ACL Repair vs. ACL Reconstruction – a Randomized Controlled Trial with Five-Year Follow-Up

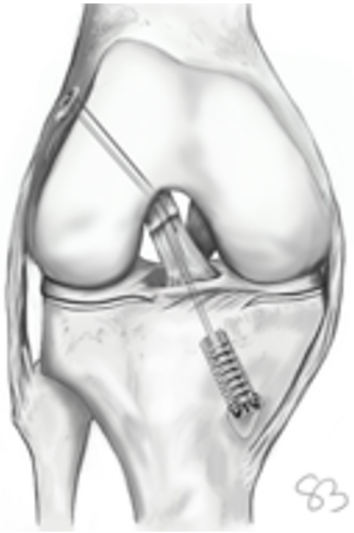
Johannes Glasbrenner

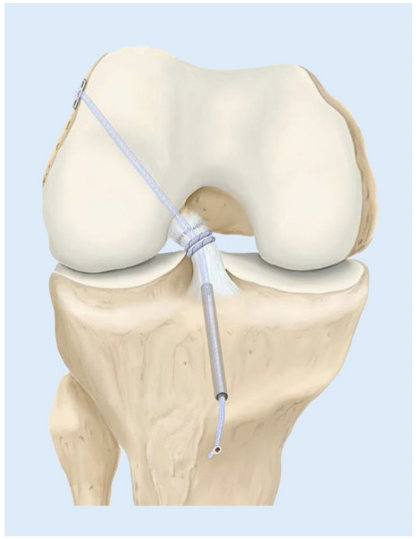
Study performed at: University Hospital Münster (Germany), Department of Trauma Hand, and Reconstructive Surgery

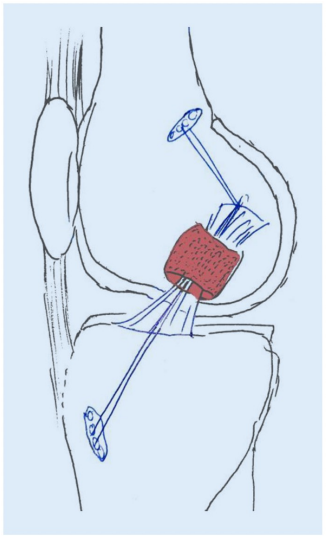
Disclosures

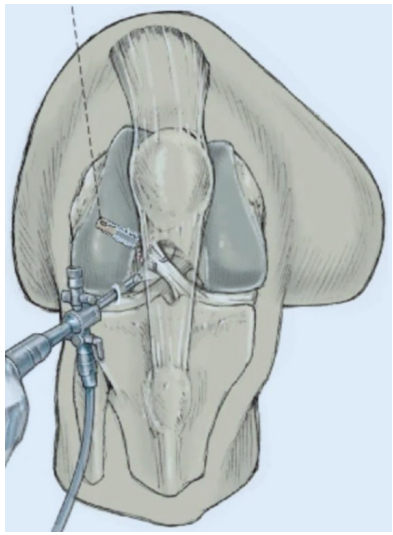
- Research Grant by Mathys (Switzerland)

Introduction: ACL Repair







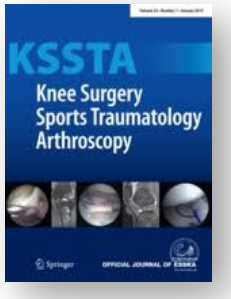


Glasbrenner 2022 AJSM

Schneider 2022 KSSTA

Glasbrenner 2023 Arthroskopie

Achtnich 2017 OOT

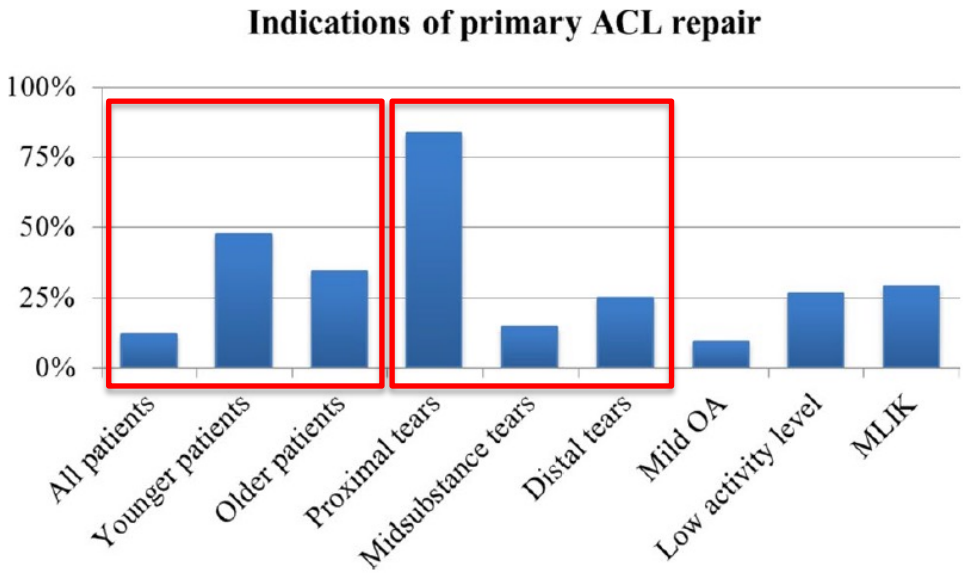


2020

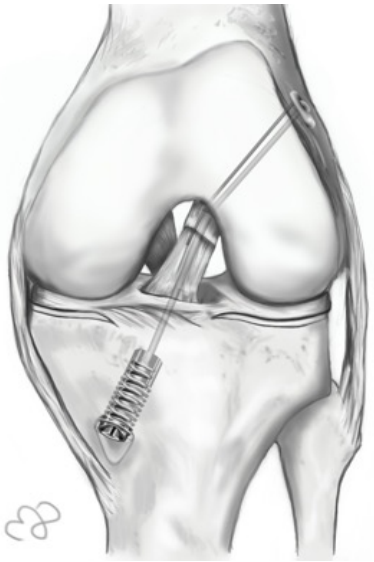
Large variation in indications, preferred surgical technique and rehabilitation protocol for primary anterior cruciate ligament repair: a survey among ESSKA members

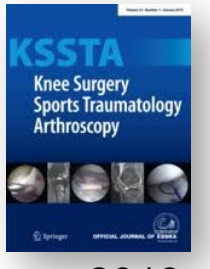
Harmen D. Vermeijden[1] · Xiuyi A. Yang[1] · Jelle P. van der List[1,2] · Gregory S. DiFelice[1]

- 169 ESSKA members & ACL Surgeons
- 70% using ACL Repair
- High variation in technique and indication
- Missing evidence



Dynamic Intraligamentary Stabilisation (DIS) – Ligamys® (Mathys)



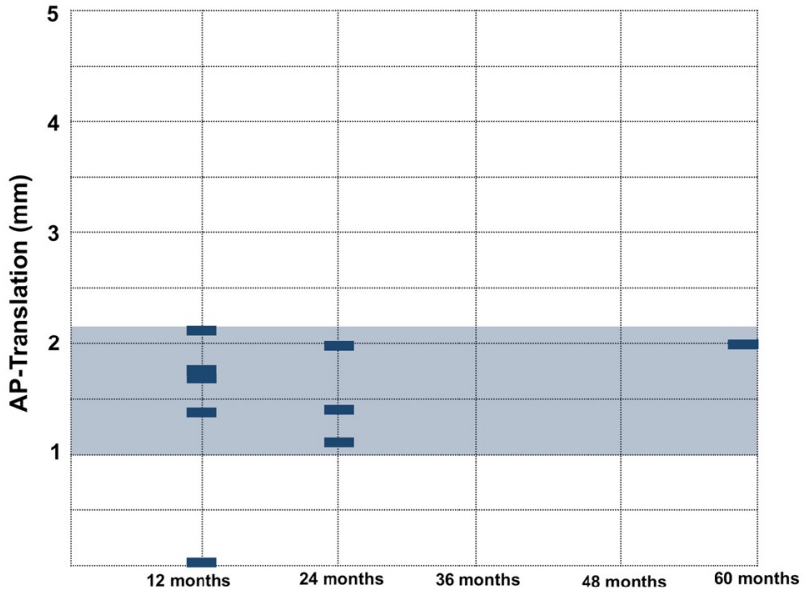


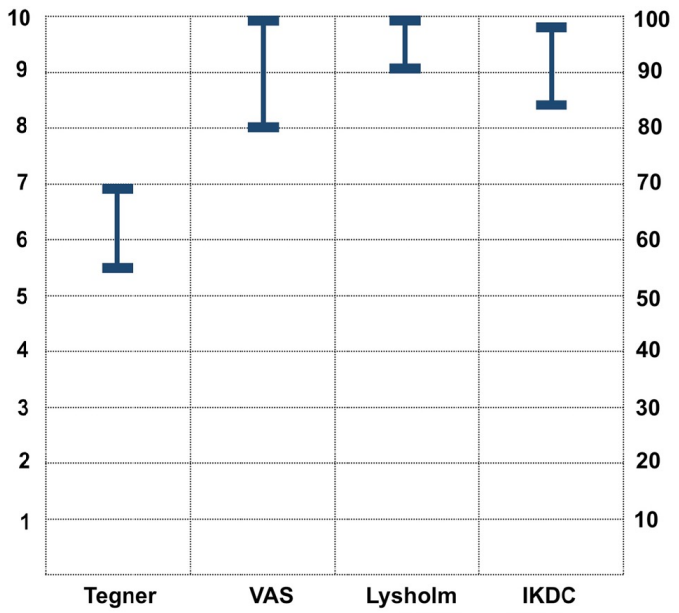
2019

Dynamic intraligamentary stabilization for ACL repair: a systematic review

Sufian S. Ahmad[1] · Anna J. Schreiner[1] · Michael T. Hirschmann[2,3] · Steffen Schröter[1] · Stefan Döbele[1] · Marc D. Ahrend[1] · Ulrich Stöckle[1] · Atesch Ateschrang[1]

- 23 studies with > 2000 patients





Study Design

Single centre, randomized controlled trial (German Trial Registry: DRKS00015466)

ACL Repair with DIS vs. ACL Reconstruction with Semitendinosus-Autograft

Inclusion:

acute ACL injury

age 18-50 years

surgery < 21 days

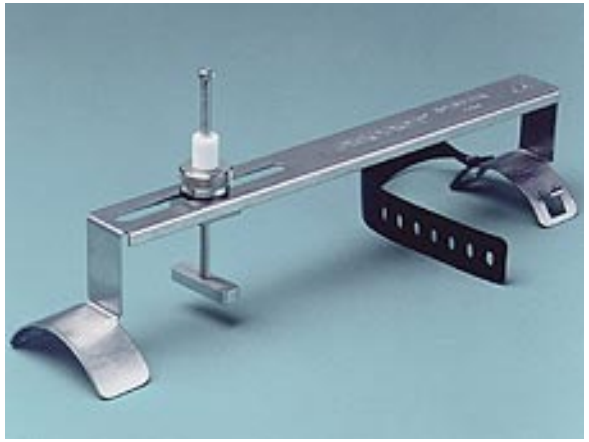
Exclusion:

relevant meniscal, cartilage or multiligament injury; medication; pregnancy; lack of compliance regarding study protocol

Treatment failure leading to exclusion from follow-Up:

Delta Lachman (operated - uninjured) > 3mm or positive pivot shift test AND subjective instability

Study Protocol



- Inclusion period 05/2014 until 12/2015
- Envelope Randomisation (4:4) at the beginning of the surgery
- Standardized Rehab protocol including full weight bearing after 5 days
- Primary Outcome Measures: ATT (Lachman-Rolimeter), Tegner, IKDC and Lysholm at 5 years postoperatively
- Secondary Outcome Measures: recurrent instability, complications and revision surgeries until 5 years postoperatively
- Power analysis a priori: inclusion of min. 28 patients per group to detect a mean delta Rolimeter-Lachman 3mm [SD 2mm] between groups with an expected loss to follow up of 15% ($\alpha = 0.05$; $\beta = 0.8$)
- Statistics: Friedman test, Mann-Witney U test, Bonferroni correction

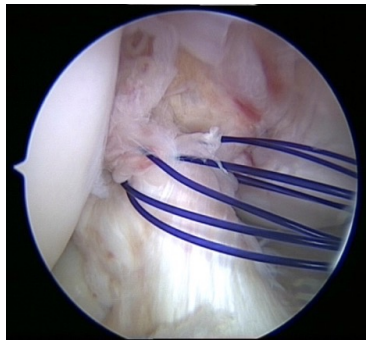
Study Cohorts

	Repair (n = 43)	Recon (n = 42)
Sex [male / female]	25 / 18	31 / 11
Age [years]	28.7 (SD 11.4)	27.6 (SD 10.6)
BMI	23 (SD 2.0)	24.6 (SD 2.8)
Tegner prior to Injury	5.9 (SD 1.5)	6.6 (SD 1.7)
Intervall Injury to Surgery [days]	14.5 (SD 5.2)	16.2 (SD 7.3)
Duration of Surgery [minutes]	54.6 (SD 12.8)	71.3 (SD 23.5)
Follow-Up at 2 Years	43 (100%)	40 (95%)
Follow-Up at 5 Years	34 (79%);	30 (71%)

Results: Recurrent Instabilities

- **n = 12 of 34 (34 %)**
- Tegner > 6 in 10 of 12 patients
- Age < 25 in 10 of 12 patients
- No case of contralateral ACL injury

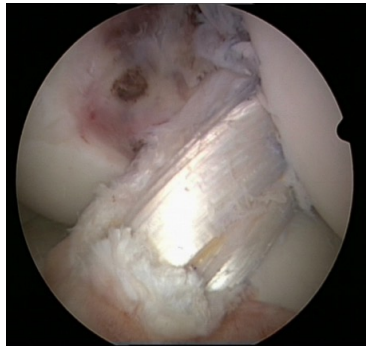
- **ACL revision reconstruction n = 10 (29 %)**
- single stage revision in each case.



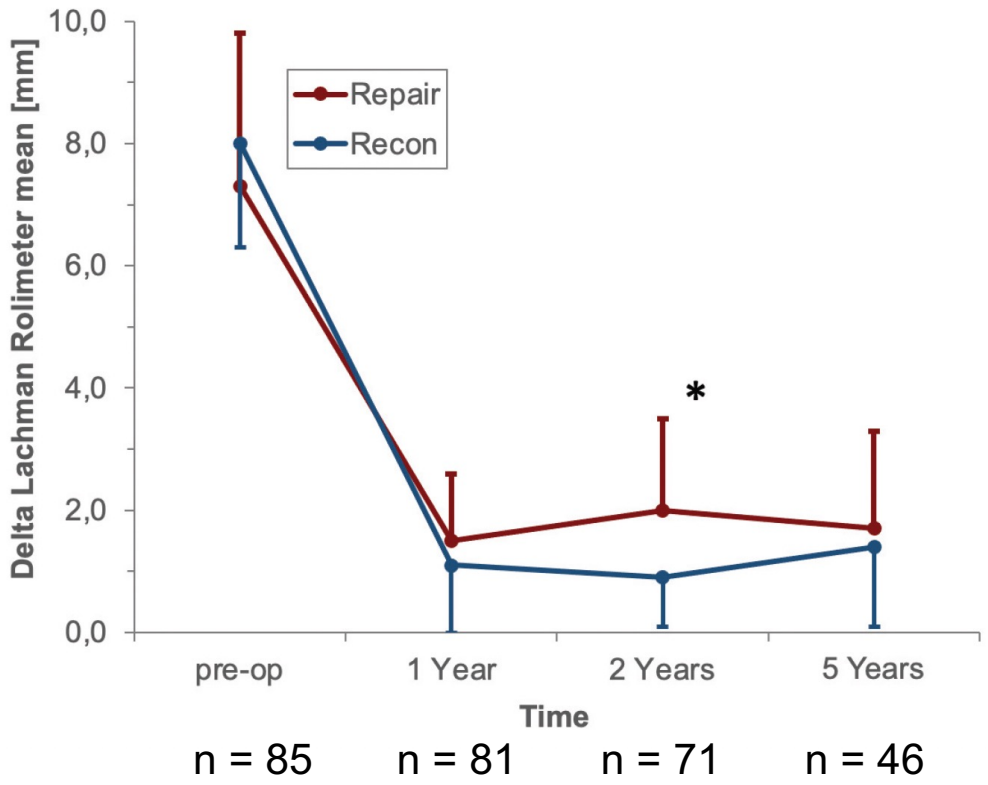
vs.

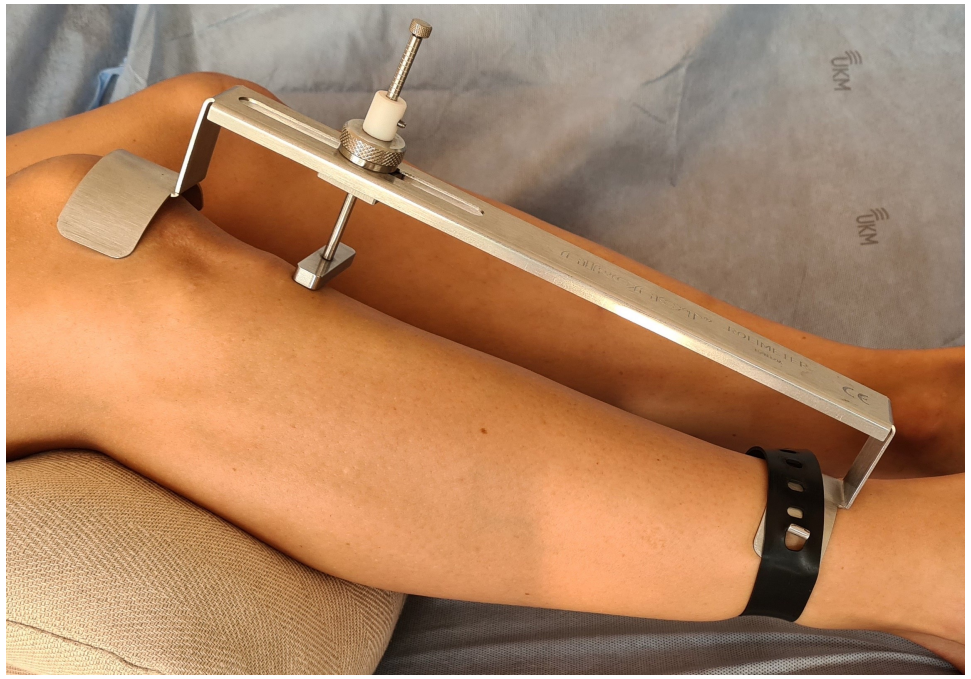
- **n = 6 of 30 (20 %)**
- Tegner > 6 in 5 of 6 patients
- Age < 25 Jahre in 5 of 6 patients
- contralateral ACL injury n = 2 (5%)

- **ACL revision reconstruction n = 5 (17 %)**
- two stage revision (tunnel widening) in each case.



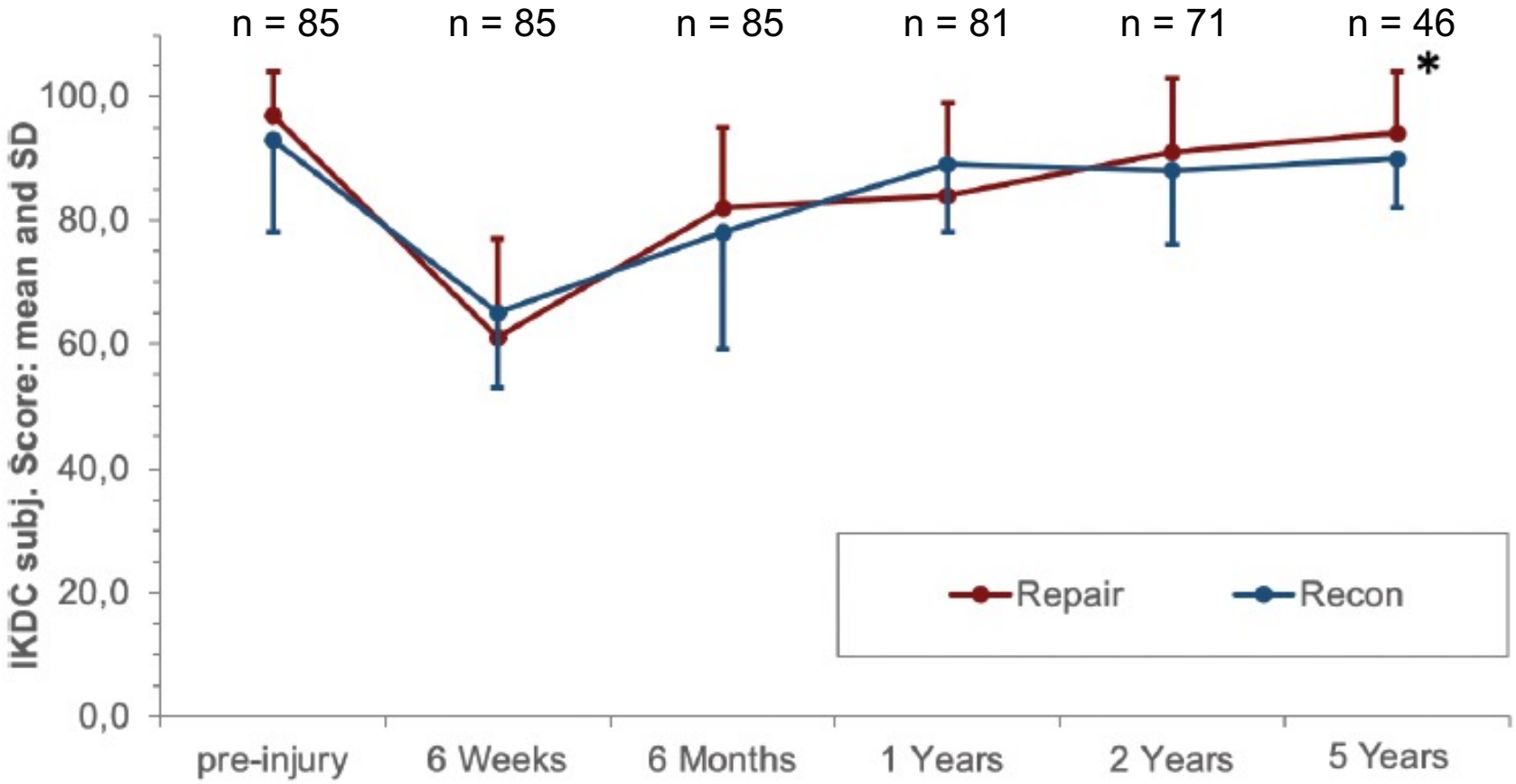
Results: Anterior Tibial Translation





- ✓ No difference between Repair (1.7 ± 1.6 mm) und Reconstruction (1.4 ±1.3 mm) at 5 years
- ✓ Delta-Lachman in both groups < 3mm during entire follow-up period

Results: Patient Reported Outcome Measures



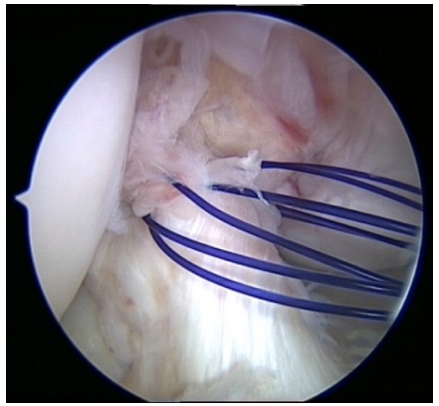
- ✓ Pre-injury level is restored in both groups as soon as 1 year after surgery
- ✓ No clinically relevant difference between Repair and Reconstruction until 5 years

Adverse Events

	Repair (n = 43)	Recon (n = 42)
Infection	-	-
Recurrent Instability (p = 0.065)	12 (28%)	6 (14%)
ACL Revision Reconstruction	10 (19%)	5 (12)
Contralateral ACL Injury	-	2 (5%)
Re-Arthroscopy	4 (9%)	4 (9%)
Arthrofibrosis / Cyclops syndrome	3 (7%)	1 (2%)
Secondary meniscal tears	1 (2%)	3 (7%)

Limitations

- No blinding of surgeon and patient
- Young an active Cohorts (mean 28 years and Tegner 6)
- Study is **underpowered at the 5-year FU** (n = 64 / 85, FU 75%)
- Exclusion in case of treatment failure (18 / 85) -> **no intention-to-treat-analysis**
- **No LET** performed
- Progressive **rehab protocol**
- **Indication for ACL Repair** has evolved …



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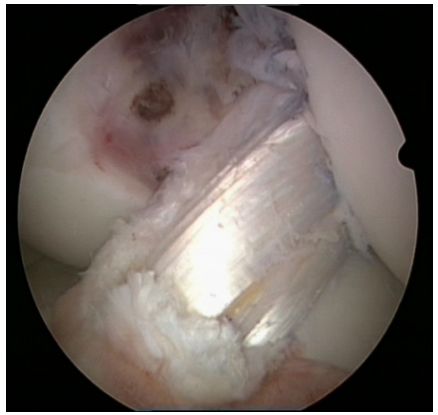
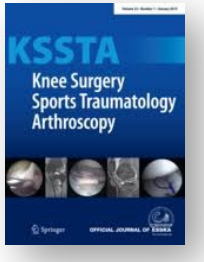
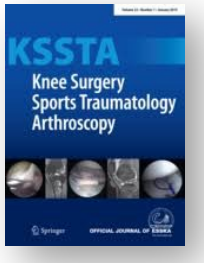




2020

Seventy percent long-term survival of the repaired ACL after dynamic intraligamentary stabilization

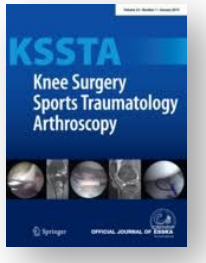
Sufian S. Ahmad[1] · Katharina Schürholz[2] · Emanuel F. Liechti[2] · Michael T. Hirschmann[3] · Sandro Kohl[4] · Frank M. Klenke[2]



2020

Patient and surgical characteristics that affect revision risk in dynamic intraligamentary stabilization of the anterior cruciate ligament

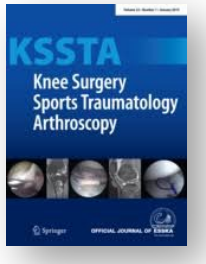
Philipp Henle[1] · Kathrin S. Bieri[2] · Manuel Brand[4] · Emin Aghayev[2] · Jessica Bettfuehr[3] · Janosch Haeberli[1] · Martina Kess[1] · Stefan Eggli[1]



2017

Factors influencing the success of anterior cruciate ligament repair with dynamic intraligamentary stabilisation

Anna M. Krismer[1] · Lampros Gousopoulos[1] · Sandro Kohl[1] · Atesch Ateschrang[2] · Hendrik Kohlhof[3] · Sufian S. Ahmad[1]



2017

Improved results of ACL primary repair in one-part tears with intact synovial coverage

Atesch Ateschrang[1] · Anna Janine Schreiner[1] · Sufian S. Ahmad[1] · Steffen Schröter[1] · Michael T. Hirschmann[2,3] · Daniel Körner[1] · Sandro Kohl[4] · Ulrich Stöckle[1] · Marc-Daniel Ahrend[1,5]

Optimal Indication for ACL Repair:

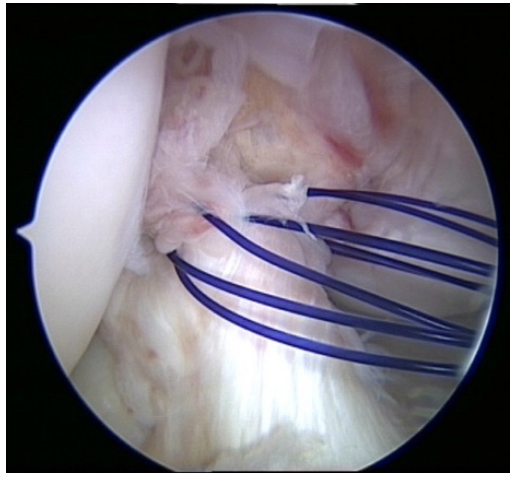
- ✓ age > 25 Years
- ✓ Tegner Score < 7
- ✓ proximal lesion
- ✓ intact synovial sheet
- ✓ surgery within 21 days

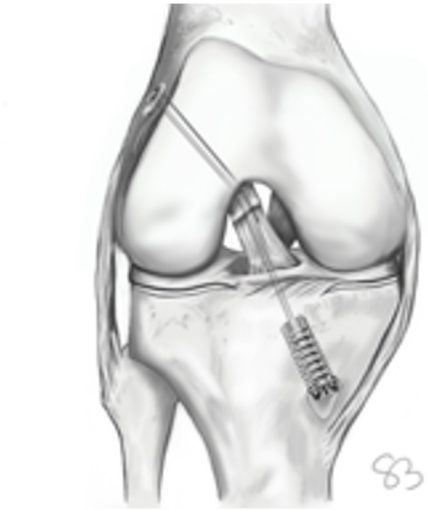
↓

- ✓ recurrent instabilities < 5 %

Conclusion ACL Repair

- ✓ **Growing evidence** (23x prospective cohorts, 2x RCT with 5-Year FU)
- ✓ Rate of recurrent instability depends on **patient selection** (activity / age / rupture / PTS)
- ✓ No sign. difference regarding obj. and subj. outcome in comparison to ACL Recon
- ✓ ACL Repair with DIS seems to be a feasible option in **a specific group of patients**
- ✓ Future: Dynamic and biologic augmentation? ACL Repair + LET?





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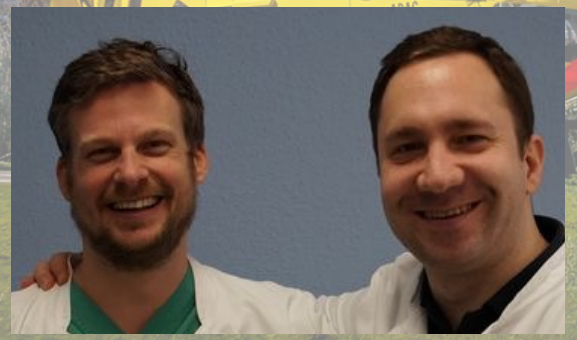




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