The Management of Multi-ligament Knee Injuries
Rehabilitation/Results/Long Term Outcome Data

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Epidemiology

- Knee dislocations with multi-ligament knee injuries involve at least 2 of 4 major ligaments such as combined anterior cruciate ligament (ACL), posterior cruciate ligament (PCL), medial collateral ligament (MCL) and/or postero-lateral corner (PLC) injuries.
  - Serious and rare injuries and are potentially limb-threatening injuries
  - Require extensive surgical and rehabilitative intervention.
  - Results vary from total disability to nearly full recovery of function even when treated adequately.
  - May result in long term morbidity of persistent pain and instability.

Combination

- ACL
- PCL
- MCL
- PLC
  - Lateral collateral ligament
- Popliteus tendon
- Popliteofibular ligament

**Timing of surgery**
- Acute
- Staged
- Chronic

**Postoperative Rehabilitation**
- **Weightbearing and range of motion**
  - All combined ligament-injured knee
    - Full extension for 3 weeks with non–weight bearing and progressive range of motion occurs during weeks 4 through 6, progressive weight bearing occur at the end of 6 weeks\(^1\).
    - Early protected postoperative range of motion\(^5\).
  - Combined injuries of PLC
    - Non-weight bearing for 6 weeks, allow for immediate initiation of range of motion out of the brace with a goal of 90° of knee flexion by the second week \(^6\)
    - Early range of motion and partial weight bearing\(^7\).

- **Mobilization vs. Immobilization**
  - Immediate postoperative immobilization typically is expected to help patients to achieve greater joint stability.
  - Among patients who were managed chronically, the difference in rehabilitation protocols only yielded a difference in lateral instability.
  - Lateral instability was significantly less among patients who were immobilized.
  - Mean range of motion was not significantly different between patients managed with early immobilization and those managed with early mobility\(^8\).
  - Early postoperative range of motion has been proposed to help to reduce arthrofibrosis\(^5,9,10\).
  - Patients who were managed acutely and mobilized postoperatively had better range-of-motion outcomes.
  - Less joint instability in all directions in patients who were allowed early postoperative mobility.
  - Early postoperative mobilization resulted in a greater percentage of patients returning to work \(^11\).
No differences in the need for arthrolysis according to postoperative rehabilitation (mobility or immobilization).

**Manipulation or Arthrolysis**
- More severe flexion and extension deficits were observed in those who were immobilized.
- Significantly fewer patients in the chronic treatment group underwent follow-up manipulation or arthrosis.

**Long term outcome data**

**Timing of surgery**
- **Acute treatments**
  - No better than staged or chronic treatments in anterior instability
  - More flexion loss
  - Good results in posterolateral instability
- **Staged treatment**
  - Satisfactory restoration of function, ligamentous stability and ROM
  - Less flexion loss
  - Significantly greater than that in the chronic treatment group and than in the acute treatment group.
- **Chronic treatment**
  - Less flexion loss
  - Leads to posterior subluxation
  - Difficulty for repairing or reconstructing fixing PLC

**Summary**
- Reported acceptable outcomes in association with acute surgical repair and/or reconstruction of damaged ligaments.
- Acceptable outcomes when the repair and reconstruction are staged.
- Significantly better results in patients undergoing autologous tendon reconstruction of cruciate ligaments.
- Immobilization may leads to significantly more severely abnormal/poor outcomes
- Different rehabilitation protocols are superimposed on these varying surgical approaches.
- Rehabilitation has differed on the basis of the need to balance the restoration of joint stability and the complication of postoperative joint stiffness.
In multiple ligament knee injuries, subjective outcomes may differ from the objective findings and the interpretations of the examiner.

Lack of consensus among experts regarding how to treat multiple ligament knee injuries.

Lack of correction of clinical outcome with injury pattern and surgical treatment.

References
10. Shapiro MS, Freedman EL. Allograft reconstruction of the anterior and posterior


