Risks and Complications of Posterior Cruciate Ligament Surgery

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Complications

- In addition to standard risks associated with all orthopedic surgical procedures, posterior cruciate ligament (PCL) reconstruction poses some relatively unique potential complications. These complications arise from a combination of several factors:
  - the relative infrequency of PCL injuries,
  - the lack of knowledge and experience in treating them,
  - the proximity of neurovascular structures to the PCL,
  - and the technically demanding nature of reconstructive procedures

Surgical complications

- Neurovascular injuries
- Osteonecrosis
- Fractures
- Compartmental syndrom

Neurovascular injuries

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Neurovascular Injury

- Most feared complication
- Especially in revision surgery
- Popliteal Artery: laceration, occlusion, spasm
- Mostly caused by guide pin and drill during the tibial tibial procedure, sometimes while doing posteromedial approach or capsule manipulation

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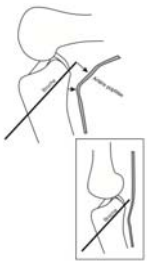
Neurovascular Injury

- Proximity between artery and nerve and PCL
- Distance 7 - 9 mm between PCL tibial insertion and popliteal artery
- the distance increases significantly to 9 -10 mm at 100° of flexion



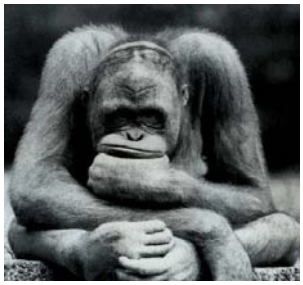
Matava MJ, Sethi NS, Totty WG. Proximity of the posterior cruciate ligament insertion to the popliteal artery as a function of the knee flexion angle : implications for posterior cruciate ligament reconstruction. Arthroscopy 2000 ; 16 : 796–804

Neurovascular Injury

- Posterior capsule release

Ahn JH, Wang JH, Lee SH, et al. Increasing the distance between the posterior cruciate ligament and the popliteal neu- rovascular bundle by a limited posterior capsular release during arthroscopic transtibial posterior cruciate ligament reconstruc- tion : a cadaveric angiographic study. Am J Sports Med 2007 ; 35 : 787–92

How to minimize the NV risk?



Leg position

- 100°
- Tourniquet
- Arthro-pump

Postero-medial approach

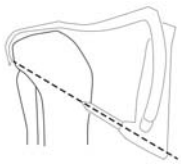
- Spinal needle, transillumination
- Thin canula (6 mm)
- Cautious use motorized instruments, arthrosurface and curettes
- Instruments must always be oriented anteriorly
- Limited distal posterior capsule release

Instrumentation

- Specific curved instruments in order to protect the neurovascular area

Tibial tunnel procedure

- Specific guide
- Protection of the vessels
- Cautious drilling under visual control
- 100° of flexion

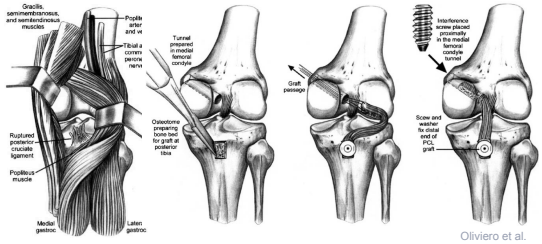


Tibial tunnel procedure

Fluoroscopy?

Killer Turn

Inlay procedure?



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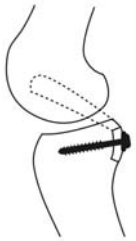
Revision



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Neurovascular Injury

- Fanelli's trick
  - Posteromedial safety incision

Fanelli GC, Boyd J. How I manage PCL injuries. Oper Tech Sports Med 2009; 17 : 175–83

Osteonecrosis: medial condyle

- Rare
- Less power blood supply than the lateral condyle
- Avoid trauma to the subchondral blood supply by accurate femoral tunnel placement 8 to 10 mm from the articular surface and limit soft tissue dissection
- Double bundle repair: Higher risk?

Athanasian EA, Wickiewicz TL, Warren RF. Osteonecrosis of the femoral condyle after arthroscopic reconstruction of a cruciate ligament: report of two cases. *J Bone Joint Surg Am.* 1995;77:1418–1422.

Reddy AS, Frederick RW. Evaluation of the intraosseous and extraosseous blood supply to the distal femoral condyles. *Am J Sports Med.* 1998;26:415–419.

Fractures

- Tibia or femur
  - tunnels
    - Divergence
    - Hammering staples
- Patella
  - 0.2% to 2.3% incidence for ACL with BTB
  - Bone harvest
  - Quadriceps graft

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Voos JE, Drakos MC, Lorich DG, et al. Proximal tibial fracture after anterior cruciate ligament reconstruction using bone-patellar tendon-bone autograft: a case report. *HSSJ.* 2008;4:20–24.

Malek MM, Kunkle KL, Knable KR. Intraoperative complications of arthroscopically assisted ACL reconstruction using patellar tendon autograft. *Instr Course Lect.* 1996;45:297–302.

Compartment Syndrome

- Fluid extravasation into the leg compartments through a rent in the capsule
  - First femoral tunnel, then tibial tunnel

Krysa J, Lofthouse R, Kavanagh G. Gluteal compartment syndrome following posterior cruciate ligament repair. *Injury, Int J Care Injured.* 2002;33:835–838.

Conclusion

- Yes, PCL reconstruction is a more dangerous procedure than ACL reconstruction
  - anatomic
  - less experience