

Complication of Meniscal Surgery

Ph. Landreau
Aspetar, Doha, Qatar

Definition

- A **surgical complication** may be defined as an untoward event that occurs during the perioperative period as a result of a surgical procedure that causes patient morbidity and adversely affects patient outcome.
- ≠ An **incident** may be defined as an untoward event that is recognized during the perioperative period and is acted upon and addressed to avoid any adverse effects or morbidity to the patient.

Outlines

- Overall complications
- Non specific complications
 - Infection, thromboembolic, vascular and neurologic
- Procedure-specific complications
 - Setup, Instrumentation, Meniscectomy
 - Meniscal repair
 - Allografts

Overall complications

- Complications of knee arthroscopy: **8.2%**
- Complications specifically attributed to meniscal surgery have been reported to range from **1.7%** for meniscectomy and **1.29%** for meniscal repair in a prospective multicenter series documenting the outcomes of 8741 knee arthroscopies performed by “experienced” arthroscopists.
- Partial medial meniscectomy: **12.5%** Partial lateral meniscectomy **8.5%**.
- Meniscal repair: overall complication rate of **18%** (19% for medial repairs and 13% for lateral repairs).

Small N. Complications in arthroscopic surgery performed by experienced arthroscopists. *Arthroscopy*. 1988;4:215–221.

Sherman O, Fox J, Snyder S, et al. Arthroscopy—“No Problem Surgery” analysis of complications in 2,640 cases. *J Bone Joint Surg*. 1986;68A:256–265.

Austin K, Sherman O. Complications of arthroscopic meniscal repair. *Am J Sports Med*. 1993;21:864–869.

Overall complications

- Wide range of numbers may: variety of factors including the timing of specific publications related to novel ever expanding arthroscopic methods and newly introduced techniques as well as the precise definition of the specific complications.

Meniscal Surgery Morbidity: Incidents (Minor)	Meniscal Surgery Morbidity: Complications (Major)
Broken Retrieved Instrumentation	Broken Retained Instrumentation
Superficial Portal Drainage Swelling	Infection/Sepsis Thrombophlebitis Pulmonary Embolism
Ecchymoses	Arterial Injury Compartment Syndrome
Venous Injury	Postoperative Hematoma
Postoperative Stiffness	Arthrofibrosis
Device Breakage (Retrieved)	Fixator/Device Extrusion
Postoperative Synovitis	Polymer-Induced Hypertrophic Synovitis
Superficial Chondral Scuffing	Full-Thickness Chondral Abrasion
Portal/Incisional Hypesthesia	Thermal-Induced Osteonecrosis
Transient Saphenous Nerve Irritation	Saphenous/Peroneal Neuropathy
Transient Tourniquet-induced Neuropathy	Entrapment/Puncture/Transection
Transient Fixator-Induced Soft Tissue Inflammation	Painful Neuroma
	Complex Regional Pain Syndromes

Non specific complications

Infection complications

- From 0.42% in 1 published series of 4256 patients to 0.23% in a study of 4000 patients.
- **Increased risk** has been noted in cases associated with an extended operative time, extended tourniquet time, multiple concurrently performed procedures, and history of prior surgeries and in cases in which intraarticular intraoperative corticosteroids were used.

Armstrong R, Bolding F, Joseph R. Septic arthritis following arthroscopy: clinical syndromes and analysis of risk factors. *Arthroscopy*. 1992; 8:213–223.

D'Angelo G, Ogilvie-Harris D. Septic arthritis following arthroscopy, cost/benefit analysis of antibiotic prophylaxis. *Arthroscopy*. 1988;4: 10–14.

Infection complications

- Prophylactic intravenous antibiotic?
 - if implant (including bioabsorbable device)?
 - if open incision is made (meniscal repair implant or device and/or arthroscopic assisted incision (ie, meniscal allograft transplantation)?

Thromboembolic complications

- Deep Veinous Thrombosis (DVT) and Pulmonar Emboly (PE) are uncommon.
- DVT incidence from 1.2% to 4.9% (Symptomatic, Veinography, Ultrasonography)
- Risk for PE increase if: age greater than 50 years, tourniquet time greater than 60 minutes, history of malignancy, congestive heart failure, prolonged bed rest, and obesity.
- No clear consensus on the indications for a specific thromboembolic prophylaxis protocol when considering the cost versus benefit. Author's preferred protocol to routinely prescribe pharmacologic DVT prophylaxis (usually low dose aspirin) for meniscal surgery.

Vascular complications

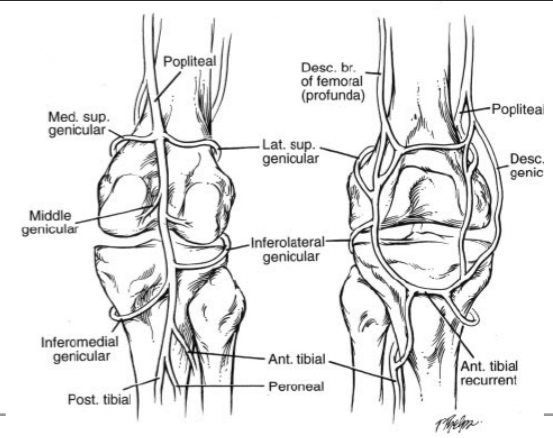
- 0.54% to 1%
- Penetrating vascular injury, ... pseudoaneurysm and arteriovenous fistulae.
- In a survey of 118,590 arthroscopic procedures, 6 cases (0.005%) of popliteal artery injury were identified, although 4 of the 6 cases went on to **amputation**

Delee J. Complications of arthroscopy and arthroscopic surgery: results of a national survey. *Arthroscopy*. 1985;1:412–420.

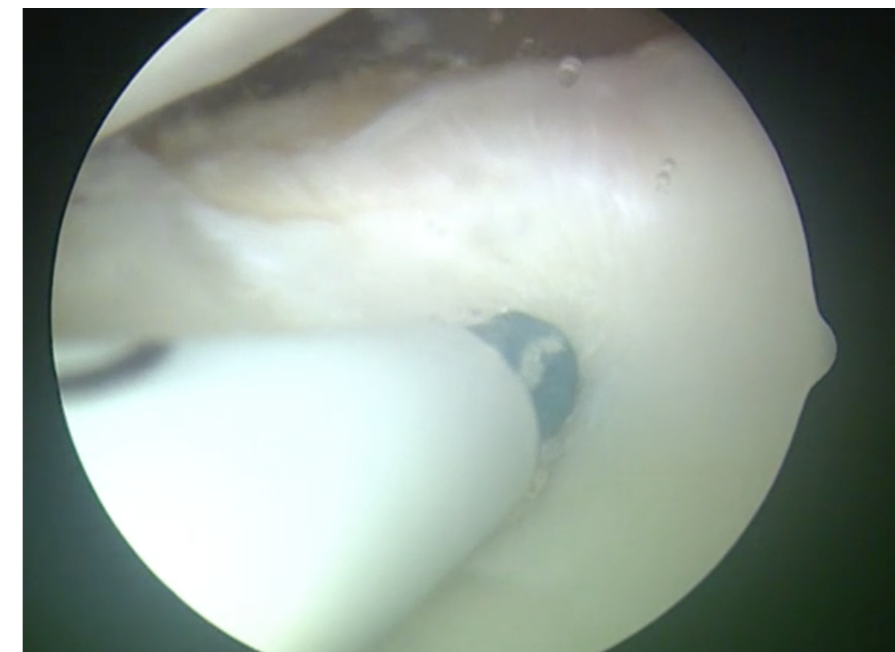
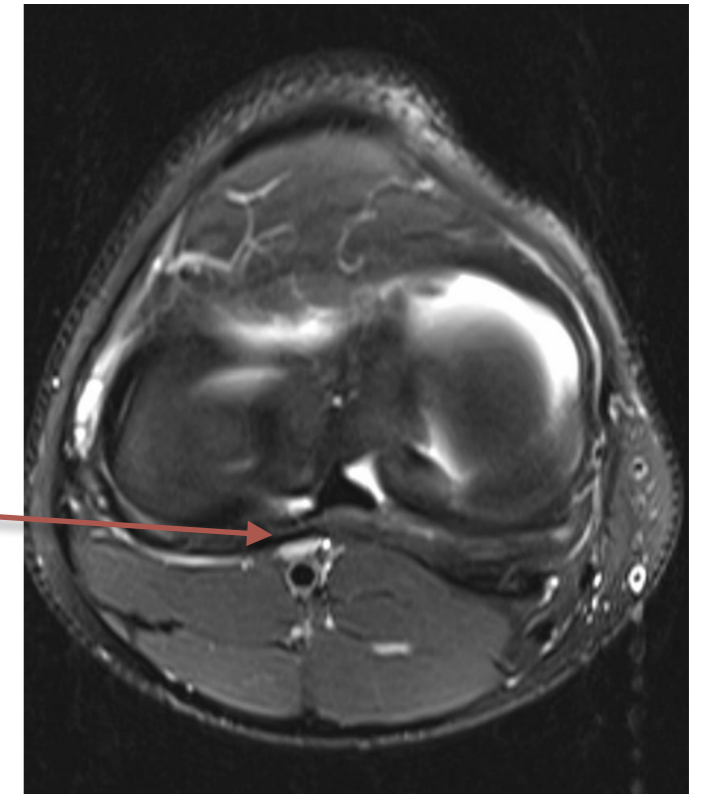
Kim T, Savino R, McFarland E, et al. Neurovascular complications of knee arthroscopy. *Am J Sports Med*. 2002;30:619–629.

Vincent G, Stanish W. False aneurysm after arthroscopic meniscectomy. *J Bone Joint Surg*. 1990;72A:770–772.

Vascular complications



- Prompt repair within 6 to 8 hours to avoid extremity compromise!!
- Proximity of the posterior horn of the lateral meniscus and posterior capsule to the popliteal artery just lateral to midline.
- Meniscal repair
 - Capture of all exiting repair needles
 - Use of contralateral portals to direct meniscal repair
 - Length of an inserted meniscal fixator implant



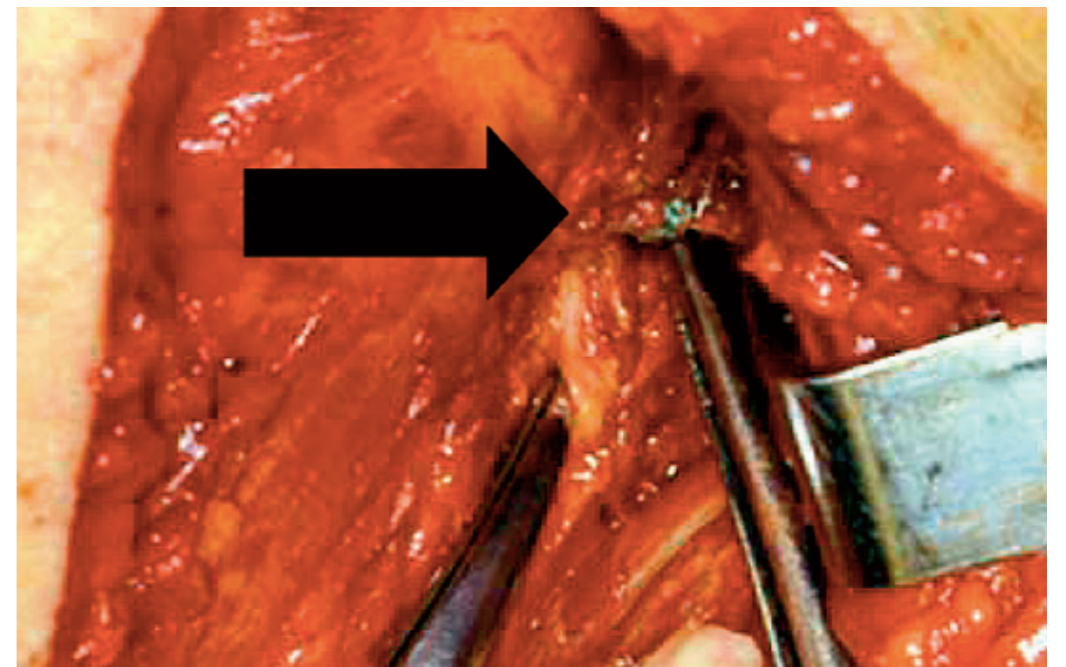
Neurologic complications

- Direct nerve injury and penetration or laceration
- Nerve compression, entrapment, and tethering with neuropraxia either from use of an arthroscopic fluid pump, leg holder, lateral post, or tourniquet
- Overall incidence of neurologic injuries following knee arthroscopy: from 0.059% to 2%.

(Meniscus Repair)

Neurologic complications

- **Medial meniscal** repairs can result in **saphenous neuropathy** and reports of saphenous neuropraxia occurring in up to 43% of cases repairs to the medial meniscus have been published. Dissection, retraction, implant compression or suture entrapment — -> Severe unrelenting pain, dysesthesia and resultant dysfunction.
- **Lateral meniscal** repairs: injury to the **peroneal nerve** — -> greater potential for a significant postoperative morbidity including motor dysfunction and an associated foot drop



Sgaglione

Neurologic complications

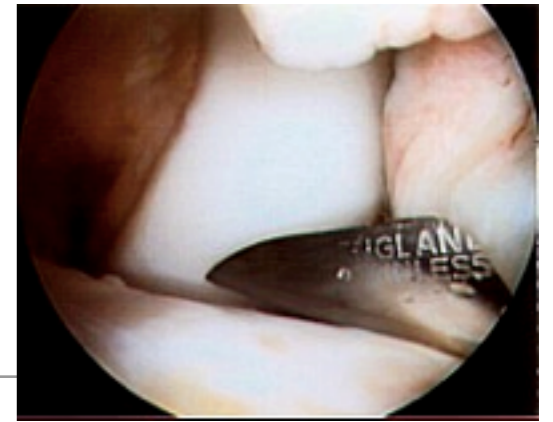
- Prevention:
 - Medial: additional approach, visualisation
 - Lateral: Deflecting retractor placed anterior to the lateral gastrocnemius muscle with the knee in 90°

Procedure-specific complications

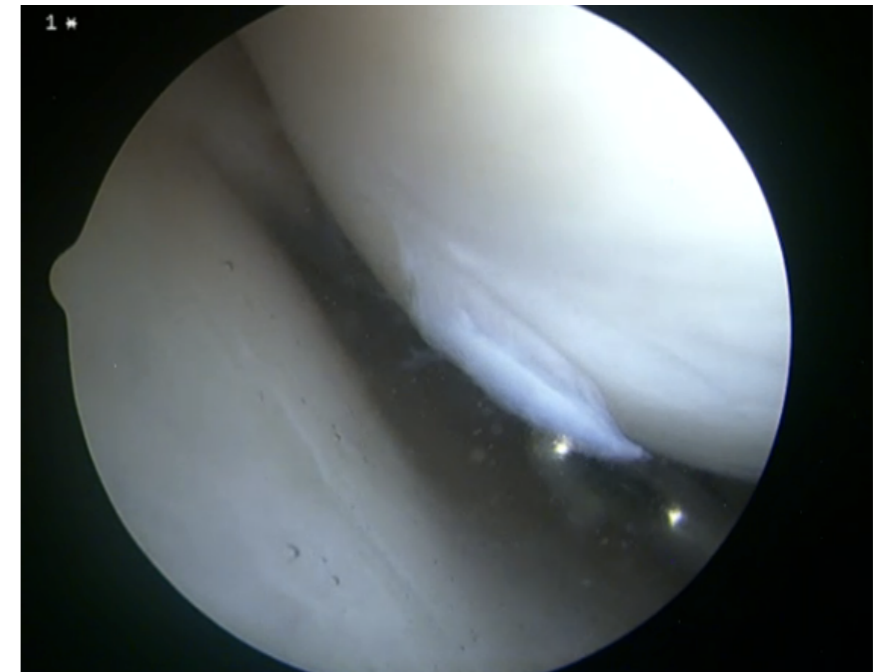
Setup

- The overall anesthesia complication rate for arthroscopy in general has been reported to represent **3.7%** of all complications
- Arthropump: Fluid extravasation and compartment syndrome with an overall complication rate of 1.4% from fluid extravasation
- No more chemical reaction

Instrumentation



- Equipment failure in 2.9% of cases. Instrument breakage: 0.3%.
- Handheld arthroscopic instruments, motorized shaver blades, radio frequency devices or laser assisted technology
 - —> Chondral injury
 - —> Heat induced injury



Meniscectomy

- Cases of **osteonecrosis** have been described after partial meniscectomy and several reports have been published describing osteonecrosis in which no heat producing instrumentation was used and attributed to altered load distribution following meniscal resection.

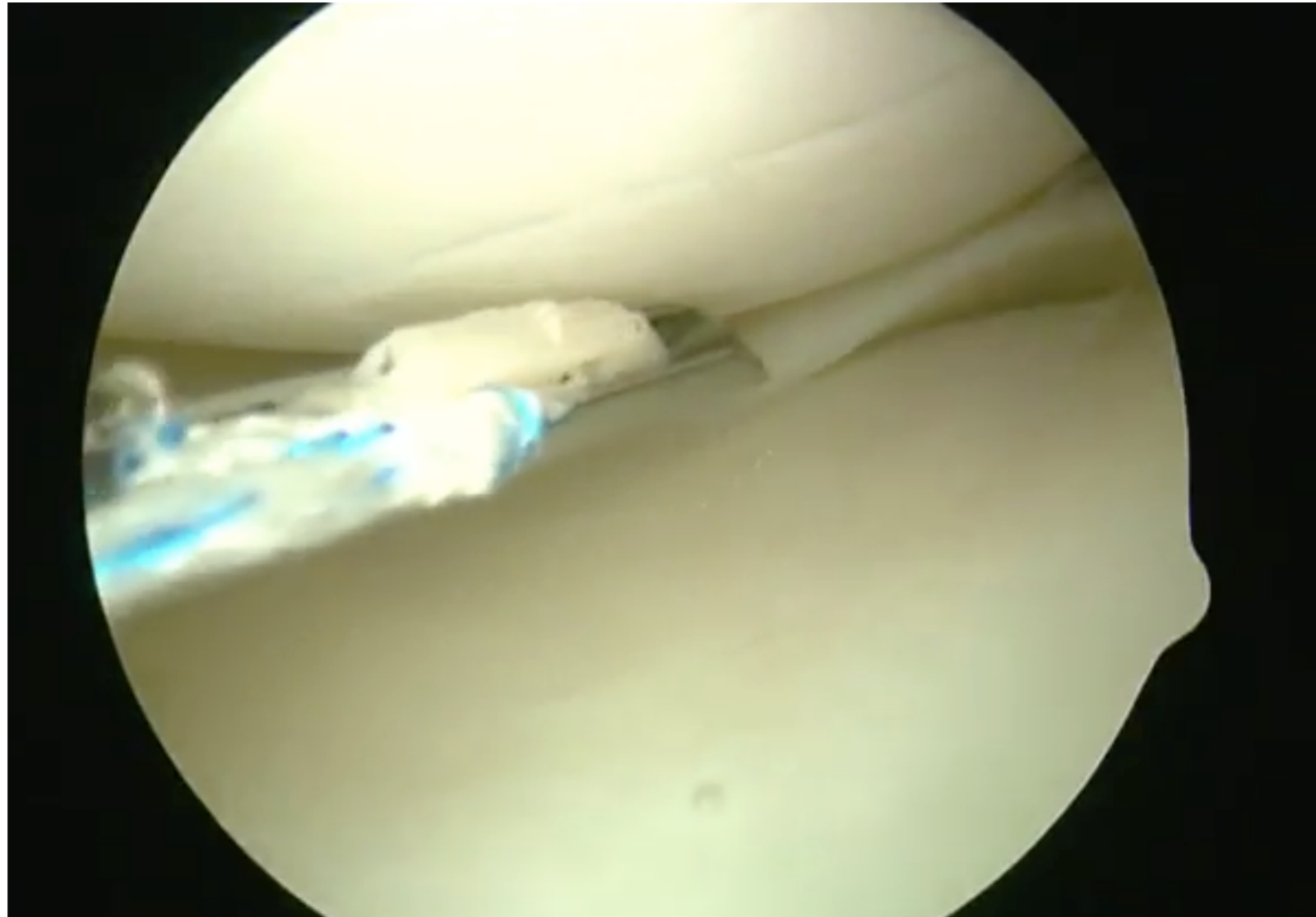
DeFalco R, Ricci A, Balduini F. Osteonecrosis of the knee after arthroscopic meniscectomy and chondroplasty: case report and literature review. *Am J Sports Med.* 2003;31:1013–1016.

—> Patient selection



Meniscus repair

- Overall complications: up to 19%



Meniscus repair: Inside-Out



- Safe **directions** and safe **area**
- **Accessory incisions** should be made before the passing needles are advanced
- **Medial side**: Knee close to extension. This tends to move the saphenous neuromuscular bundle anteriorly and away from the incision
- **Lateral side**, the needles should be passed with the knee in 90° of flexion, which tends to place the peroneal nerve posteriorly and away from the accessory incision. And popliteal retractor (Tablespoon ++)



Meniscus repair: outside-In

- Outside–in meniscal repair techniques have been described and advocated by several authors
- 3% complications
- Soft tissue inflammation can occur and especially can be noted over the mid third of the medial meniscal which is closely adherent to the MCL. Even if extended resorption suture is used, the bulk of the suture knot can result in subcutaneous prominence and irritation that tends to resolve over 4 to 9 months.



Morgan C, Casscells SW. Arthroscopic meniscus repair: a safe approach to the posterior horns. *Arthroscopy*. 1986;2:3–12.

Rodeo S. Arthroscopic meniscal repair with use of the outside-to-inside technique. *J Bone Joint Surg*. 2000;82A:127–141.

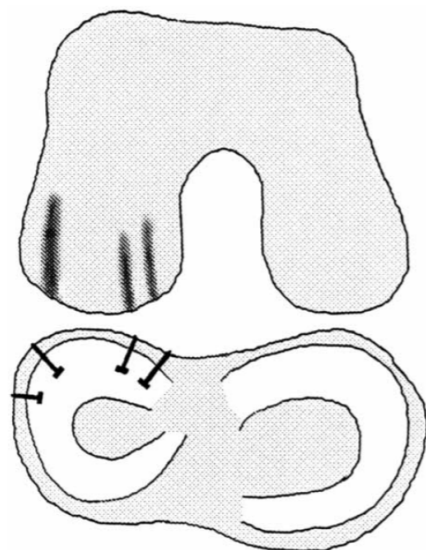
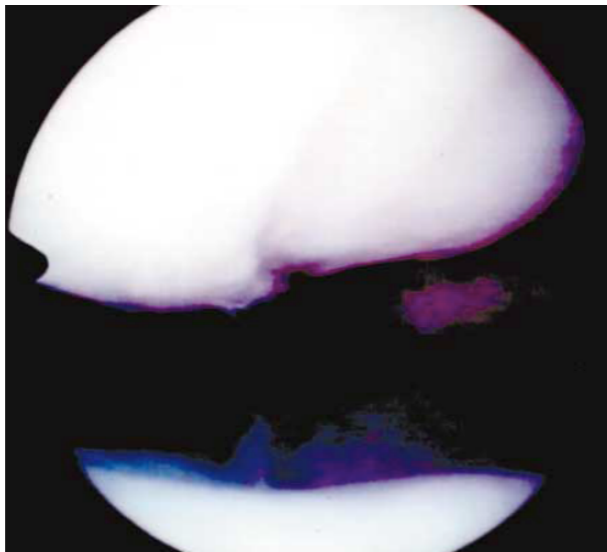
Meniscus repair: All-Inside: Implants

- Purpose: carrying out less invasive surgical methods, easier procedures, posterior access and less complication?
- 1990s: Numerous implant fixator devices
- Different implant geometry, size, polymer composition and resorption profile.



Meniscus repair: All-Inside: Implants

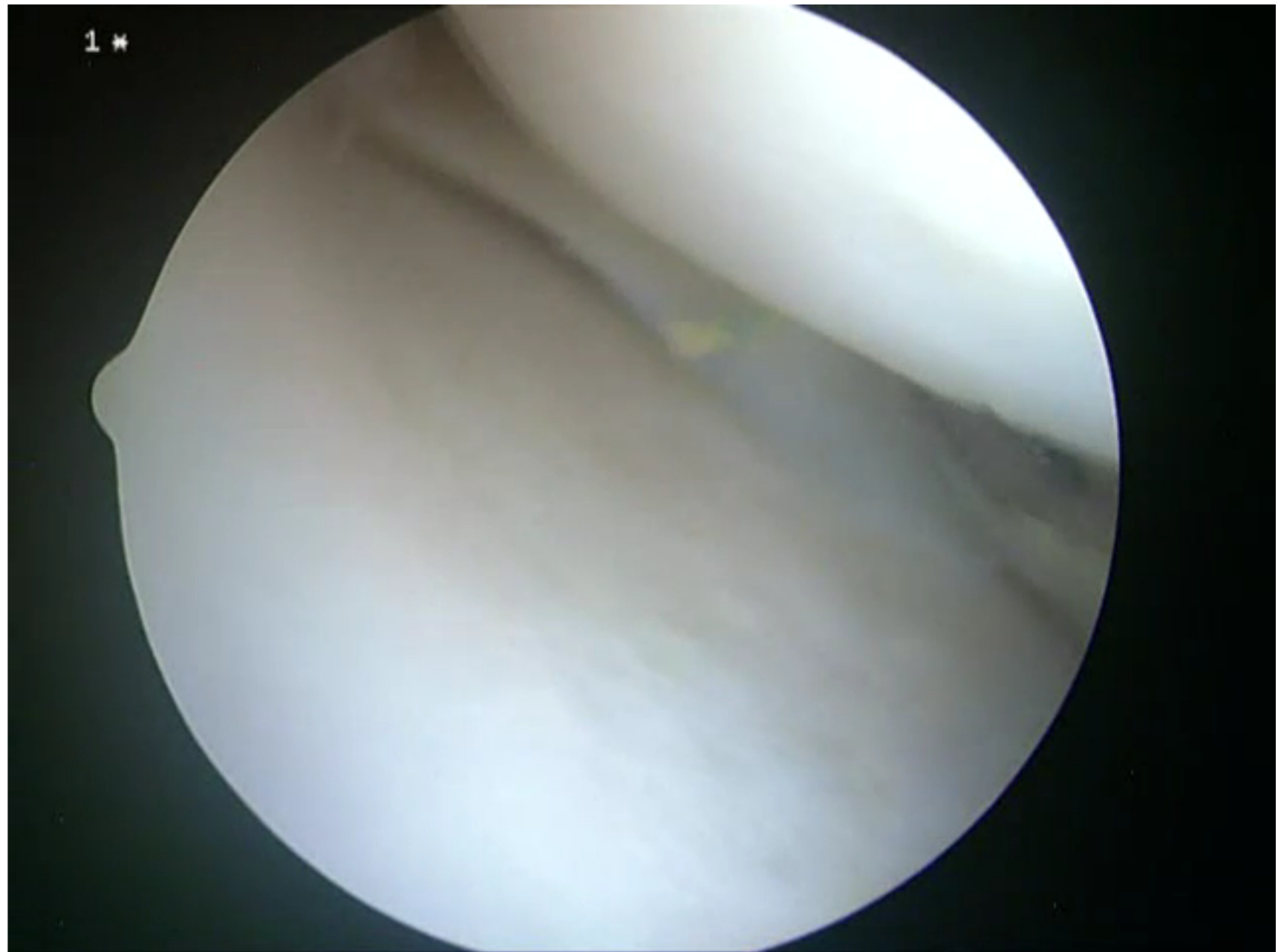
- Description of full thickness chondral injury presumably secondary to implant abrasion against adjacent articular cartilage surfaces.



Ross G, Grabill J, McDevitt E. Chondral injury after meniscal repair with bioabsorbable arrows. *Arthroscopy*. 2000;16:754–756.
Schultz W, Carr C. Femoral osteochondral lesion resulting from meniscal arrow repair. *Arthroscopy*. 2000;16:1–3.
Seil R, Rupp S, Dienst M, et al. Chondral lesions after arthroscopic meniscus repair using meniscus arrows. *Arthroscopy*. 2000;17:1–4.
Kumar A, Malhan K, Roberts S. chondral injury from bioabsorbable screws after meniscal repair. *Arthroscopy*. 2001;17:34.
Menterey J, Seil R, Rupp S, et al. Chondral damage after meniscal repair with the use of a bioabsorbable implant. *Am J Sports Med*. 2002;30:896–899.

Meniscus repair: All-Inside: Suture-based devices

- New generation of meniscal repair devices

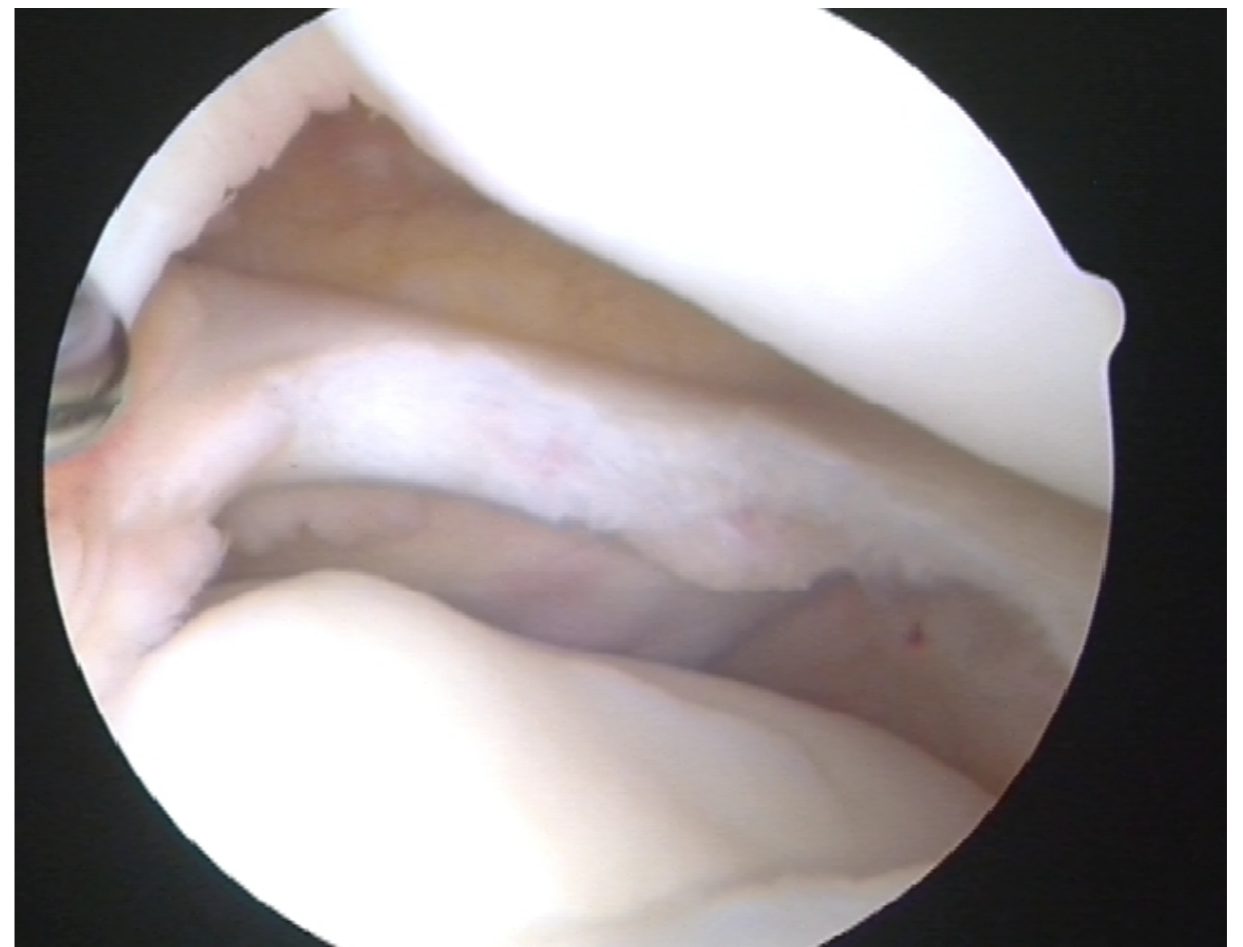


Allografts

- Cases of meniscal graft tearing, displacement, shrinkage, and infection have been described.
- Few cases of overt immune rejection
- Potential disease transmission

Postoperative complications

- Hemarthrosis
- Persistent pain
- Swelling
- Physiotherapy issues
- Time to return to sport



Conclusion

- Not “No Problem Surgery”!
- 8.2% complications (4.8% severe)

Sherman O, Fox J, Snyder S, et al. Arthroscopy—“No Problem Surgery” analysis of complications in 2,640 cases. *J Bone Joint Surg.* 1986;68A: 256–265.

Thank you



Fausse b nignit  de l'arthroscopie

- **3,8% per-op ratoires**
- **17,5% post-op ratoires**

Symposium « Les complications des arthroscopies » Congr s SFA 2001 La Baule

