# POST-OPERATIVE OUTCOMES

## ACHILLES REPAIR

<table>
<thead>
<tr>
<th>COMMON PROCEDURE TYPES</th>
<th>• Variety of approaches. Usually broken down into open vs. percutaneous options</th>
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| POST-OPERATIVE COMPLICATION RATES | • Regardless of procedure type, complication rate of 8.5%  
  • Re-rupture rate of 4%  
    ○ No significant difference in re-rupture rates between surgical techniques  
  
  OPEN: 3% sural neuritis, 4% superficial wound dehiscence, 2% superficial infection, 2% deep infection  
  
  PERCUtANEOUS: 0% sural neuritis, 3% superficial wound dehiscence, 2% reaction to foreign body |
| COMPLICATION RISK FACTORS | • Diabetes, steroid therapy, smokers, rheumatoid disease |
| RECOVERY TIMELINE | • 88% return to baseline activities by 5 months  
  • General return to sport timeline of 20-24 weeks |
  • [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4436906/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4436906/) |

## ACL RECONSTRUCTION

| POST-OPERATIVE COMPLICATIONS | Osteoarthritis Development  
  • Patients with no meniscal tear had 0-13% risk of developing knee OA at 10 years after injury, whereas those with a meniscal tear had a 21 to 48% risk  
  
  Re-Injury Rates  
  • 29.5% of athletes suffered a second ACL injury within 24 months of returning to sport (RTS), with 20.5% sustaining a contralateral injury and 9.0% incurring a re-tear injury of the ipsilateral graft.  
  
  Pain  
  • Prevalent among 9-39% of first-time ACL reconstruction patients at 6 years.  
  • Incidence rate of knee pain between 3 and 47% regardless of graft type  
  
  Stiffness  
  • Stiffness and/or loss of ROM found in 5.5 to 24% of patients  
  
  Infection  
  • Rate of 0.5% |

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Re-injury risk factors

- The re-injury rate was significantly reduced by 51% for each month return to sport was delayed until 9 months after surgery, after which no further risk reduction was observed
- 38.2% of those who failed RTS criteria suffered re-injuries versus 5.6% of those who passed (Quad strength and Hop Testing ≥90% LSI)
- Bony morphologic factors: tibial slope, intercondylar notch shape and width
- Surgical factors:
  - Tunnel malpositioning
  - 5.2x greater risk for an allograft failure compared to bone-patellar tendon-bone (BTB) autograft
  - No significant difference between BTB autograft and hamstring autograft
- Neuromuscular factors
- Psycho-social factors
- No statistical significance between sexes for the rates of re-tear

Post-operative stiffness risk factors

- Surgical factors: surgery performed <4 weeks s/p injury, arthrofibrosis (Cyclops Lesion) secondary to tunnel malpositioning, large graft, or inadequate trochleoplasty
- Arthrofibrosis secondary to excessive inflammation due to aggressive therapy/activity
- Excessive immobilization

Post-operative anterior knee pain risk factors

- Previous anterior knee pain, flexion contracture, quad weakness, aggressive rehab
- BTB autograft may be a factor, but not conclusive

RECOVERY TIMELINE

- 65% of athletes return to their previous level of sport and only 55% returned to competitive sports
- General return to sport timeline 9 months to 2 years

REFERENCES

- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4628627/
- http://bjsm.bmj.com/content/50/13/804
# POST-OPERATIVE OUTCOMES

## BANKART REPAIR

<table>
<thead>
<tr>
<th>COMMON PROCEDURE TYPES</th>
<th>• Arthroscopic vs. Open Techniques</th>
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</table>
| **POST-OPERATIVE COMPLICATIONS** | • Instability recurrence of 6 to 22% regardless of technique  
• Nearly one-third of patients had recurrence of instability after arthroscopic Bankart repair after a minimum of 10-year follow-up  
• No difference in failure rates between techniques  
• Open technique leads to significantly less external rotation ROM compared to arthroscopic technique  
• The pooled failure rate after arthroscopic shoulder stabilization in the contact or collision athlete was 17.8% |
| **COMPLICATION RISK FACTORS** | • Young age remains a significant risk factor for surgical failure  
• Contact or collision sports increase risk of instability recurrence and failure |
| **RECOVERY TIMELINE** | • Open: 16-20 weeks  
• Arthroscopic: 20-24 weeks |
• [https://link.springer.com/article/10.1007/s00167-017-4504-z](https://link.springer.com/article/10.1007/s00167-017-4504-z)  

## HIP ARTHROSCOPY

<table>
<thead>
<tr>
<th>COMMON PROCEDURE TYPES</th>
<th>• Labral Debridement / Labral Repair / Capsular Repair / Femoral Osteochondroplasty / Acetabular Osteochondroplasty</th>
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</table>
| **POST-OPERATIVE COMPLICATIONS** | • Reoperation rates range from 5 to 14.6% within 2 years  
• 0.5% lateral femoral cutaneous nerve neuropraxia, 0.67% pudendal nerve neuropraxia, 0.1% sciatic nerve neuropraxia (all resolved within 3 months)  
• 1.7% heterotopic bone formation, 0.5% lower extremity DVT, 0.84% superficial wound infection, 0.17% deep infection |
| **COMPLICATION RISK FACTORS** | • Acetabular dysplasia  
• Arthritis  
• FAI |
| **RECOVERY TIMELINE** | • 12-24 weeks |
LUMBAR DISCECTOMY

POST-OPERATIVE OUTCOMES

- Rate of persistent or recurring low back pain after surgery is 10-40%
- 15% of patients undergo re-operation within 8 years post-op
- Persistent nerve root irritation
- Spinal instability occurs in 12% of cases after first surgery and increases up to 50% after 4 or more revisions
- Recurrent disc herniations occur in ~15% of patients
- Dural tear in 3% of patients
- Pars interarticularis fracture

COMPLICATION RISK FACTORS

Preoperative Risk Factors
- Significant levels of depression, anxiety, poor coping, somatization
- Previous low back surgeries

Intraoperative Risk Factors
- Inadequate or aggressive decompression in surgery
- Battered root syndrome (excessive retraction or bleeding)

Postoperative Risk Factors
- Aggressive rehab/activity
- Hematoma or infection

RECOVERY TIMELINE

- Non-professional athletes: 7.5 weeks to 6 months
- Professional athletes: 5.2 to 8.7 months
- 84% of athletes return to sport
- Only 27% of athletes return to sport without disability

REFERENCES

- https://link.springer.com/article/10.1007/s00167-014-2886-8
### Meniscal Repair

#### Common Procedure Types
- Inside-Out
- Outside-In
- All-Inside

#### Post-Operative Complications
- 18% failure rate in children and adolescents
- 8.7% re-tear rate in athletes by 33 months post-op
- 22.3 to 24.3% failure rate in general population by 5-years post-op
  - Failure defined as “persistent mechanical symptoms, effusion, or joint line tenderness”
- Neuropraxia of saphenous or peroneal nerves in 2% (all-inside) and 11% (inside-out) of patients
- Infection rate of 1%

#### Complication Risk Factors
- No significant difference in failure rates or subjective outcomes between inside-out, all-inside, or outside-in repairs
- Tear type (Vertical longitudinal, vertical radial, horizontal, oblique)
- Zone of the tear (Red-Red vs. Red-White vs. White-White)
- Traumatic tears fare better than chronic tears (73% vs. 42% success rate)
- Aggressive rehab/activity post-operatively

#### Recovery Timeline
- 6-9 months
- 81% of elite athletes returned to sport at same level of play

#### References
- [http://ojisagepubcom/content/3/2_suppl/2325967115s00075short](http://ojisagepubcom/content/3/2_suppl/2325967115s00075short)
- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4061409/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4061409/)
- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095015/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095015/)
# POST-OPERATIVE OUTCOMES

## PARTIAL MENISCECTOMY

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<tr>
<th>COMMON PROCEDURE TYPES</th>
<th>Arthroscopy</th>
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### POST-OPERATIVE COMPLICATIONS

- 7% failure rate in children and adolescents
- Reoperation rate of 1.4 to 3.9%
- 22.8% re-operation rate in general population by 8.5 years post-op
- ~50% symptomatic in general population by 4.5 years post-op
- ~2/3 patients symptomatic in general population by 14 years post-op

### COMPLICATION RISK FACTORS

- Patients <40 years old, symptoms present <1 year, absence of patellar symptoms, and no evidence of degeneration have better outcomes
- No significant differences in clinical outcomes in obese patients compared to normal-weight patients 1-year post-op

### RECOVERY TIMELINE

- 5-6 weeks
- Mean time interval for substantial pain relief was $3.5 \pm 1.5$ months
- 91% and 62% reported excellent functional results at 1 year and 7.8 years respectively

### REFERENCES

- [http://ojs.sagepub.com/content/3/2_suppl/2325967115500075.short](http://ojs.sagepub.com/content/3/2_suppl/2325967115500075.short)
- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095015/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4095015/)
### POST-OPERATIVE OUTCOMES

#### ROTATOR CUFF REPAIR

| COMMON PROCEDURE TYPES | • Single vs. Double Row  
• Open vs. Arthroscopic |
|------------------------|--------------------------------------------------|
| POST-OPERATIVE COMPLICATIONS | • Overall re-tear rate at 6 months is 17%  
  o Re-tears in 27% of full-thickness tears and 5% of partial-thickness tears  
  o Re-tear rates increase as the initial tear size increases  
  o ≤2 cm² (10%), 2 to 4 cm² (16%), 4 to 6 cm² (31%), 6 to 8 cm² (50%), and >8 cm² (57%)  
• Large tears tend to re-tear between 3-26 weeks after surgery  
• Re-tear rate of 25.9% in single-row group and 14.2% in double-row group  
• Post-op stiffness associated with decreased re-tear rates  
  o <20° ER at 6 weeks post-op had a re-tear rate of 7% vs. 15% in group of >20° ER at 6 weeks post-op  
• Infection rates of 0.44% (arthroscopic) and 2.45% (open procedure)  
• **No clinically important difference in pain or function for patients with a post-operative re-tear vs. intact repairs** |
| COMPLICATION RISK FACTORS | • Best predictor of RTC integrity was pre-operative tear size  
• Pre-operative stiffness significantly associated with stiffness at 6 and 12 weeks post-op  
• Smokers, diabetes mellitus, fatty infiltration, osteopenia and osteoporosis (BMD > -1), BMI >30, aged >60 years  
• Pre-operative strength is the best predictor of post-operative strength at 12 months post-op  
• Presence of GH osteoarthritis associated with re-tears  
• Evidence is lacking for optimal timing of PROM after repair. Some evidence suggests that tear sizes of >5cm have a greater risk of re-tear with early PROM vs. delayed |
| RECOVERY TIMELINE | • 5-6 months  
• Timeline of post-op symptom duration and percentage of patients:  
  <1 month (8%), 1-3 months (22%), 4-6 months (20%), 7-12 months (15%), >1 year (36%)  
• 89% of pro and collegiate pitchers s/p partial-thickness repair returned to same level of play at 12 month follow-up |
• [http://journals.lww.com/jbjsjournal/subjects/Sports%20Medicine/Abstract/2014/02190/Structural_Integrity_After_Rotator_Cuff_Repair.1.aspx](http://journals.lww.com/jbjsjournal/subjects/Sports%20Medicine/Abstract/2014/02190/Structural_Integrity_After_Rotator_Cuff_Repair.1.aspx)  
• [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4018774/pdf/793.pdf](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4018774/pdf/793.pdf) |
## POST-OPERATIVE OUTCOMES

### TOTAL HIP ARTHROPLASTY

| COMMON PROCEDURE TYPES | • Anterior vs. Posterior Approach  
| | • Cemented vs. Uncemented  
| | • Dislocation rate of 1-3%  
| | • 24.1% of revisions occur within 5-years post-op for the following reasons:  
| | o Aseptic loosening (29%), acetabular failures (17%), infection (19%), instability (13%), metallosis (10%), and fracture (9%)  
| | o <9% prevalence of the following: Iliopsoas impingement, heterotopic ossification, pain, failed resurfacing, squeaking hip, leg length discrepancy, snapping hip  
| POST-OPERATIVE COMPLICATIONS | • No difference in dislocation rates between anterior vs. posterior approach  
| | • Obese patients have a significantly higher complication rates, dislocation rates, deep infection rates, and slightly lower Harris Hip Scores than non-obese patients  
| | • Patients using corticosteroids preoperatively for chronic conditions were 3x more likely to be readmitted and to experience persistent post-operative pain  
| | • Women have a 29% higher risk of implant failure than men  
| | • **No difference in dislocation rates between patients adhering to strict precautions vs. relaxed precautions (regardless of surgical approach)**  

| RECOVERY TIMELINE | • 10-year survival rate >95%  
| | • 25-year survival rate >80%  
| | • 58.7% of patients report none to mild pain whereas 41.3% reported moderate to severe pain 4-6 months post-op  
| | • About 80% of patients have unassisted limp-free gait by 3-6 weeks  
| | • 17% of patients report a residual limp 1-year post-op  
| | • **About 75-80% of patients do NOT adhere to all of their hip precautions**  
| | • 73% of patients maintained their BMI 2-years after surgery  

### POST-OPERATIVE OUTCOMES

#### REFERENCES
- [https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5560211/](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5560211/)
- [https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/1653996?keepThis=true&amp;TB_iframe=true&amp;height=600&amp;width=800&amp;caption=JAMA%20Internal%20Medicine%20Current%20Issue](https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/1653996?keepThis=true&amp;TB_iframe=true&amp;height=600&amp;width=800&amp;caption=JAMA%20Internal%20Medicine%20Current%20Issue)
- [http://journals.lww.com/jbjsjournal/Abstract/2014/07160/Factors_Affecting_Readmission_Rates_Following_8.aspx](http://journals.lww.com/jbjsjournal/Abstract/2014/07160/Factors_Affecting_Readmission_Rates_Following_8.aspx)
- [http://journals.lww.com/jbjsjournal/subjects/Hip/Abstract/2015/06030/Weight_Changes_After_Total_Hip_or_Knee_5.aspx](http://journals.lww.com/jbjsjournal/subjects/Hip/Abstract/2015/06030/Weight_Changes_After_Total_Hip_or_Knee_5.aspx)

### TOTAL KNEE ARTHROPLASTY

#### POST-OPERATIVE COMPLICATIONS
- 30-day post-op complications
  - 0.18% of patients died and 5.6% experienced complications including: UTI (1.49%), DVT (1.34%), deep wound infection (0.3%), superficial wound infection (0.79%), PE (0.78%), sepsis (0.57%), wound dehiscence (0.27%), peripheral nerve injury (0.1%)
- Most common failure mechanism:
  - Loosening (39.9%), infection (27.4%), instability (7.5%), periprosthetic fracture (4.7%), arthrofibrosis (4.5%)

#### COMPLICATION RISK FACTORS
- Diabetes mellitus, increased age, and BMI of >40 kg/m²
- Pain catastrophizing is a significant predictor of chronic post-op pain
- Malalignment and incorrect rotation
- **Pre-operative ROM is a significant predictor of long-term ROM**
  - Gender, physical function, BMI not predictive of long-term ROM

#### RECOVERY TIMELINE
- Frequency of revision is 4% at 5 years and 8.9% at 9 years post-op
- **58.7% of patients report none to mild pain whereas 41.3% reported moderate to severe pain 4-6 months post-op**
- 14-25% of patients report little to no symptom improvement and/or dissatisfaction up to 1 year after surgery
- 69% of patients maintained their BMI 2 years after surgery
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- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4350663/
- http://journals.lww.com/jbjsjournal/subjects/Knee/Abstract/2013/05010/Risk_Factors_Associated_with_Deep_Surgical_Site.2.aspx
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