Complications in ACL reconstruction surgery

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Complications in ACLR surgery

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Complications in ACLR surgery

Outcomes and Complication Rates After Primary Anterior Cruciate Ligament Reconstruction Are Similar in Younger and Older Patients

Mark E. Cinque,* MS, BS, Jorge Chahla,* MD, PhD, Gilbert Moatshe,† MD, Nicholas N. DePhillipo,† MS, ATC, OTC, Nicholas I. Kennedy,* MD, Jonathan A. Godin,* MD, and Robert F. LaPrade,*‡§ MD, PhD

Orthop J Sports Med, 2017

1 - 15 % of complications

10 - 15 % of failures

Complications in ACLR surgery

Clinical Sports Medicine Update

Current Concepts Review: Revision Anterior Cruciate Ligament Reconstruction

Michael S. George, MD, Warren R. Dunn, MD, MPH, and Kurt P. Spindler,* MD
From Vanderbilt Sports Medicine, Vanderbilt University Medical Center, Nashville, Tennessee

American Journal Sports Medicine, 2006

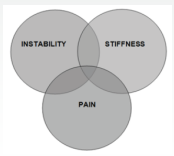
Complications in ACLR surgery

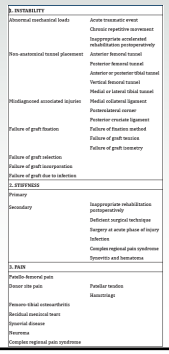
CURRENT CONCEPT REVIEW

Failure of Anterior Cruciate Ligament Reconstruction

Gonzalo Samitier, MD, PhD; Alejandro J. Marcano, MD; Eduard Alentorn-Geli, MD, PhD; Ramon Cugat, MD, PhD; Kevin W Farmer, MD; Michael W Moser, MD

Arch Bone Jt Surg 2015





Common complications ARTHROFIBROSIS

Most common cause

Probably 100% will undergo

but most will go through & recover w/o problem

Ahn et al, KSSTA 2007

relooks at 2y

- cyclops 21%
- notchfibrosis 40%
- partial graft tear 10%

Common complications ARTHROFIBROSIS

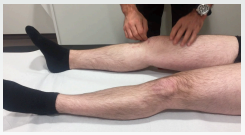
= excessive scar tissue resulting in loss of motion or pain

2 months post semiT + monoloop
not full extension
over 130° flexion
patellar mobility not symmetrical

Courtesy K.C. Lagae

Common complications ARTHROFIBROSIS

3/52 visit inhibition



3/52 visit full relax

But extension loss is not always due to fibrosis

Gastroc defense

- Hamstrings contracture
- Hamstrings fatiguing exercices
- Quads control

Common complications ARTHROFIBROSIS

Usual postop control at 5-6 months
if 2-3° loss of hyperextension, full flexion & stable
ask for stiffness / starting stiffness ?
most of the ladies « yes » vs. very few gentlemen
does it click ?
most of it goes away by itself
by returning to sport it goes quicker

Common complications ARTHROFIBROSIS

Wait long enough
NSAIDs
Sports in the mean time
MRI control at 7-8 months, not before
Reevaluate
Maybe surgery

Common complications ARTHROFIBROSIS

Normal ROM !
Clicks
Effusion after activity

Courtesy K.C. Lagae

Common complications ARTHROFIBROSIS

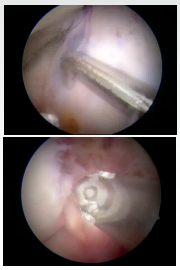
Normal ROM !
Clicks
Effusion after activity

Common complications ARTHROFIBROSIS

Normal ROM !

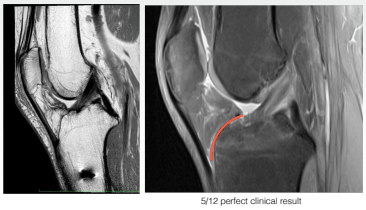
Clicks

Effusion after activity



Common complications ARTHROFIBROSIS

Hoffa interval



5/12 perfect clinical result

Common complications ARTHROFIBROSIS

Hoffa interval

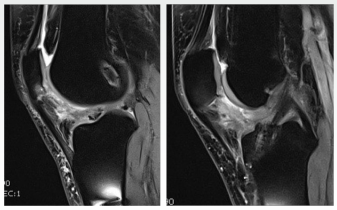
9 months after ACLR
Full ROM
Stiff
Deep anterior knee pain

Courtesy K.C. Lagae

Common complications ARTHROFIBROSIS

Hoffa interval

9 months after ACLR
Full ROM
Stiff
Deep anterior knee pain



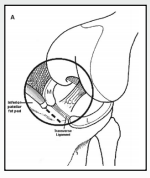
Common complications ARTHROFIBROSIS

Hoffa interval

Arthroscopic Release for Symptomatic Scarring of the Anterior Interval of the Knee

J. Richard Steadman,*† MD, Jason L. Dragoo,‡ MD, Sophie L. Hines,* and Karen K. Briggs,* MPH
*From the *Steadman Hawkins Research Foundation, Vail, Colorado, and the †Department of Orthopaedic Surgery, Stanford University, Stanford, California*

AJSM 2008



Common complications ARTHROFIBROSIS

HOW TO PREVENT ?

- no surgery on **angry** knee
- surgery details : remnant vs non remnant
- early phase : rehab
- later phase : cool down
- wait long enough to plan surgery : 8-9 months

Common complications ARTHROFIBROSIS

« Good complication »
- awareness
- tell your patient they « heal too well »
- very frequent : reop rate 1,5% males / 5% females
- early detection
- good physiotherapist
- neuromuscular inhibition
- operate late !

Common complications DVT / PE

- Relatively rare (amongst >300000 procedures)
- PE rate 0,08%*
- DVT rate 0,12%*

  but asymptomatic DVT up to 15%**

* *Palazzolo et al, Joints 2018*
** *Gaskill et al, AJSM 2015*

Common complications INFECTION

Septic arthritis is every orthopaedic surgeon's nightmare !

Postoperative Infection After Anterior Cruciate Ligament Reconstruction

Alberto Gobbi, MD,*† Georgios Karnatzikos, MD,† Sanyam Chaurasia, MS,† Mudhigere Abhishek, MS,† Erica Bulgherhoni, MD,‡ and John Lane, MD‡§

Sports Health, 2015

Literature review
16 studies over 35795 ACLRs
245 infections
mean incidence **0,68%**

Common complications INFECTION

Could low incidence still be reduced ?

Vancomycin-soaking of the graft reduces the incidence of septic arthritis following ACL reconstruction: results of a systematic review and meta-analysis

Jan-Hendrik Naendrup[1,2] · Benedikt Marche[1] · Darren de SA[2] · Paola Koenen[1] · Robin Otchwemah[1] · Arasch Wafaisade[1] · Thomas R. Pfeiffer[1,2]

KSSTA 17 jan 2019

Conclusion The incidence of septic arthritis following ACLR can be reduced dramatically by vancomycin-soaking the grafts intra-operatively prior to graft passage and fixation. Within the limitation confines of this study, intra-operative graft-soaking in vancomycin appears to be a safe and effective method to reduce the incidence of septic arthritis following ACLR. Still, it remains debatable if the available data facilitate the recommendation for a universal application of vancomycin-soaking for all ACLR patients or if it should be reserved for patients at risk, including the use hamstring tendons, revision cases and in the presence of medical preconditions.

everyone or only at risk patients ?

Common complications INFECTION

Hemarthrosis

« early onset infection »

can give 38°-38,5°

but aseptic effusion

Other complications ?

Uncommon Complications after Anterior Cruciate Ligament Reconstruction

Anna Palazzolo[1] Federica Rosso[2] Davide Edoardo Bonasia[2] Francesco Saccia[3] Roberto Rossi[2] Knee Committee SIGASCOT

Anterior cruciate ligament reconstruction (ACL-R) is a common surgical procedure, with good outcome in 75 to 97% of the cases. However, different complications have been described including infection, hemarthrosis, deep vein thrombosis (DVT), and pulmonary embolism (PE) with a rate ranging from 1 to 15%. There are few case reports in the literature describing rare complications after ACL-R and they can be divided into: (1) complications related to the fixation device (rupture, migration); (2) fractures (tibial or femoral side); (3) infections due to uncommon bacteria, mycobacterium, and mycosis; (4) rare vascular injuries; (5) nerve injuries; and (6) other rare complications. In case of

Joints, 2018

Uncommon complications
Fixation devices

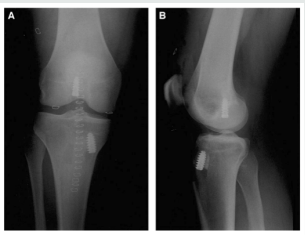
Everything can happen …

- Breakage
- Migration
- Recurrent effusion
- Synovitis
- Osteolysis around screw
- Aseptic exsudates

No difference in complication rate between metallic / adsorbable screws

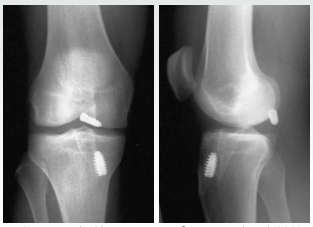
Saccomanni et al, Musculoskelet 2011

Uncommon complications
Fixation devices



immediate postop BTB ACLR

Uncommon complications
Fixation devices



2y postop, locking symptoms. Saccomanni et al, 2011

Uncommon complications
Fixation devices

Tunnel widening

>10mm close to joint line

= sign of graft motion

Uncommon complications
Fixation devices

2y postop ACLR
Lateral mechanical pain
ITB friction // button
Removal : pain was gone

Uncommon complications
Fractures

Patella

- with BTB technique : 0,2 - 2,3 % *

Tibia

- late and related to new injury (low/high energy)
- more with BTB (site harvesting / tunnel pressure ?)
- mostly non surgical treatment

Femur

- mostly because technical errors
- or additional fixation devices holes (extra-articular fixation)

Influence of mineral bone loss ?

** Busam et al, AJSM 2008*

Uncommon complications
Neurovascular injuries

Vascular

- < 1% of all complications
- few cases in litterature
- pseudoaneurysm geniculate artery

Nerve

- commonly infrapatellar branches N. Saphenous
- oblique scar seems to decrease incidence
- extremely rare : saphenous / common peroneal / sciatic
- due to surgical errors

Graft failure

= retear of the ACL reconstruction

5,8% ACL failure at 5 Years
58% of male
Age : 26y (12-63)
Associated lesions
- 72% grade II or worse cartilage damage
- 80% meniscus damage
- 62% both
- 9% neither

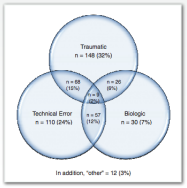
Risk factors
- Young with high level of sport activity
- Tunnel diameter <8mm
- Meniscal deficiency
- Increased posterior tibial slope
- Hypermobility / Laxity
- BMI > 30

Graft failure
Why does it fail ?

Descriptive Epidemiology of the Multicenter ACL Revision Study (MARS) Cohort

The MARS Group*†

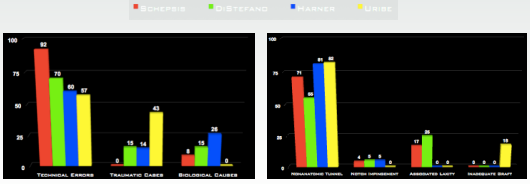
AJSM 2015



Graft failure
Disruption or recurrent instability ?

- New traumatic event
- Atraumatic
  - Technical errors
    - graft malposition - non anatomical
    - fixation loss
    - improper graft tension
  - Biological issue
    - failure of incorporation
    - osteolysis
    - other
  - Diagnostic errors / undiagnosed associated lesions
    - PLC / PMC
    - PCL
    - MCL / LCL

Graft failure
Technical errors

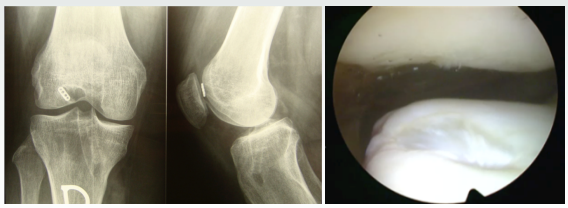


around 80% non anatomical tunnels
femoral >>> tibial

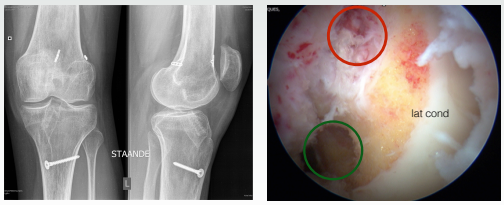
Graft failure
Technical errors

TECHNICAL ERROR	EFFECT
Femoral tunnel anterior	Flexion deficit + lateral impgt
Femoral tunnel vertical	Rotational instability
Tibial tunnel anterior	Extension loss
Tibial tunnel posterior	Flexion laxity
Inadequate notch plasty	Extension loss
Inadequate graft tensioning	Instability
Poor fixation	Instability
Unrecognized cartilage or meniscus injury	Persistent pain

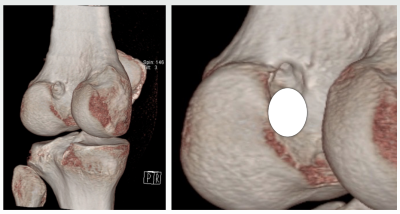
Graft failure
Technical errors



Graft failure
Technical errors



Graft failure
Technical errors



too posterior - 2 stages revision

Graft failure
Biological issue

"Biological failure" of the anterior cruciate ligament graft

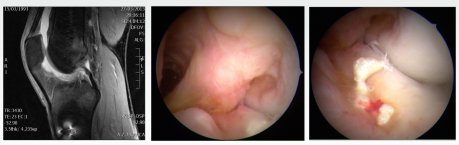
J. Ménétrey · V. B. Duthon · T. Laumonier · D. Fritschy

KSSTA 2008

- Avascularity
- Immunology
- Stress shielding

Graft failure
Biological issue

5m postop - no trauma but clear laxity

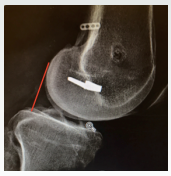


Vanishing graft

Graft failure
Associated lesions

Collateral ligaments
Posterior cruciate ligament
Posterior corners

Good clinical evaluation !



« If you think you've never seen posterolateralcorner injuries, you could be sure they have more likely already seen you »
Robert Laprade

Graft failure
Underappreciated factors

Underappreciated Factors to Consider in Revision Anterior Cruciate Ligament Reconstruction

A Current Concepts Review

Brendan R. Southam,*† MD, Angelo J. Colosimo,† MD, and Brian Grawe,† MD

Orthop J Sports Med, 2018

- Posterior tibial slope
- Varus malalignment
- Meniscal deficiency

Graft failure
Posterior tibial slope

PTS > 10° pathological

Increased PTS induce an increased anterior joint reaction but also an increased Hip and Tibia internal rotation responsible for more valgus stress

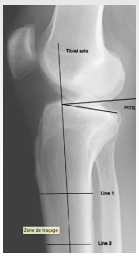
2,4x risk for graft failure with a 4° increase of slope

4x risk '' '' 6° '' ''

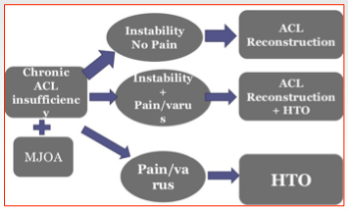
Wordeman et al, AJSM 2012

Every 10° of tibial slope leads to 6mm anterior tibial translation

Bonnin et al 1993



Graft failure
Varus malalignment

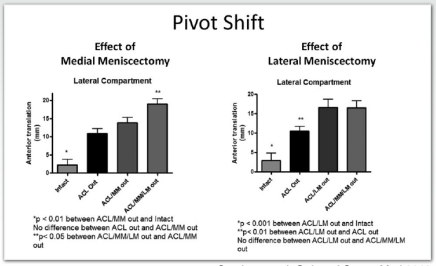


Tischer et al, Orthop J Sports Med 2017

Graft failure
Varus malalignment

Southam et al, Orthop J Sports Med 2018

Graft failure
Meniscal deficiency



Southam et al, Orthop J Sports Med 2018

ACL revision ?

- Multiple etiologies, sometimes combined
- Needs to be well identified
- Don't rush and think you'll do better

  … don't do the same mistakes
- Key to success : analyse - identify - planify

Thanks