntangiopoulos⁸ · David Dejour⁹ · Romain Seil^{10,11} · Roland Becker¹²

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Why failure rate?

- Depending on many reasons

→ Inform the patient accordingly

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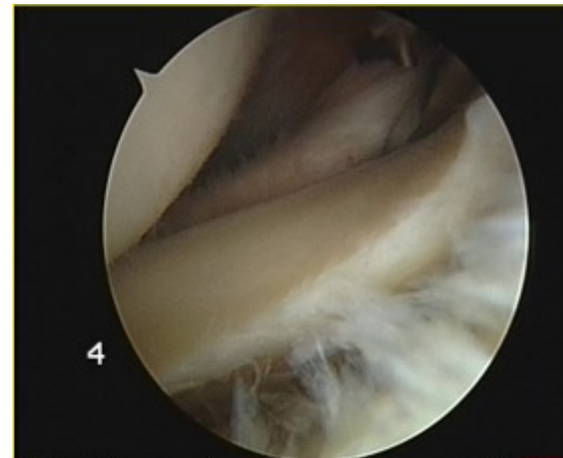
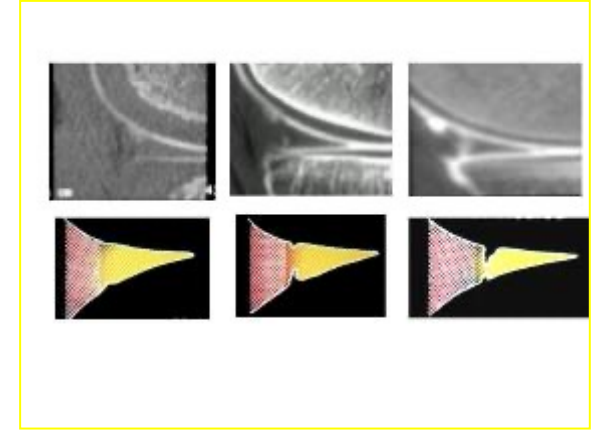
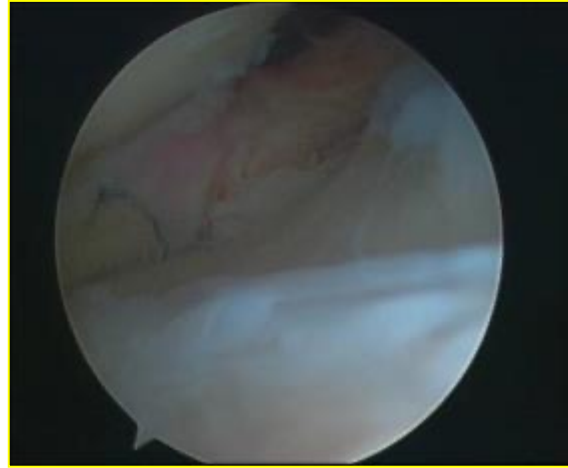
« 10/15% » Versailles Rule of the repaired meniscus

- Clinically: long-term
 - Subjective outcomes 15%
 - Objective outcomes 10 à 15%
 - O-Arthritis

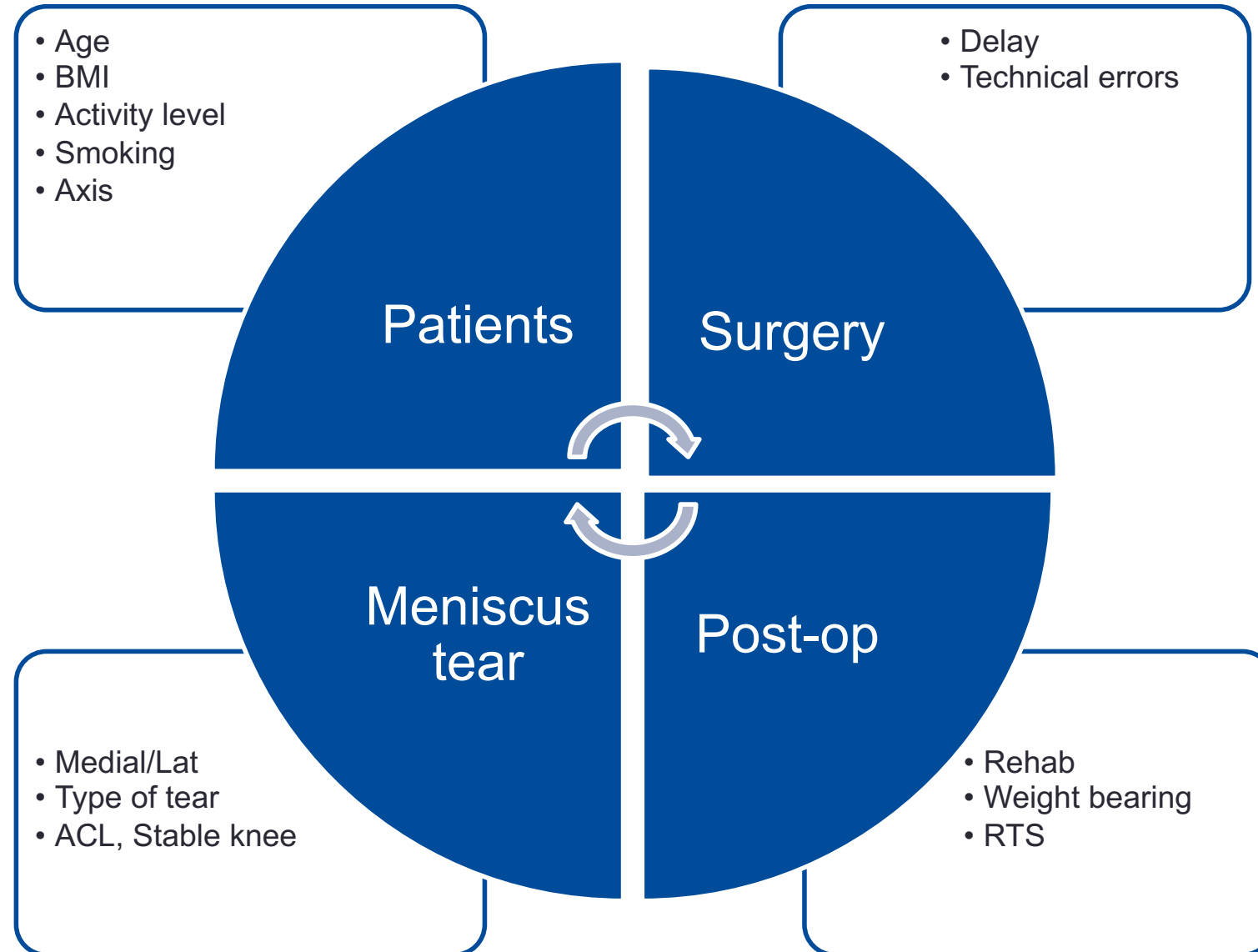
- Failures
 - Meniscectomy } 15%
 - Re-repair }

- Anatomical results
 - Healing 10 à 15%

- Morphology
 - Shortening 15%



Risk factors of failure



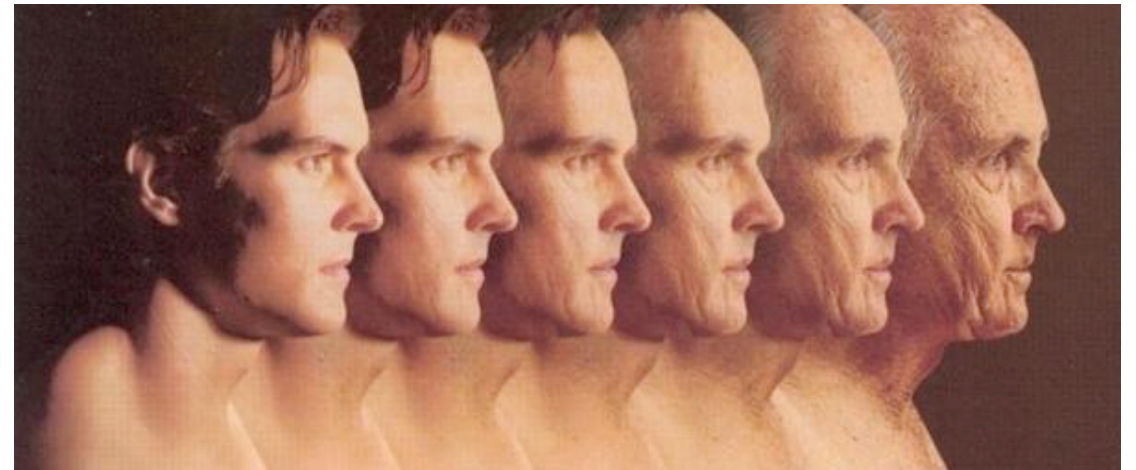
Age

- Age IS NOT a risk factor of failure

- > 200 patients

< 40 : 21%

> 40 : 18%

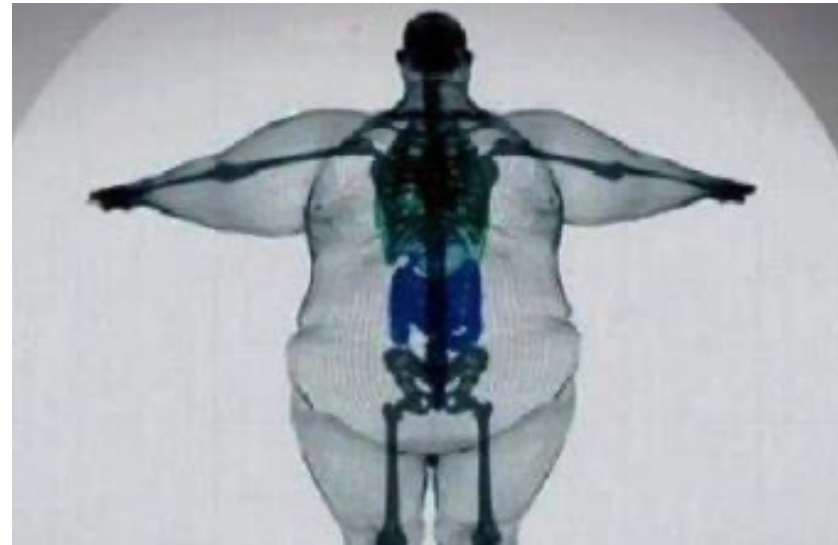


**Age of 40 Years or Older Does Not Affect Meniscal
Repair Failure Risk at 5 Years**

Poland S, Magnussen R, Flanigan D et al.
Arthroscopy 2019

BMI

- Overweight is not correlated with meniscus repair failure
- 216 patients, at 2y
- Failure rate:
 - BMI < 25 : 20%
 - BMI > 25 : 12%
- BMI > 35...???



The relationship between body mass index and risk of failure following meniscus repair.

Sommerfeldt M, Magnussen R, Randall K, et al.

J Knee Surg 2016

Sport Activity level

- 28 Studies, 664 patients
- RTS: 6 months
- Same level : 86% pros, 90% others
- Failure:

9% pros VS 22% leisure



**Sport-specific outcomes after isolated meniscal repair :
a systematic review**

Eberbach H, Zwingmann, Feucht MJ et al.

KSSTA 2017

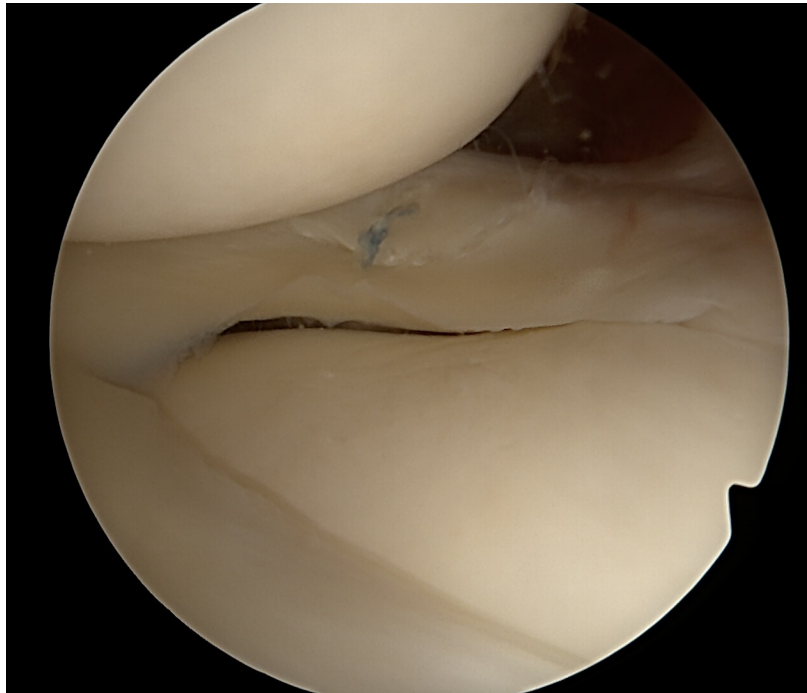
Tobacco

- YES
- 64 smokers (cohort of 444 patients)
- 13 months FU
- Failure: 17%
 - **Smokers : 27%**
 - **Non-smokers : 7%**

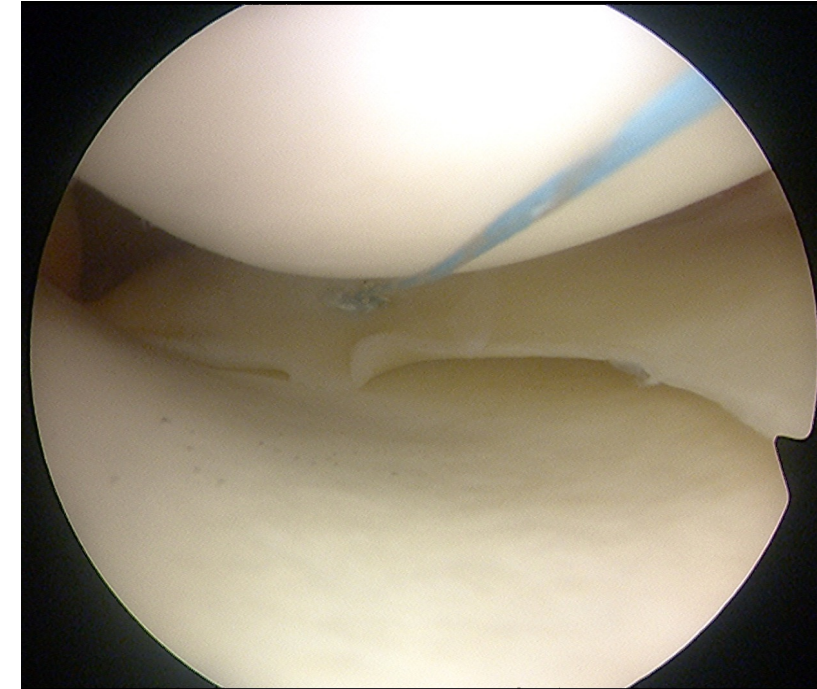
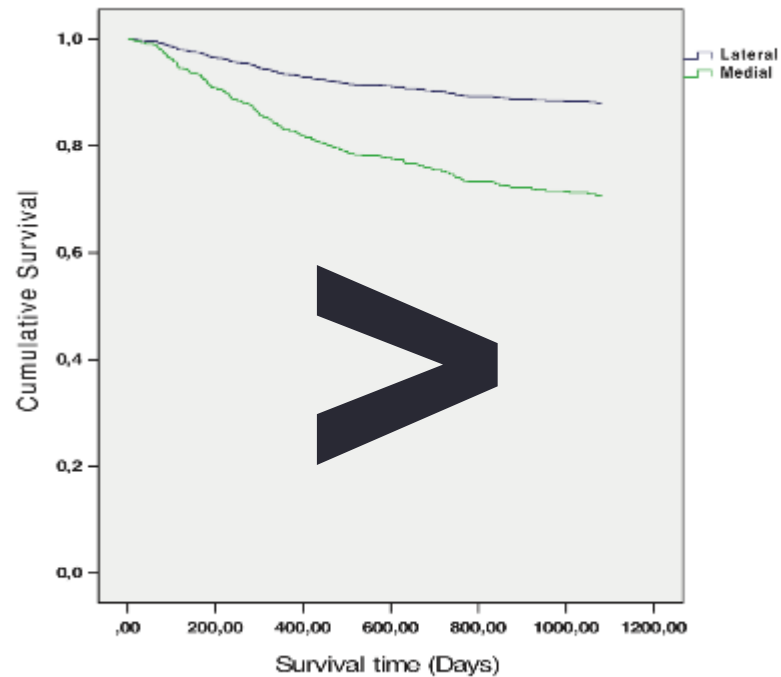


Smoking increases the risk of early meniscus repair failure
Blackwell R, Magnussen RA
KSSTA 2016

Side: lateral better than medial



Lateral



Medial

Meniscal repair versus partial meniscectomy: a systematic review comparing reoperation rates and clinical outcomes

Paxton E, Stock M, Brophy R
Arthroscopy 2011

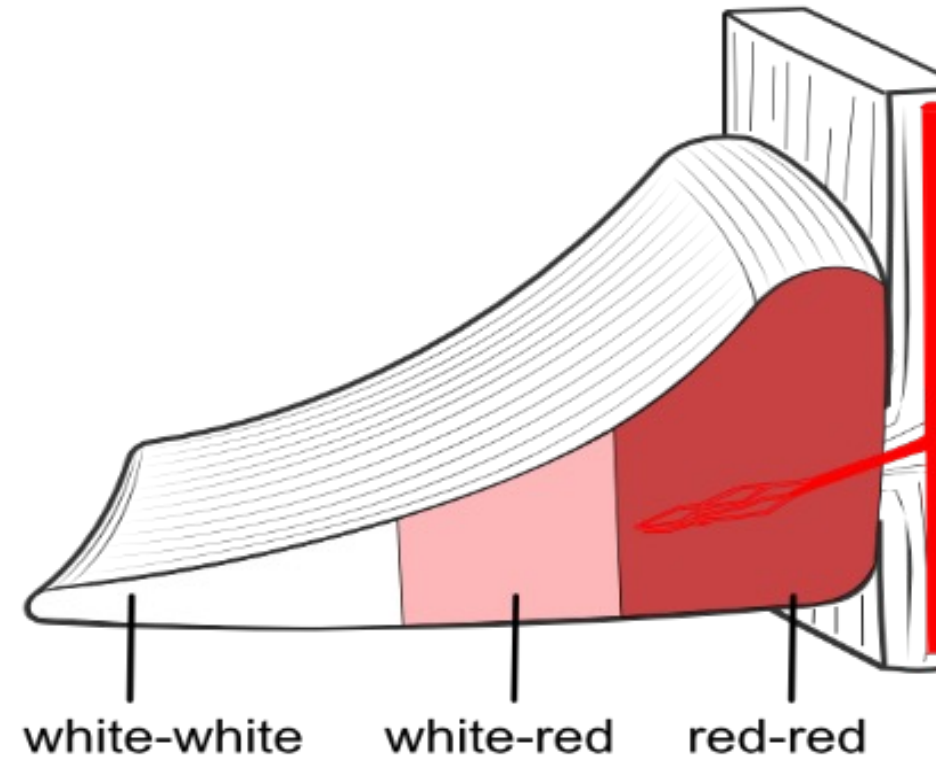
Predictive Factors for Failure of Meniscal Repair – Retrospective analysis of 918 Consecutive Cases

Ronnblad E, Erikson K et al.
OJSM 2020



Location of tear

- Yes, but...
- 36% failure in W/W zone at 3 y



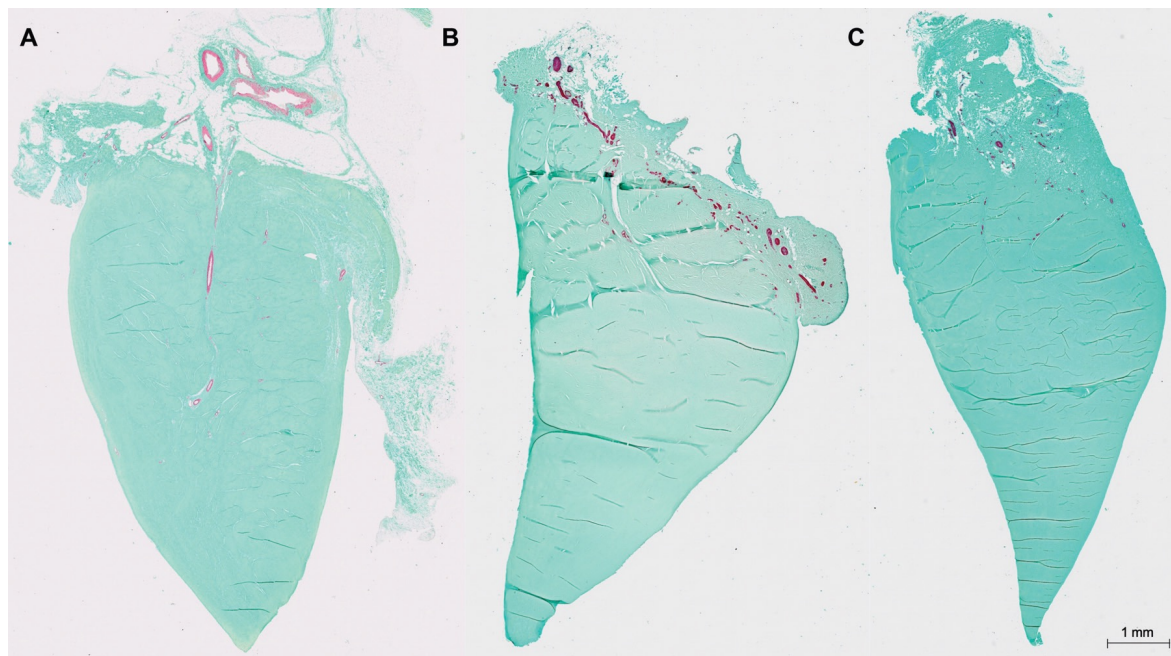
**Predictive Factors for Failure of Meniscal Repair –
Retrospective analysis of 918 Consecutive Cases**

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OJSM 2020

Microscopic anatomy

- Vessels:
- Decreasing with age



Age-Related Changes in the Microvascular Density of the Human Meniscus

Philipp A. Michel,^{*,†} MD, Christoph J. Domnick,[‡] MD, Michael J. Raschke,[†] MD, Anna Hoffmann,[†] MD, Christoph Kittl,[†] MD, Elmar Herbst,[†] MD, PhD, Johannes Glasbrenner,[†] MD, Jendrik Hardes,[§] MD, Arne Streitbürger,[§] MD, Georg Gosheger,^{||} MD, and Mirco Herbert,[†] MD
Investigation performed at the Department of Trauma, Hand and Reconstructive Surgery, University Hospital Muenster, Muenster, Germany

2021



ALMOST NO VESSELS AFTER ADOLESCENCE IN “RR OR RW” ZONE

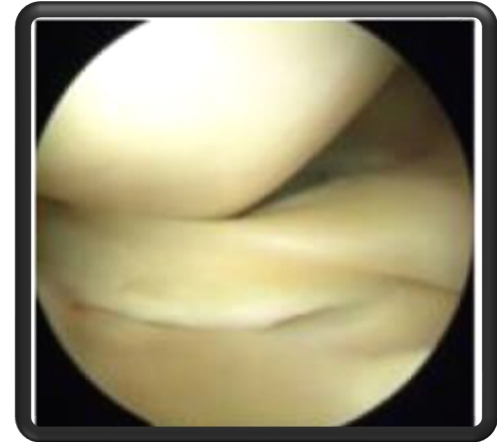
Bucket handle meniscal tear

- Technical tips and tricks
- Abrasion ++
- Knots 5/7mm (moy 5 sutures)

→17% failure (4 y FU)

→To

→29% Failure



Outcomes After Repair of Chronic Bucket-Handle Tears of Medial Meniscus

[Alejandro Espejo-Reina, M.D.](#), [José Miguel Serrano-Fernández, M.D.](#),
[Belén Martín-Castilla, M.D.](#), [Francisco Javier Estades-Rubio, M.D.](#), [Karen K. Briggs, M.P.H.](#),
and [Alejandro Espejo-Baena, M.D.](#)

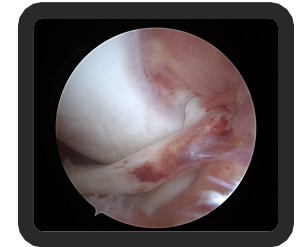
> [Am J Sports Med.](#) 2020 Nov;48(13):3386-3393. doi: 10.1177/0363546520906141.
Epub 2020 Mar 20.

All-Inside Repair of Bucket-Handle Meniscal Tears: Clinical Outcomes and Prognostic Factors

[Carolyn A Ardizzone](#)¹, [Darby A Houck](#)¹, [Derek W McCartney](#)¹, [Armando F Vidal](#)²,
[Rachel M Frank](#)¹

Always suture bucket handle lesions?

- Discussion versus meniscectomy,
- Failure rate up to 33%,
- MM (RR=4,8) and patient < 16y (RR=5,7),
- But better function (KOOS, IKDC, Lysholm) and less Oa at 10y



A high rate of clinical failure was observed after meniscal repair of bucket-handle tears. However, successful treatment led to lower rates of knee OA development and better knee function, approximately 10 years postoperatively.

Long-term follow-up of bucket-handle meniscal repairs: chondroprotective effect outweighs high failure risk

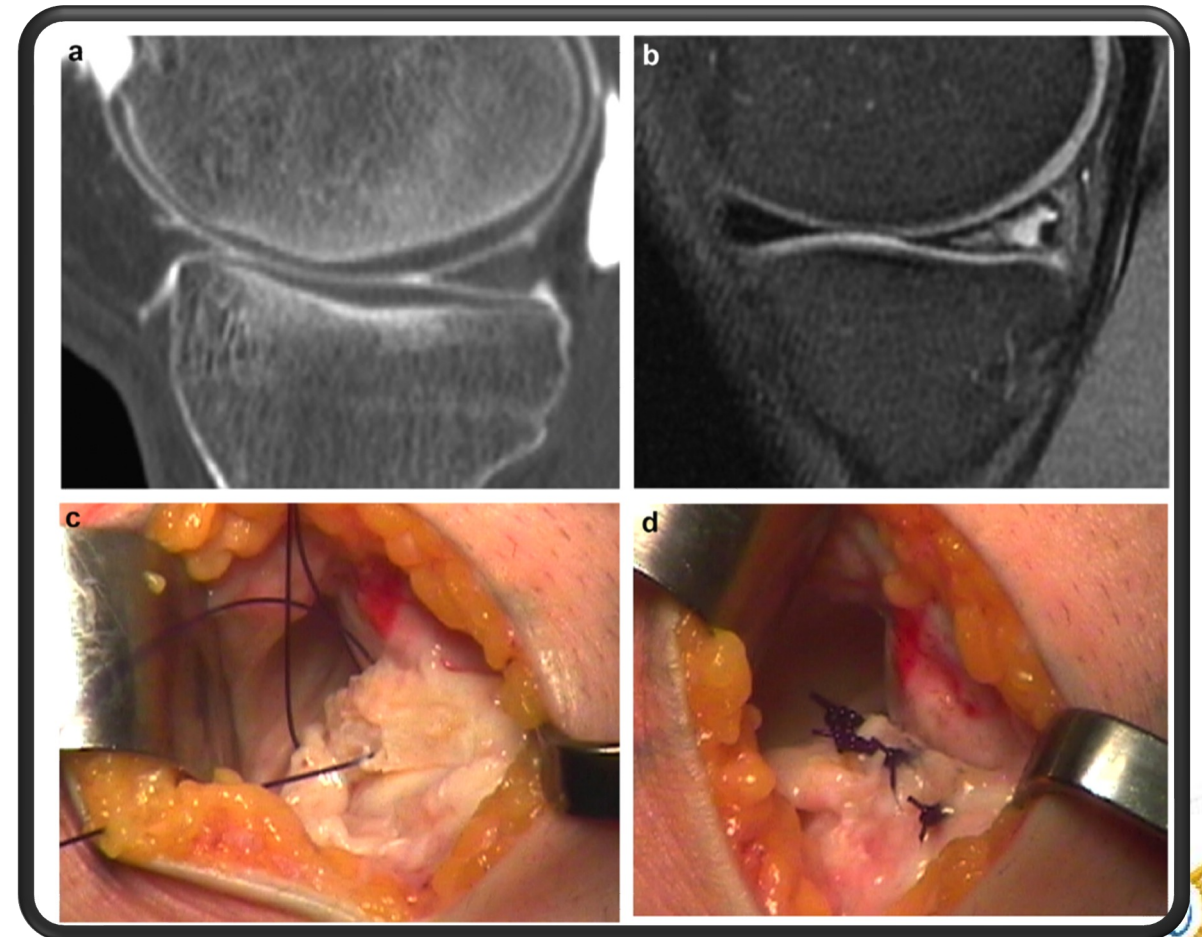
[George Kalifis](#), [Vasilios Raoulis](#), [Frideriki Panteliadou](#), [Athanasios Liantsis](#), [Riccardo D'Ambrosi](#) & [Michael Hantes](#) ✉

[Knee Surgery, Sports Traumatology, Arthroscopy](#) (2021) | [Cite this article](#)

Horizontal cleavages in young patients

- Overuse lesions
- Degenerative tissue
- MM=ML

→ 19 % Failure



Knee Surg Sports Traumatol Arthrosc
DOI 10.1007/s00167-012-2099-y

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Clinical outcomes of open meniscal repair of horizontal meniscal tears in young patients

Nicolas Pujol · Yohann Bohu · Philippe Boisrenoult ·
Ali Macdes · Philippe Beaufils

Failure rate according to the Type of lesion

ROOT



6,7%

RAMP



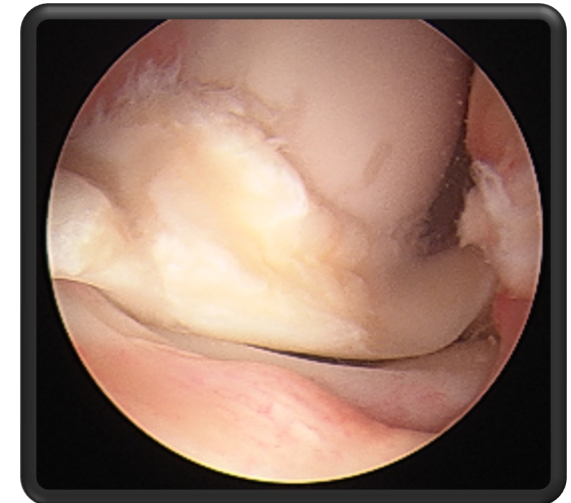
6-10,8%

HORIZONTAL (young)



19%

BUCKET HANDLE



15-30%

Chronic vs acute lesions: better if acute

Table 2 Success rates of meniscus repairs depending on time of repair after tear

Study	Type of study	Level of evidence	Number of patients	Treatment	Time cutoff	Acute/chronic	Success rate [%]
Steenbrugge et al. (2002)	Prospective study	IV	13(7 M/6F)	Meniscal repair	2 weeks	Acute	100
						Chronic	80
Stone et al. [100]	Prospective study	IV	31	Meniscal repair	2 weeks	Acute	100
						Chronic	64
Cannon and Vittori [111]	Prospective study	IV	90	Meniscal repair	8 weeks	Acute	88
						Chronic	79
Buseck and Noyes	Prospective study	IV	66(21 M/45F)	Meniscal repair	8 weeks	Acute	97
						Chronic	90
Barrett et al. [121]	Prospective study	IV	37(26 M/11F)	Meniscal repair	8 weeks	Acute	89
						Chronic	78
Egglı et al. (1995)	Prospective study	IV	54	Meniscal repair	8 weeks	Acute	90
						Chronic	71
Noyes et al. (2000)	Prospective study	IV	27	Meniscal repair	10 weeks	Acute	90
						Chronic	85
Venkatachalam et al. (2001)	Prospective study	IV	59(38 M/21F)	Meniscal repair	3 months	Acute	92
						Chronic	58

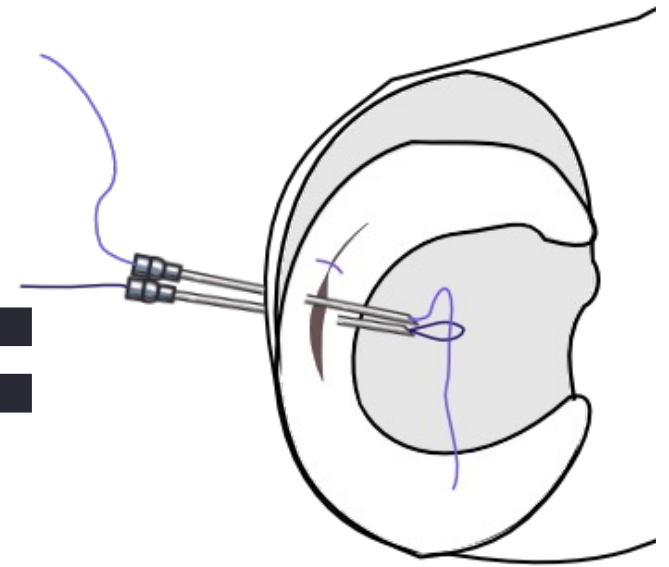
Management of traumatic meniscus tears: the 2019 ESSKA meniscus consensus

Kopf S, Beaufils P et al.

KSSTA 2020



Technique



Meniscal repair outcomes at greater than five years : a systematic literature review and meta-analysis

Nepple JJ, Dunn WR, Wright RW.
J Bone Joint Surg Am. 2012

Weight bearing, rehab

- No difference
(except for Roots and Radial tears)



Free rehabilitation is safe after isolated meniscus repair: a prospective randomized trial comparing free with restricted rehabilitation regimens.

Lind M, Christiansen SE
Am J Sports Med 2013

Similar failure rate in immediate post-operative weight bearing versus protected weight bearing following meniscal repair on peripheral, vertical meniscal tears

Perkins B, Tompkins MA
KSSTA 2017

Diagnosis of failure: MRI?

- Sensibility ok, low specificity.

	No signal	Horizontal signal	Vertical signal
IKDC	90	85	94
Lysholm	96	95	96



[Int Orthop.](#) 2013 Dec; 37(12): 2371–2376.

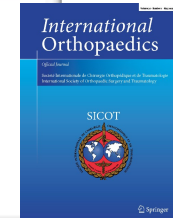
Published online 2013 Aug 15. doi: [10.1007/s00264-013-2039-6](https://doi.org/10.1007/s00264-013-2039-6)

PMCID: PMC3843218

PMID: [23948982](https://pubmed.ncbi.nlm.nih.gov/23948982/)

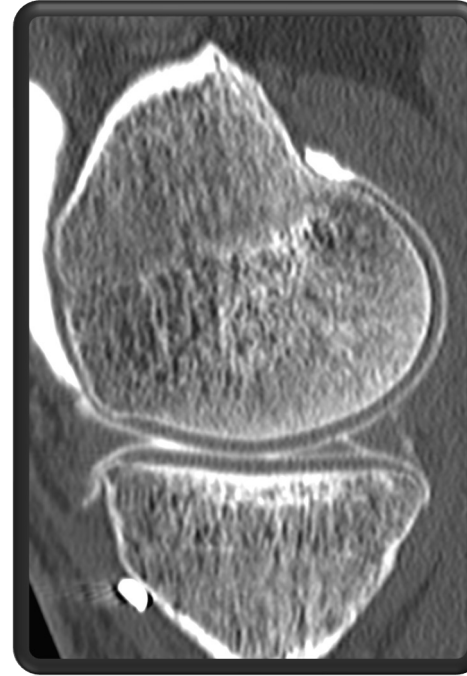
Magnetic Resonance Imaging is not suitable for interpretation of meniscal status ten years after arthroscopic repair

Nicolas Pujol,  Nicolas Tardy, Philippe Boisrenoult, and Philippe Beaufile



Arthro CT scan ++

- After 6 months
- If persisting symptoms
- Objective Healing



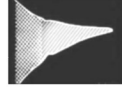
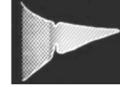

Meniscal Healing After Meniscus Repair

A CT Arthrography Assessment

Nicolas Pujol,^{*†} MD, Ludovico Panarella,[†] MD, Tarik Ait Si Selmi,[‡] MD, Philippe Neyret,[‡] MD, PhD, Donald Fithian,[§] MD, and Philippe Beaufils,[†] MD



TABLE 2
Healing Rates by Meniscus Segment

Complete Healing	Partial Healing >50%	<50% Healing	Total
			

What if meniscus repair failure= meniscectomy?

- Often Less resection
- No additional chondral damage

Amount of Meniscectomy Related to the Initial Tear⁴

	Posterior Segment	Medium and Posterior Segments	All Segments
Less (35% cases)	0	11	2
Equivalent (51.5% cases)	5	12	2
More (13.5% cases)	4	1	0

Amount of Meniscal Resection After Failed Meniscal Repair

Nicolas Pujol,^{*†} MD, Olivier Barbier,[†] MD, Philippe Boisrenoult,[†] MD, and Philippe Beaufile,[†] MD

Investigation performed at the Orthopedic Department, Centre Hospitalier de Versailles, Versailles-Saint Quentin University, Le Chesnay, France

Mean reoperation: 3 years.

→ Partial failure !

Revision meniscus Repair?

- Re-Failure: 25.5%
- Indications?

Young age
Technical error
Lateral meniscus
+++

Study	Number of patients	Follow-up period	Failure rate	Lysholm Score	IKDC Score	Tegner Scale
Imade et al., 2014	15	41 months (range, 24–74 months)	33%	97.4 (range, 90–100)	–	5.9 (range, 2–9)
Krych et al., 2016	34	72 months (range, 2 to 17 years)	21%	–	84.8 (range, 51.7–100)	6.2 (range, 3–9)
Voloshin et al., 2003	18	7.33 years (range, 3.25 to 13.75 years)	28%	82.1 (range, 38–100)	–	5.6 (range, 2–8)
Present study	12	43 months (range, 24–78 months)	25%	95.2 (range, 90–100)	–	6.8 (range, 4–10)

Conclusions

- Each repairable lesion must be repaired
- Even if you will have 15% reoperations
- Inform the patient accordingly

And

... Repair !

