

ACL Reconstruction: 20 Year Retrospective

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Clin Orthop Relat Res 1996

Allograft versus autograft ACL reconstruction: 3- to 5-year outcome

“No statistically significant differences were found except a higher incidence of loss of terminal extension in the autograft group. These differences were small and not considered clinically significant. Laxity and knee scores were similar in both groups. According to International Knee Documentation Committee ratings, overall outcome was normal or nearly normal in 48% of the allograft patients and in 38% of the autograft patients. Overall subjective rating with the Cincinnati Knee Score was 85.8 for the allograft patients and 84.5 for the autograft patients.” (328)

Arthroscopy 1997

A prospective outcome study of rehabilitation programs and ACL reconstruction

“ All patients reported good satisfaction with the function of their knee at average follow-up of 21.6 months (range, 12 to 48). Patients managed by home rehabilitation averaged 2.85 visits as compared with 14.2 for clinic-centered patient ($P < .05$). There were no differences in functional or subjective outcomes in the different postoperative rehabilitation regimens, with both groups reporting high satisfaction and improved quality of life. Cost savings in the home rehabilitation group were significant.” (78)

Am J Sports Med 2005

Comparison of home versus physical therapy-supervised rehab programs after ACL reconstruction: a RCT

“Recreational athletes undergoing nonacute anterior cruciate ligament reconstruction can successfully reach acceptable rehabilitation goals in the first 3 months after surgery with a limited number of purposeful physical therapy education sessions, allowing recreational athletes more flexibility when integrating the necessary postoperative rehabilitation into their daily activities.” (94)

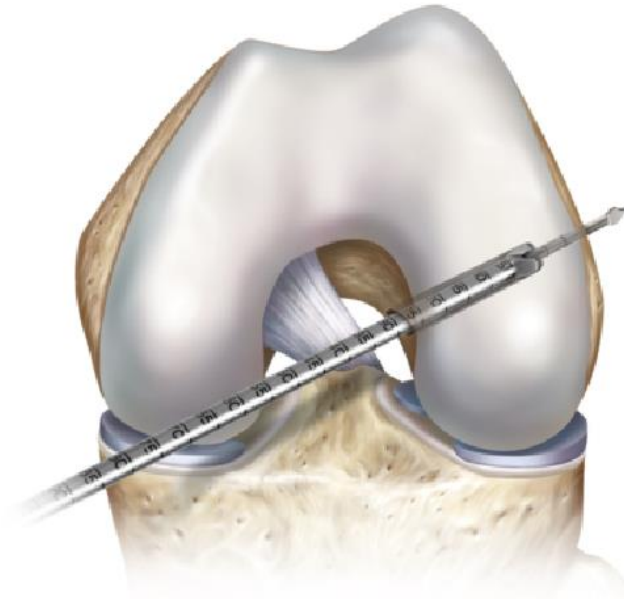
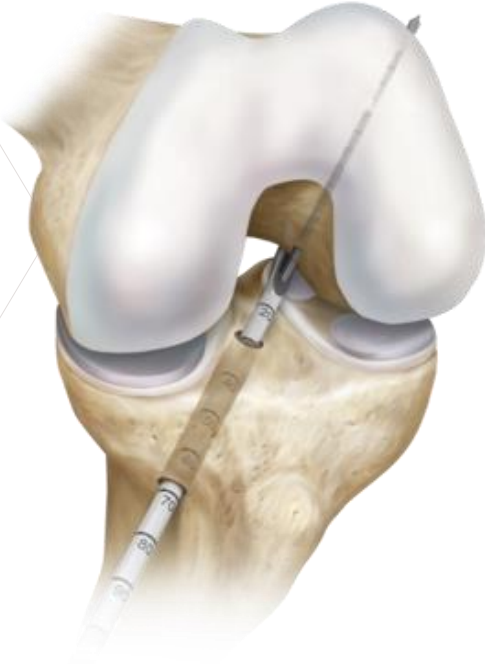


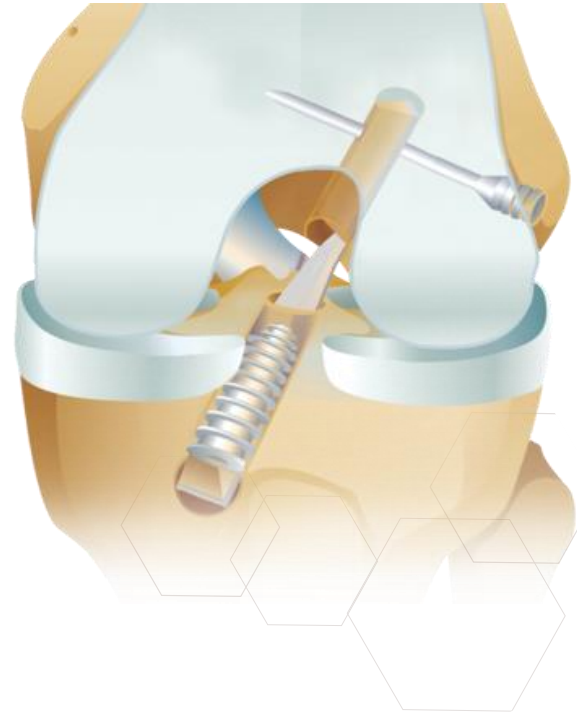
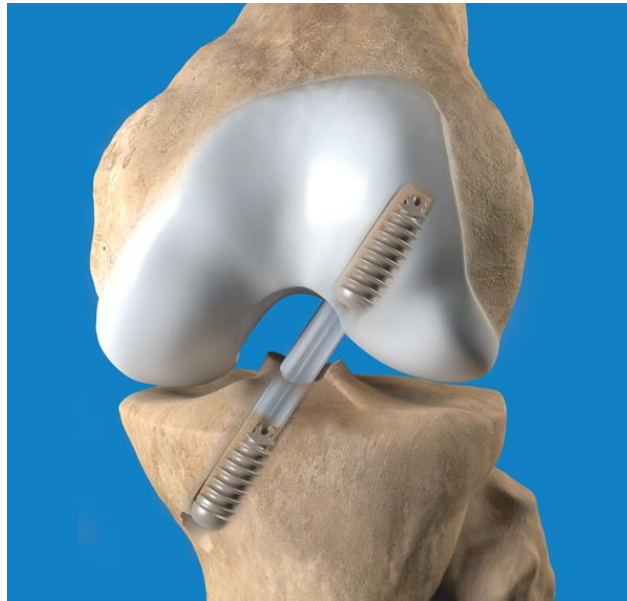


My perspective!



- Arduous recovery
- Takes a long time to return to sport
- What I do matters less than what you do *
- High re-injury rate









Arthroscopy 2012

Outcomes and revision rate after BTB allograft versus autograft
ACLR in patients 18 years and younger with closed physes.

“In the autograft group, 3% (2 of 59) required revision ACL reconstruction at a mean of 15.4 months (range, 13.0 to 17.7 months) after the index procedure. In the allograft group, 35% (7 of 20) required revision ACL reconstruction at a mean of 9.1 months (range, 5.3 to 12.0 months) after the index procedure. The allograft group was 15 (95% confidence interval [CI], 2 to 123) times more likely to require revision reconstruction than the autograft group ($P = .001$). ” (64)

Autograft Tissue is far superior to Allograft Tissue in young patients!

- Am J Sports Med 2013 Oct 5182 Patient meta-analysis
- Am J Sports Med 2014 Oct >5 Odds ratio
- Arthroscopy 2018 May Hybrid Grafts

AJSM 2016 Jul

Risk of Secondary Injury in Younger Athletes After ACLr: A systematic Review and Meta-analysis

- 15% Total second ACL reinjury rate
 - 7% ipsilateral; 8% contralateral
- 21% in patients < 25 years
- 23% in patients < 25 years who return to sports

JBJS 2017

Return to Sport After Pediatric ACLr and Its Effect on Subsequent ACL Injury

- 112 Patients
- Ages 6 -17
- 4 yr follow-up
- 19% graft rupture : 13% contralateral ACL tear: 1% Both
- TIME TO SPORT WAS THE ONLY SIGNIFICANT PREDICTOR OF A SECOND INJURY

Evolving Treatment Patterns of NFL Players by Orthopaedic Team Physicians Over the Past Decade, 2008-2016

- 31 NFL Team Physicians in 2008, 29 in 2016-17
- BTB Autograft 87% to 97%
- Return at 6 months or less: 49% to 14%

MOON Group

- Multicenter Orthopaedic Outcomes Network
- Started in 2002
- 7 Institutions
- Largest prospective longitudinal ACLr cohort in the US
- Patient-reported Outcomes

AJSM 2015 Jul

Risk Factors and Predictors of Subsequent ACL Injury in Either Knee After ACL Reconstruction: Prospective Analysis of 2488 Primary ACL Reconstructions From the MOON Cohort

“CONCLUSION: Younger age, higher activity level, and allograft graft type were predictors of increased odds of ipsilateral graft failure. Higher activity and younger age were found to be risk factors in contralateral ACL tears.”

Clinical Insights Uncovered by MOON

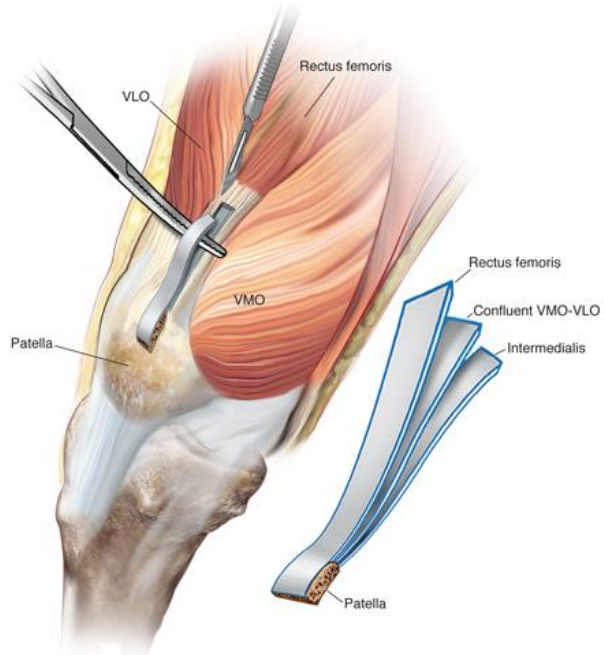
Here's a sampling of notable findings gleaned from MOON to date:

- A constellation of patient-related factors influence outcome after ACL reconstruction, but those most associated with difficult rehabilitation and pain are smoking, elevated body mass index and lower educational level. Contrary to popular belief, incidence of bone bruising has not been shown to be a factor.
- Patients ages 10 to 19 have the highest ACL reconstruction failure rate, regardless of graft type.
- In high school- and college-age patients, allografts fail three times more often than autografts do. In light of this finding, many orthopaedic surgeons, including those in the MOON Group, are no longer using allografts in young patients.
- Repairs of meniscal injuries (in association with ACL tears) have a 14 percent failure rate. Yet patients with unrepaired meniscal tears report doing well at the same follow-up. More study is needed, but these early results may indicate that surgeons have been overtreating concomitant injuries.
- Gender is not a factor in risk of reinjury. Male and female patients who have torn an ACL are at equally high risk of repeat injury. Devising a strategy to prevent reinjury is important for all patients.
- Rehabilitation therapy can reduce the risk of repeat ACL tears by 40 to 60 percent. All patients should participate in training programs before returning to sports or resuming normal activity. Even after six to nine months of recovery, patients may still have neuromuscular deficiencies that require fine-tuning.

Arthroscopy 2013 Dec

The influence of hamstring autograft size on patient-reported outcomes and risk of revision after ACLr: A MOON Cohort Study

- 2 year data on 263 patients
- Controlled for age, sex, operative side, BMI
- No revisions in grafts >8mm
- 18% revision rate with grafts <8mm in patients <18 years



Quadriceps Tendon Autograft

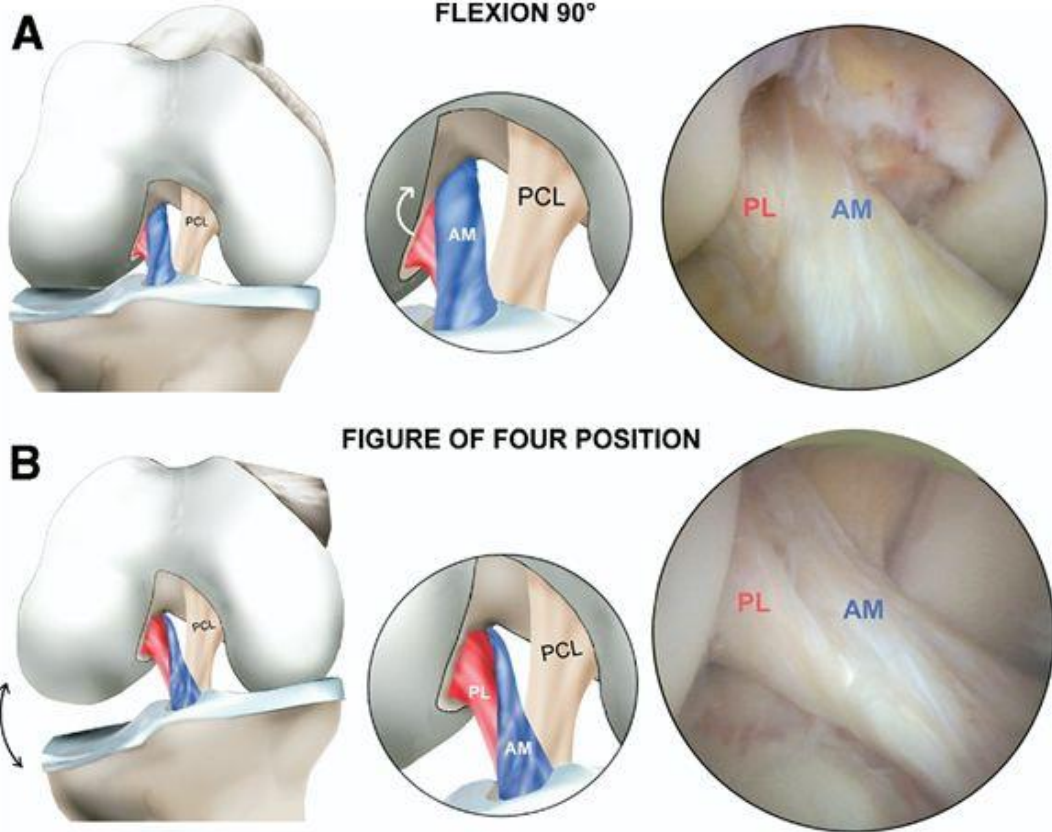
- Arthroscopy 2009 Dec Equivalent to BPTB
 - 198 Patient ACLr at 55.6 Months
- Arthroscopy 2014 May
 - Prospective randomized study
 - QTB -> less kneeling pain, graft site pain, sensitivity loss
 - Similar knee stability and subjective outcomes

Trending Techniques

- Double Bundle ACLr
- ACL REPAIR
- Extra-Articular Augmentation

Anteromedial Bundle (AM)

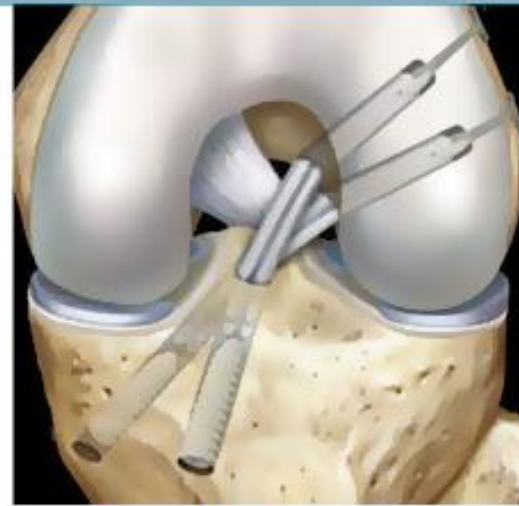
Posterolateral Bundle (PL)



ACL Reconstruction Techniques

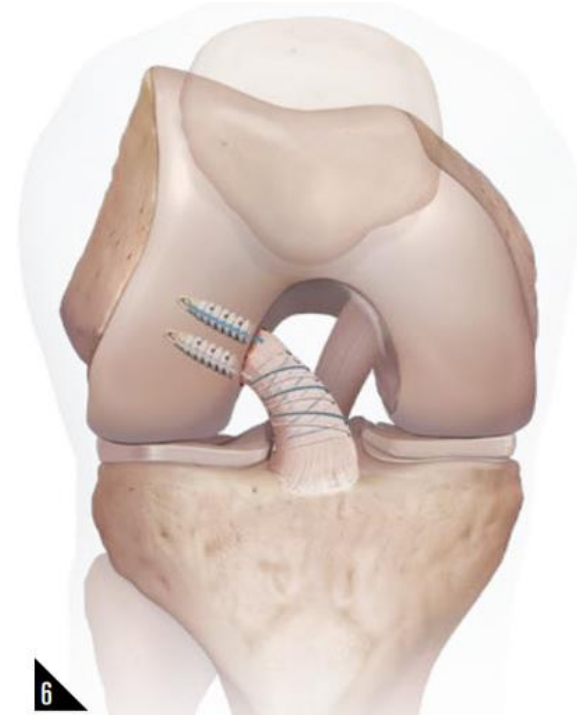
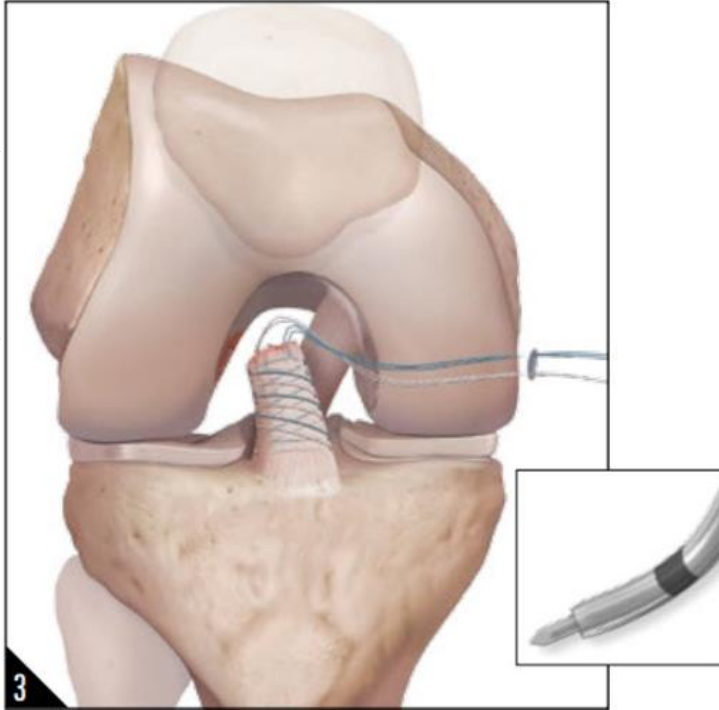


Single Bundle



Double Bundle

ACL Repair

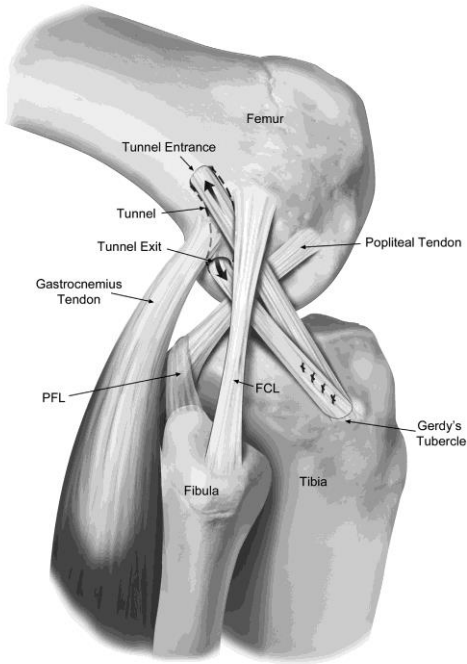


AJSM 2019 Feb

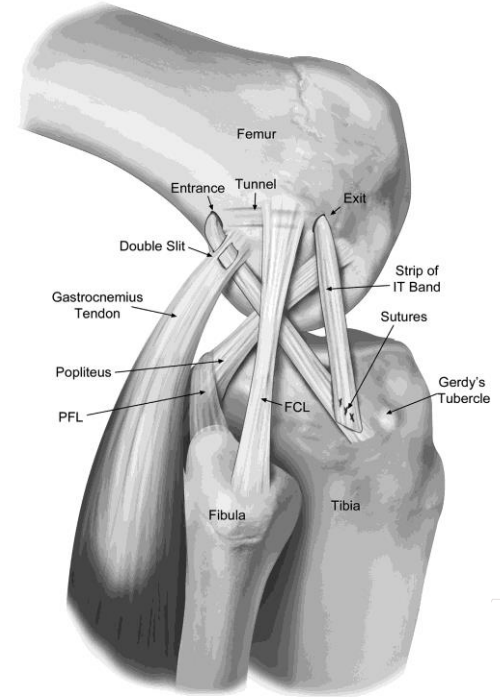
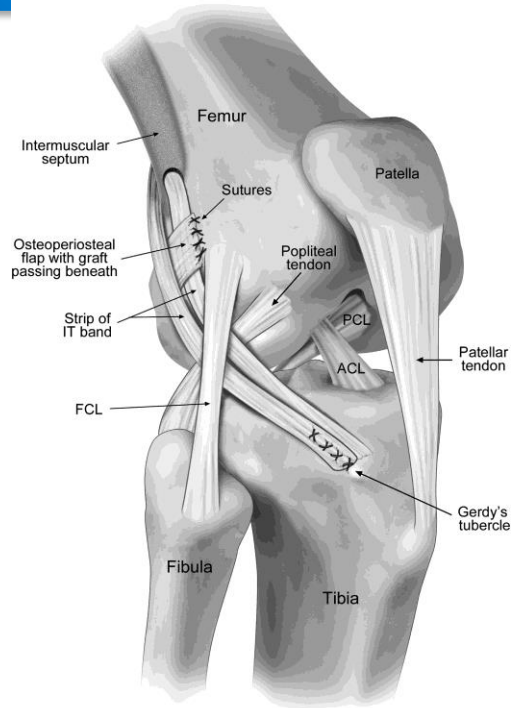
ACL Repair With Suture Ligament Augmentation Is Associated With a High Failure Rate Among Adolescent Patients

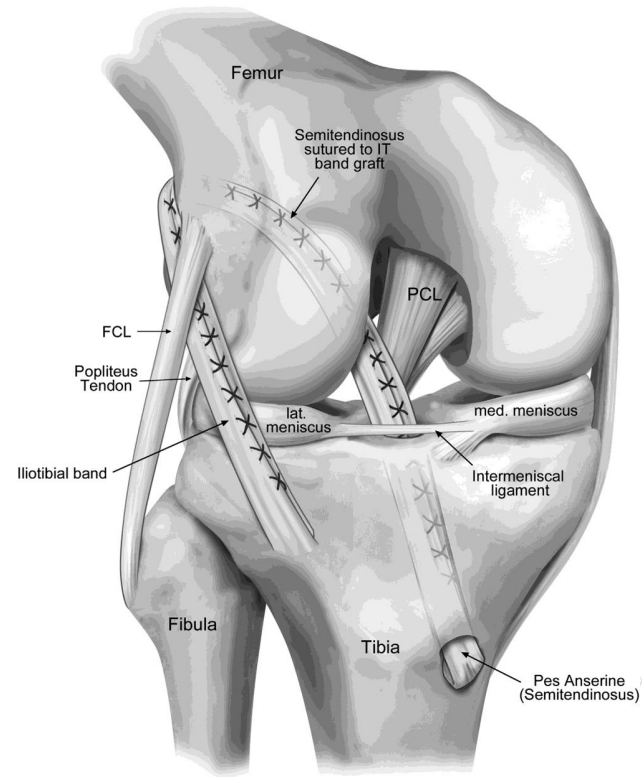
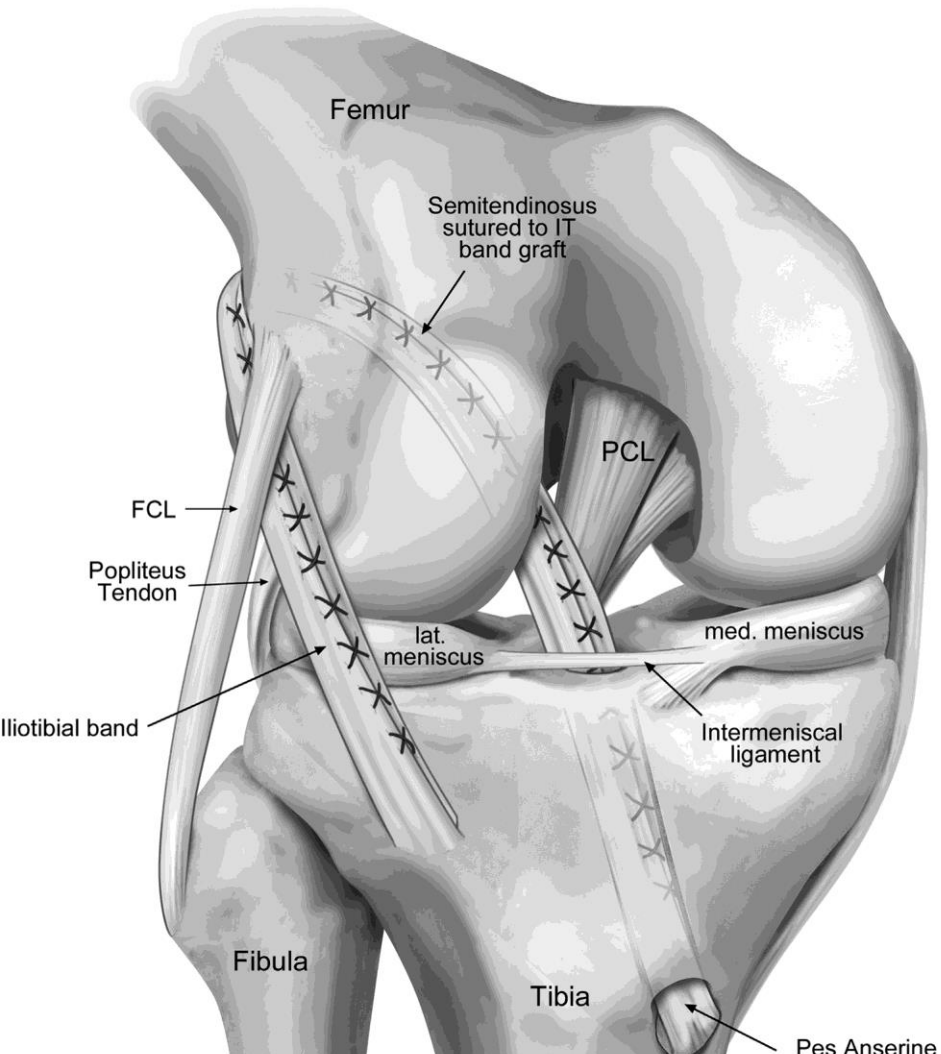
- Compared repair (SLA) to ACLr with QPA
- 4.7% failure in QPA vs. 48.8% in SLA at 3 years
 - Odds ratio of 10.66

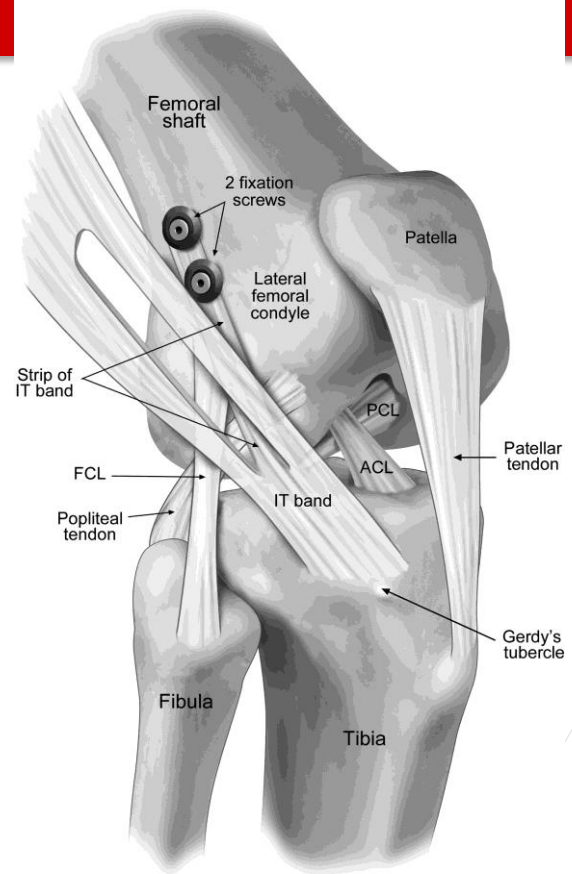
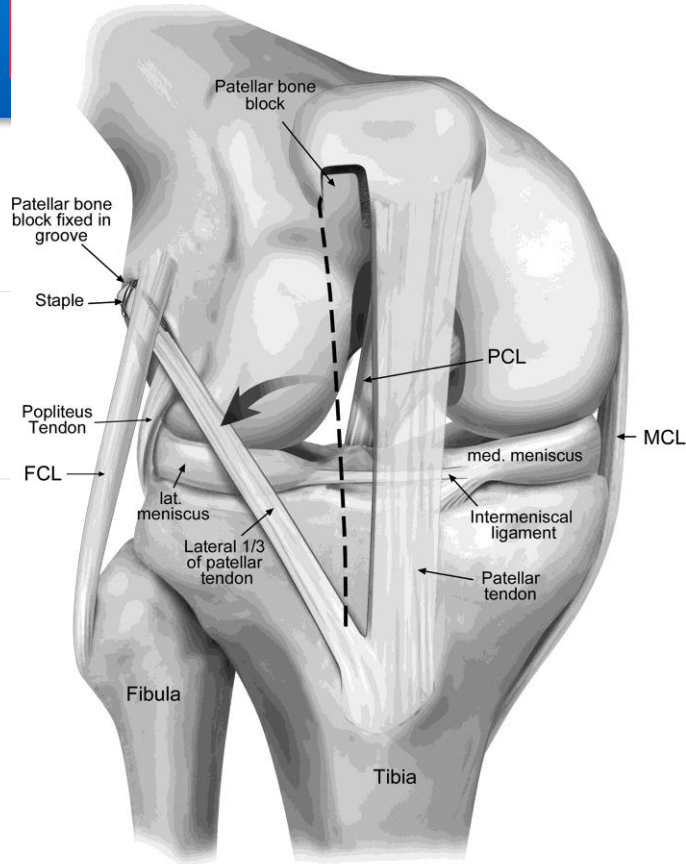
Anterolateral Augmentation



- Secondary stabilizers for controlling anterolateral rotatory movement
- Lemaire, MacIntosh, Losee, Ellison, Andrews, Modified Andrews, etc.







AJSM 2014 Feb

Increased risk of revision with hamstring tendon grafts compared with patellar tendon grafts after ACLr: a study of 12,643 patients from the Norwegian Cruciate Ligament Registry, 2004-2012

- Patients with HT grafts had twice the risk of revision compared with PT grafts (2.3)
- Younger age was an important independent risk factor
- No effect for sex

Thank you!