Catastrophic Knee Injuries

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Conflict of Interest

Nothing to declare

Catastrophic Knee Injuries

- Etiology
- Concomitant injuries
  - Diagnosis
  - Examination
  - Imaging

Catastrophic Knee Injuries

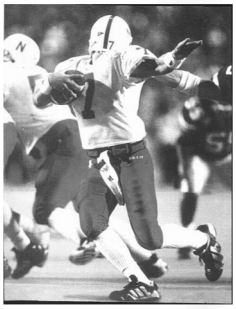
- Treatment
  - Timing
  - Staging
  - Repair vs. Reconstruction
  - Graft choice
- Rehabilitation
- Outcome

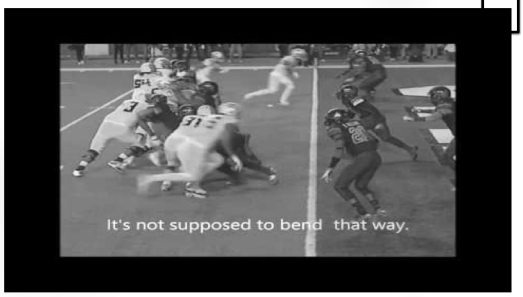
Etiology

Sports injuries

MVA

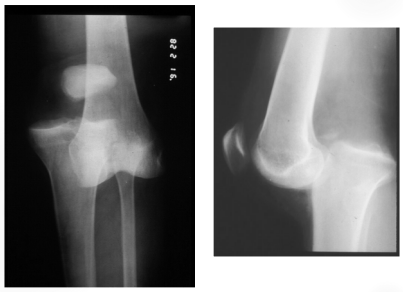
Falls from height





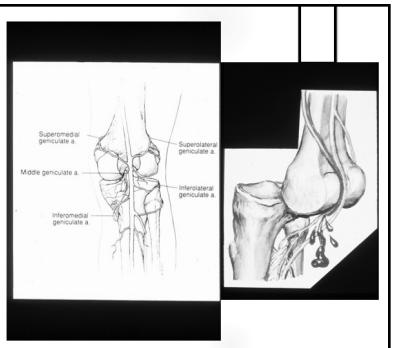
Video https://www.youtube.com/watch?v=ZW3Z6CNjNzk

Video https://www.youtube.com/watch?v=_Ms028tlwiw



Vascular injury

- 1.6-18%
- Risk of delayed obstruction for 48 hours!
- ABI of uncertain utility
  - Less than 0.9 (ankle vs. arm) is worrisome
- Angiography or MRAngiography has false positive rate of 5%
- CT angiography reportedly better (with less rads than conventional)

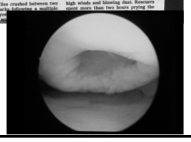


Nerve Injury

- Up to 25%
- Peroneal nerve injury most common
- 83% of partial palsies regain normal function
- 38% complete palsies regain function

Additional injuries

- Fractures
- Patellar tendon rupture
- Patellar dislocation
- Collateral ligament
- Posterolateral corner
- Posteromedial corner
- Meniscal tears
- Chondral injuries



Bicruciate injuries

- These can present late
- Examination suggests anterior and posterior laxity
- Difficult to find a "neutral point" on examination
- Typically requires MR imaging to identify this diagnosis

Systematic Review

- Levy, Dajani, Whelan et al: Arthroscopy 2009
- Surgical treatment consistently better than non-surgical
  - Earlier return to work and athletic activities
- Early surgical treatment with reconstruction yields superior results compared to repair
- Non-surgical treatment
  - Polytrauma, head injury, elderly
  - Morbid obesity: much higher complication rate

Is there a role for External Fixation?

- More common amongst fracture surgeons
- Indications:
  - Open injuries
  - Vascular repair
  - Persisting subluxation
- Get the pins way out of the potential surgical field

Timing of Surgery: controversial!

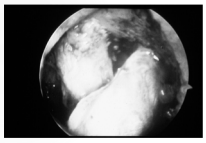
- Some (but not all) studies show better outcomes with definitive surgery at < 4 weeks
- Earlier surgery carries increased risk of arthrofibrosis
- Delayed reconstruction (4-10 weeks) allows early rehab followed by an opportunity for MUA/LOA before definitive cruciate reconstruction

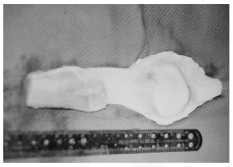
Repair vs. Reconstruction

- Reconstruction of the cruciates consistently shows better outcomes and fewer failures than repairs
- Patients with early repairs have comparable outcome scores although lower rates of return to pre-injury activities
- There is some data to support isolated ACL reconstruction with non-operative treatment of the PCL
- Reconstruction of the PLC and PMC outperforms repair
- Consider combined repair (collateral ligaments, meniscus, associated tendon injuries) with staged cruciate reconstruction

Allograft vs. Autograft

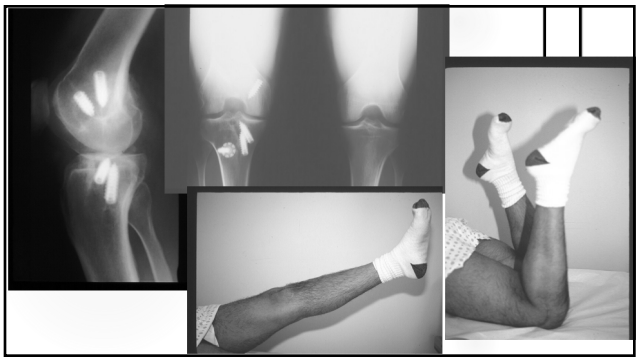
- The need for multiple grafts requires use of allograft
- Decreased donor site morbidity leads to fewer complications
- Allograft associated with less surgical time and, perhaps, less recovery time





Rehabilitation

- Stiffness is common
- Full extension is critical
- Loss of flexion is better tolerated
- Long-leg hinged knee brace
  - Locked in extension for ambulation (consider partial weight-bearing)
  - Unlocked at other times
- Early motion
- Use prone or side-lying ROM exercises to protect the PCL graft



Outcomes

- Major goal is to achieve stability and mobility
- Return to sports is doubtful
- Treat neurovascular injuries aggressively
  - Consider tendon transfers for persisting foot drop
- Multiple surgeries are common, perhaps even preferred
  - Set up realistic expectation at the beginning of treatment
- Post-traumatic osteoarthritis is likely (up to 23%)
  - Infections: as high as 12.5%
  - Heterotopic bone: as high as 25%
  - Arthrofibrosis: 5-71% (mean=38%)

My recommendations

- High quality assessment for neurovascular and structural injuries
  - Consider early MRI and MR angiography
  - Emergent consultation and treatment for vascular injury
  - Stabilize the knee quickly and simply
- Use early surgery for meniscal or additional soft tissue injuries
  - Explore the peroneal nerve in the setting of complete palsy
  - Repair or reconstruct the collateral ligaments
- Staged surgical reconstruction of ACL and PCL with allograft at 4-6 weeks after injury