

THE PERFECT ACL RECONSTRUCTION



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SPORTHOPAEDIE

CONGRES

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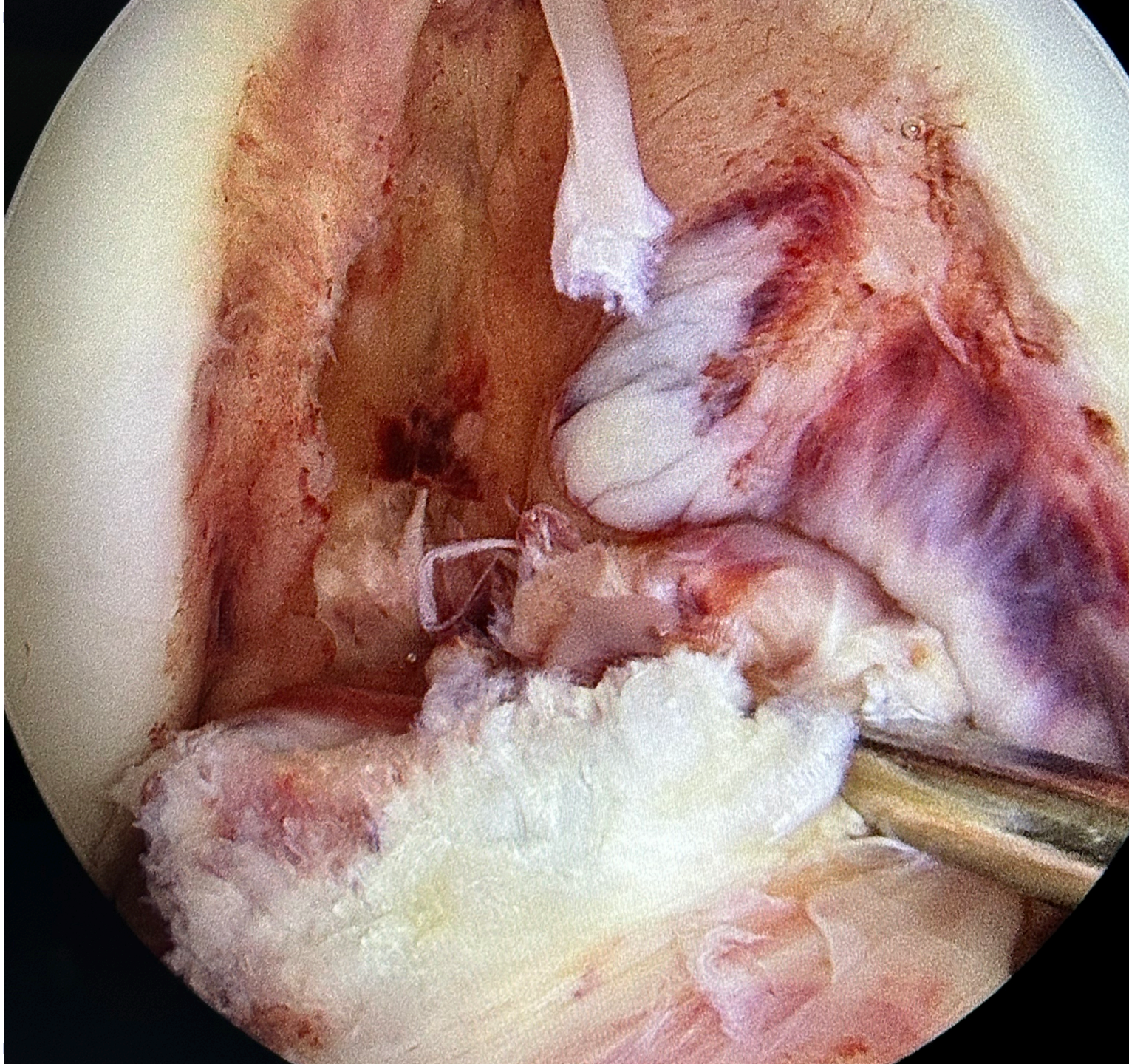


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Guideline on anterior cruciate ligament injury

A multidisciplinary review by the Dutch Orthopaedic Association

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Surgery for knee injury: The perfect ACL reconstruction



Establish diagnosis and
surgical indication



Recognize determinants for
treatment (algorithm)

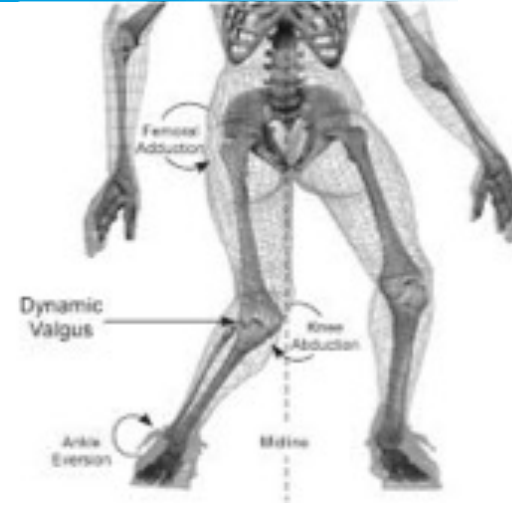


Improve treatment and
outcome

Short term: a stable knee with full functional recovery, long term: prevent osteoarthritis

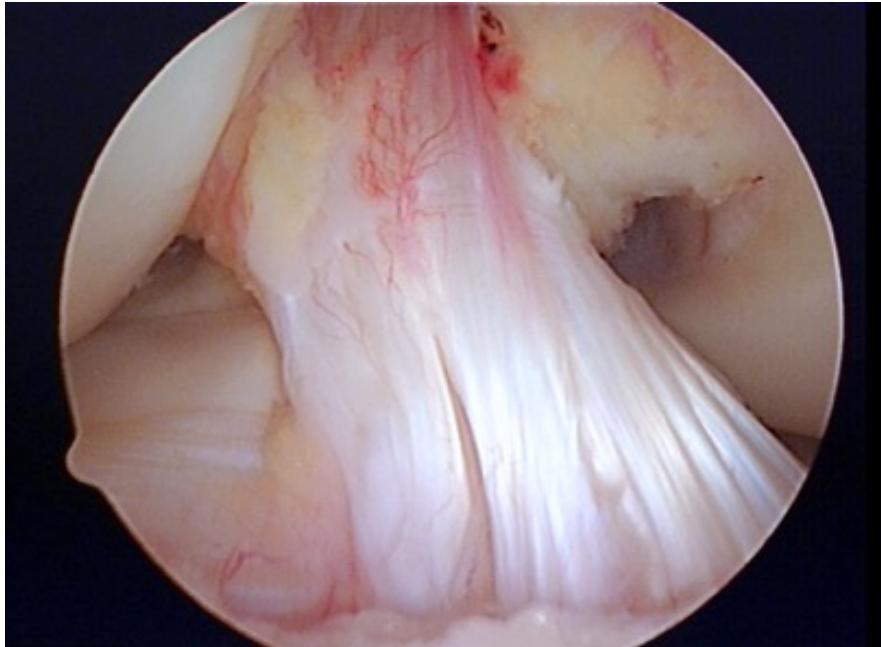
ACL injury patterns

- ✓ Is ACL injury only an intra-articular injury?
- ✓ Valgus rotation trauma:
 - High grade Pivot
 - Deep lateral femoral notch sign
 - Segond fracture
 - Bone bruise patterns
 - Damage anterolateral corner



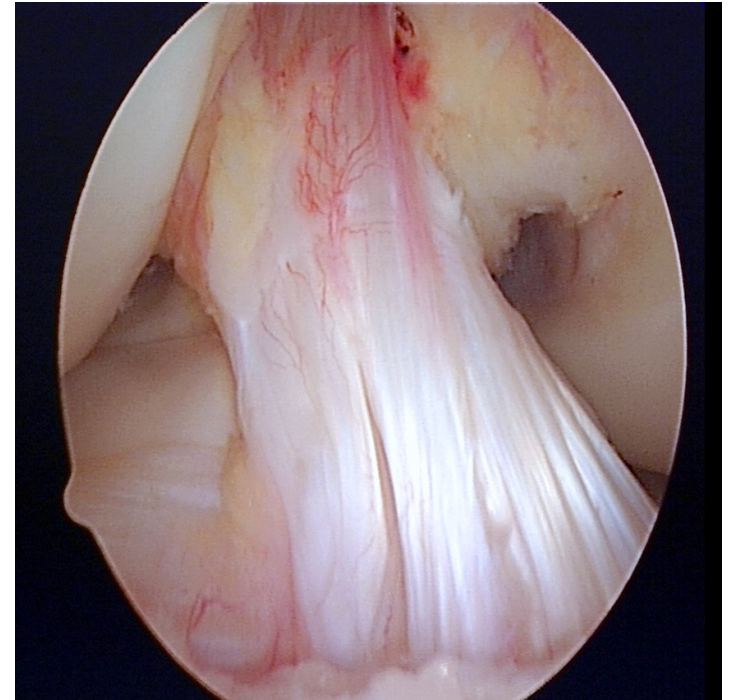
-The lateral femoral notch sign: a reliable diagnostic measurement in acute anterior cruciate ligament injury. Prabath Lodewijks KSSTA oct 2018

Intra-articular knee injury

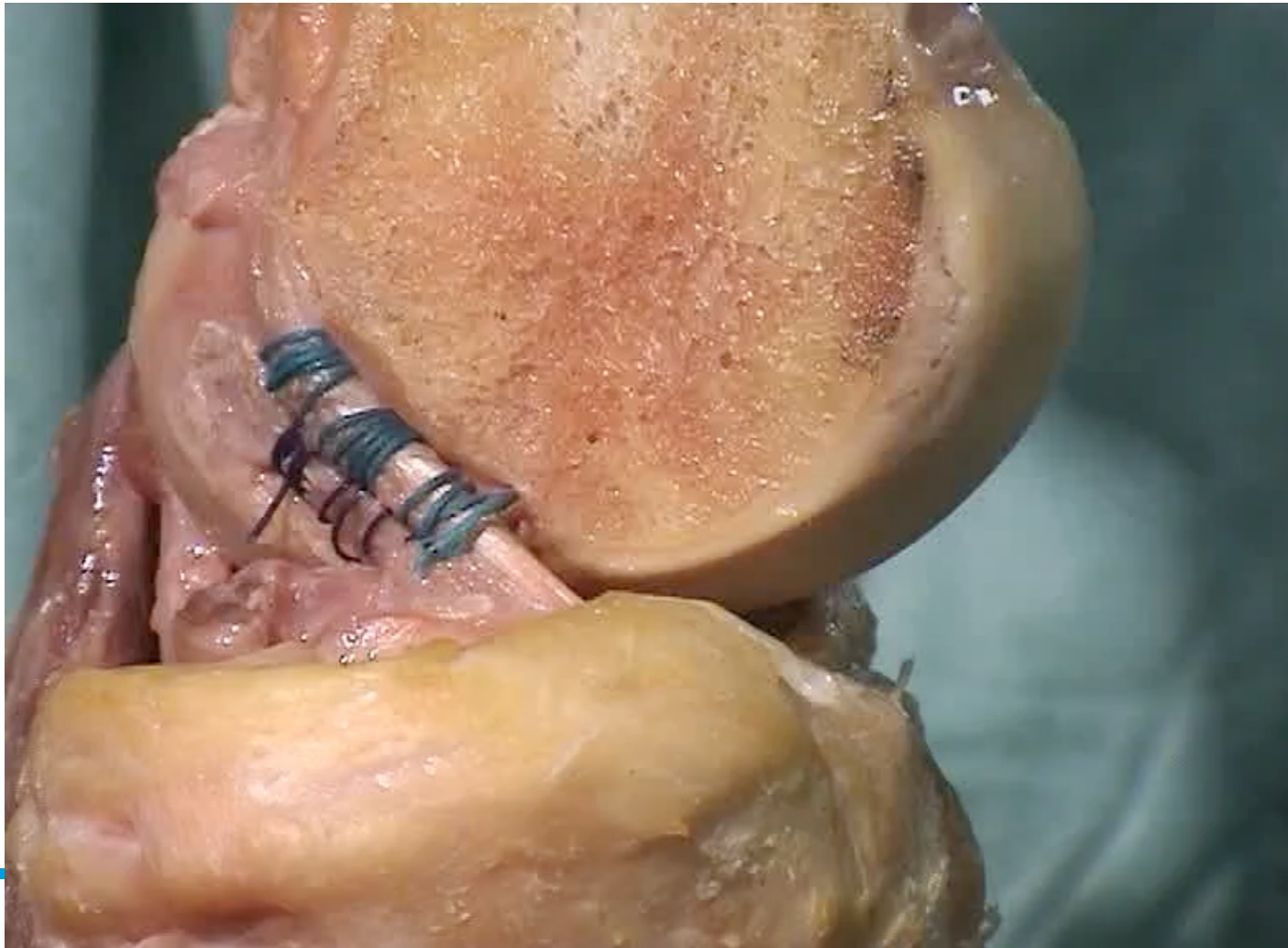


Anterior cruciate ligament reconstruction

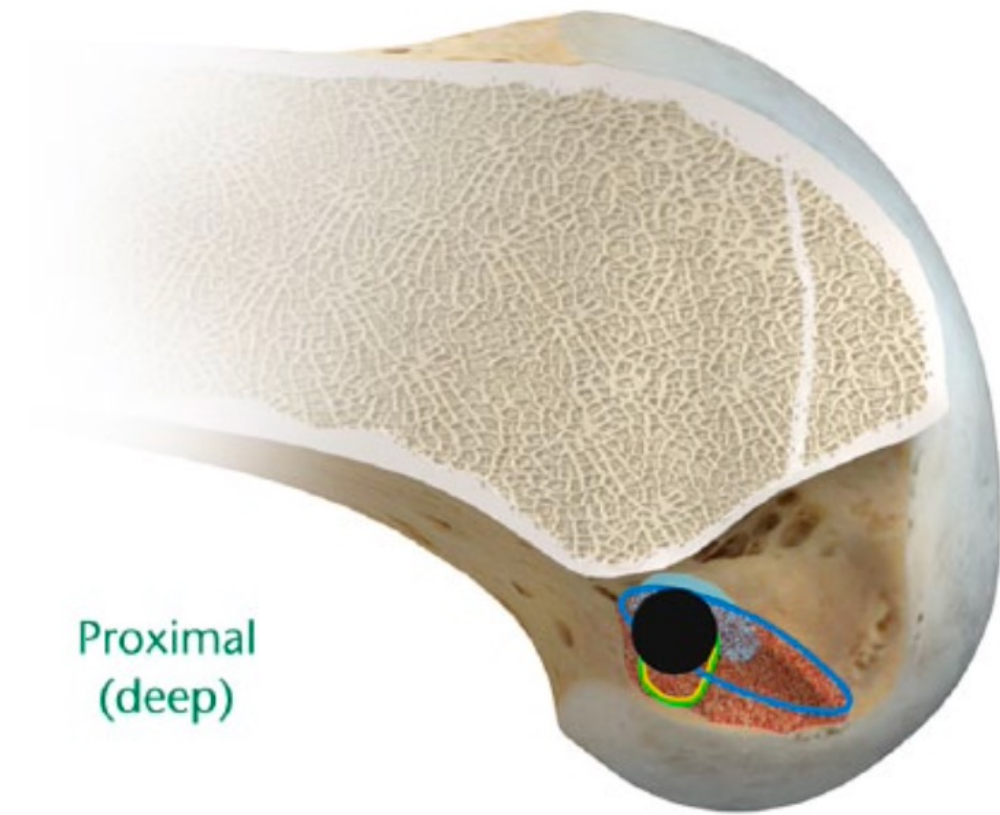
- ✓ restore anatomy of the native ligament
- ✓ restore normal insertion site anatomy
- ✓ restore normal tensioning pattern
- ✓ restore normal functioning
- ✓ prevent secondary lesions



ACL Anatomy



Anterior
(High)

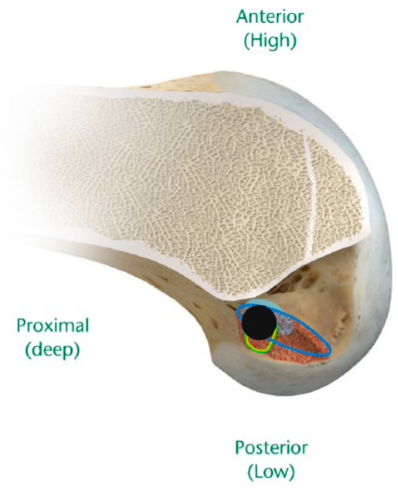


Proximal
(deep)

Posterior
(Low)

- IDEAL
- Isometric
- Direct fibres
- Anatomic
- Low tension
- Eccentric

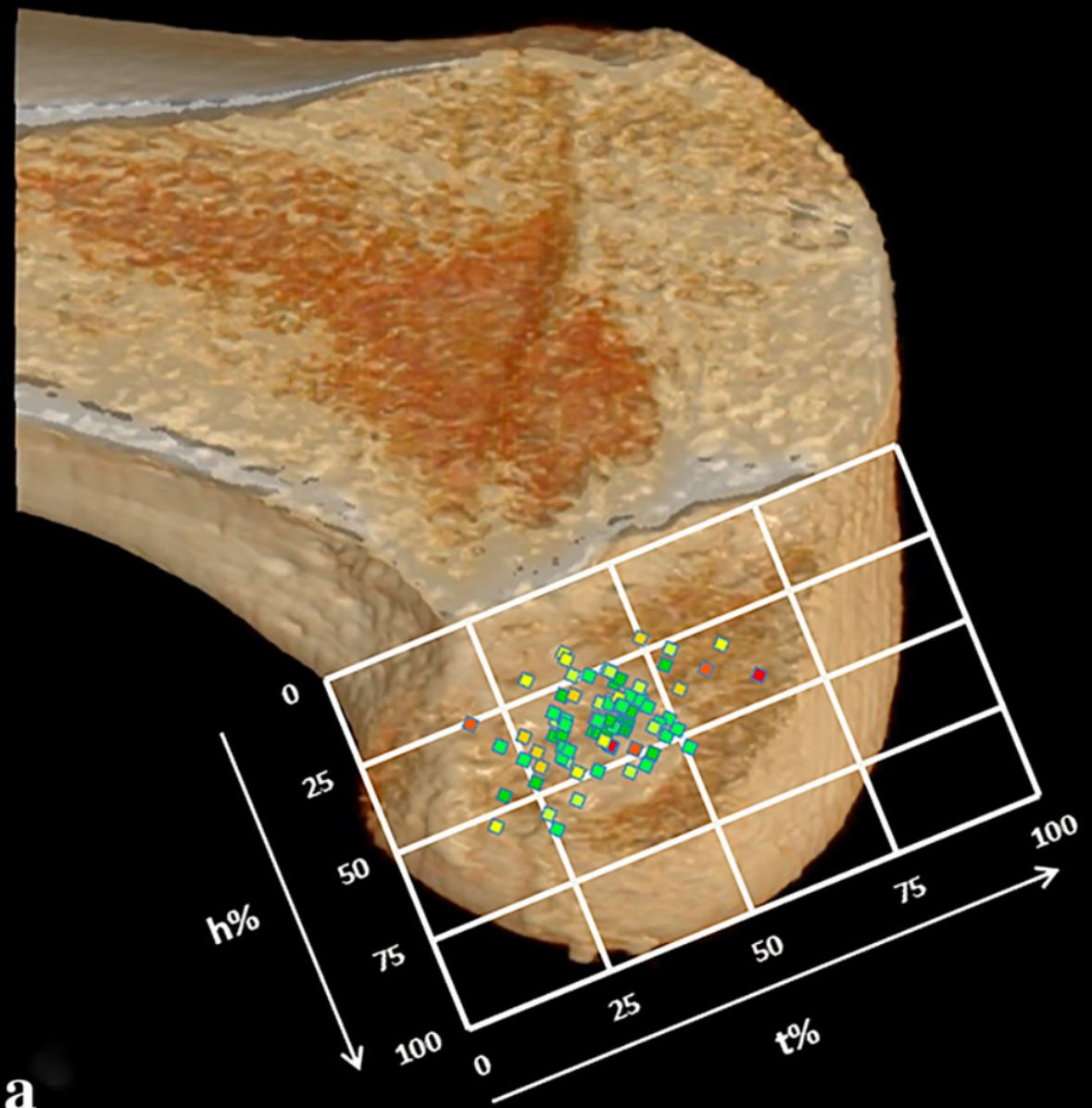
Distal
(Shallow)



- IDEAL
- Isometric
- Direct fibres
- Anatomic
- Low tension
- Eccentric

Distal (Shallow)

IKDC score of the tunnel position

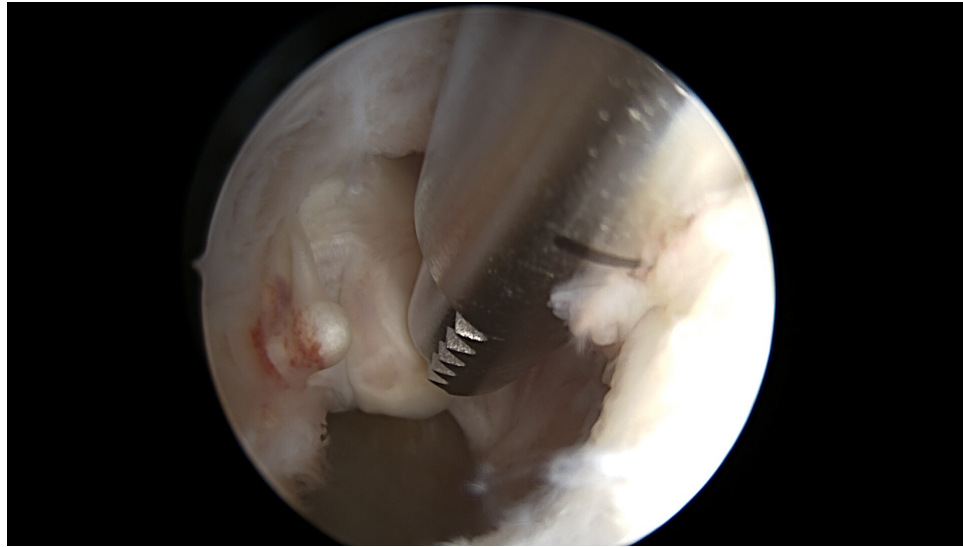


a

IDEAL graft:

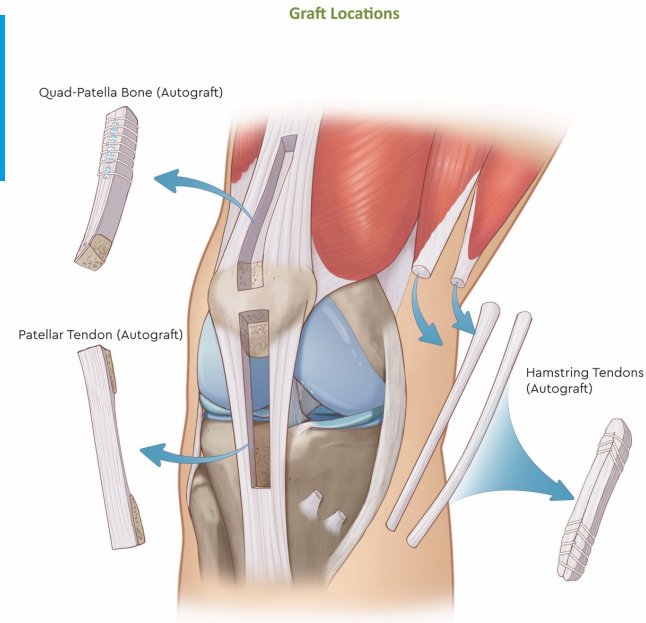
- ✓ Similar properties to the native ACL
- ✓ Individualized to patients risk factors for failure
 - anatomy
 - sport
 - level of competition
 - age
 - previous graft harvest
 - graft size

Anatomical Tunnel Placement



Graft Options

- ✓ Hamstring
- ✓ Bone Patellar Tendon Bone (BPTB)
- ✓ Quadriceps Tendon (+Bone)
- ✓ Allograft
- ✓ Synthetic graft
- ✓ No graft: Repair



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Preferences: patient selection – surgeon – sport specific?

Pro's and cons

Selection

✓ Sport:

No hamstrings for:

sprinters

wrestlers, judo: combat: do not weaken hamstrings

MCL deficient knee

No BPTB / QT for:

jumping: do not weaken knee-extensors

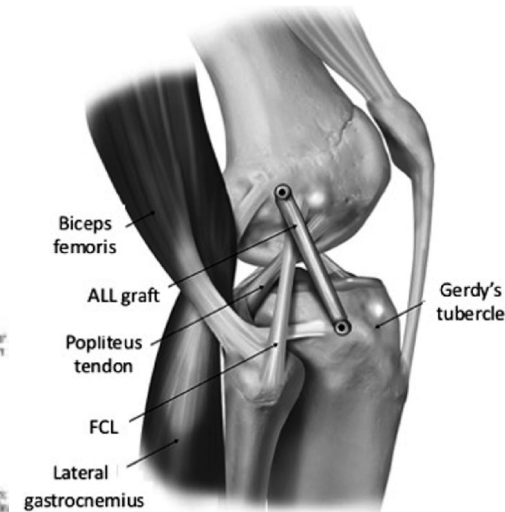
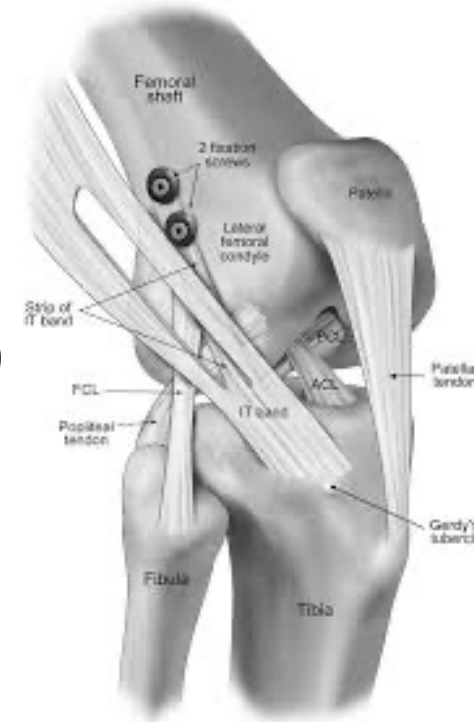
much kneeling: Judo/ wrestling no BPTB

Diameter + surgical skill + comprehension of anatomy is important

	Patellar tendon	Hamstrings
Advantages	<ul style="list-style-type: none">• Higher strength• Lower re-tear rate• Earlier graft remodeling and healing• Better knee stability	<ul style="list-style-type: none">• Smaller incision/better cosmesis• Minor functional impairment from graft harvesting• Earlier regeneration of hamstrings
Disadvantages	<ul style="list-style-type: none">• Higher incidence of anterior knee pain and kneeling pain• Increased incidence of OA post-ACL reconstruction• Higher rate knee extension deficit due to adhesions	<ul style="list-style-type: none">• Higher incidence of tunnel widening• Electromechanical delay in knee flexors/weakness

Indications for Additional Anterolateral Procedure

- Explosive Pivot shift
- Active in pivoting sports
- Adolescents
- Hyperlaxe/ hyperextension knees (>10 °)
- Increased tibial slope?
- Meniscectomy?
- Revision surgery



✓ Bourke AJSM 2012, Mars group AJSM 2018, Salmon AJSM 2017, Magnussen AJSM 2018

✓ When NOT to do it?

Minimally Invasive Modified Lemaire Tenodesis.

Muller B, Willinge GJA, Zijl JAC. Arthroscopy Tech. 2020 Dec 19;10(1):e29-e36



CURRENT CONCEPTS REVIEW

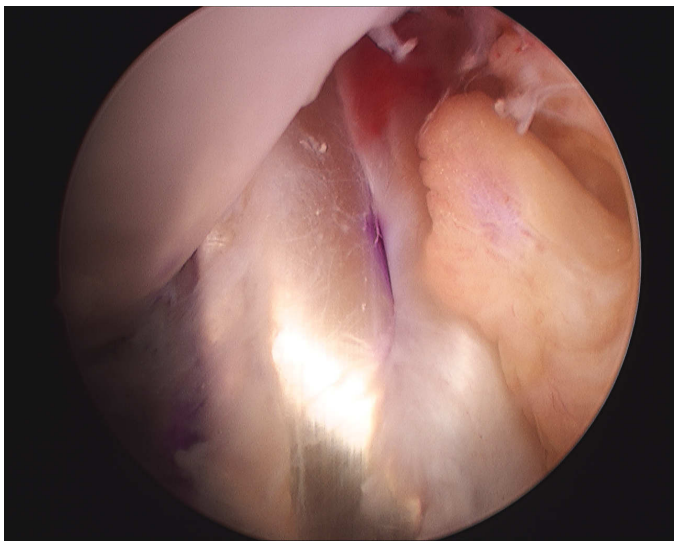
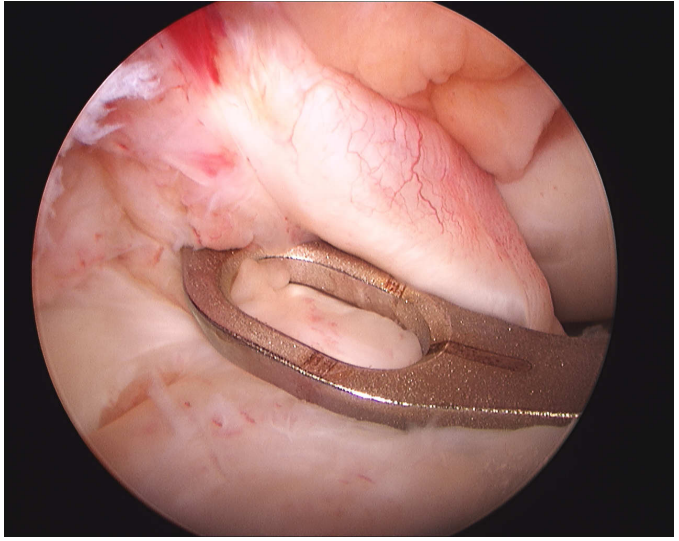
Anterior Cruciate Ligament Repair: The Current Status



- Failure rates for anterior cruciate ligament (ACL) repair are greater than those for ACL reconstruction.
- There are no long-term outcome studies for ACL repairs, as far as we know, and postoperative protocols including physical therapy progression and return-to-play criteria following ACL repair have not been established.
- There are currently insufficient data to support utilization of ACL repair in all patients and tear types.
- ACL reconstruction remains the gold standard surgical option for patients with ACL tears.

Criteria for the Anatomic Anterior Cruciate Ligament Reconstruction Scoring Checklist (AARSC) by van Eck et al. [62]. 17 items with a maximum score of 19 points. A score of 8 or higher has been used as a threshold to define anatomic ACL reconstruction.

Surgical Criteria	Maximum Score
Individualization of the surgery to each patient	1
Use of a 30° arthroscope	1
Use of an accessory medial portal, in addition to medial and lateral portals	1
Direct visualization of the femoral ACL insertion site	1
Measuring the femoral ACL insertion site dimensions	1
Visualizing the lateral intercondylar ridge	1
Visualizing the lateral bifurcate ridge	1
Placing the femoral tunnel(s) in the femoral ACL insertion site	1
Trans-portal drilling of the femoral ACL tunnel(s)	1
Direct visualization of the tibial ACL insertion site	1
Measuring the ACL insertion site dimensions	1
Placing the tibial tunnel(s) in the tibial ACL insertion site	1
Documenting of femoral fixation method	1
Documenting of tibial fixation method	1
Documenting of knee flexion angle during femoral tunnel drilling	1
Documenting graft type	1
Documenting knee flexion angle during graft tensioning	1
Documentation used for ACL tunnel position	2
Drawing, diagram, operative note, dictation, or clock face reference (0 points)	
Arthroscopic pictures, radiographs, 2D MRI, or 2D CT (1 point)	1
3D MRI, 3D CT, or navigation (2 points)	2
Total	19



Conclusion

- ✓ Single preferred graft type and the ideal ACLR does not exist
- ✓ Patient selection
- ✓ Beware of interpreting differences in failure rates
 - Surgical techniques used!
 - Graft diameter!
 - Address rotational instability!
- ✓ Address all injured structures involved in instability

