COMMON ERRORS IN ACL SURGERY

Tunnel position

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CONFLICT OF INTEREST

Smith & Nephew
FEMORAL TUNNEL

Most common error!

too anterior
Femoral tunnel malposition

- 1st cause for ACL failure & revision
- X-rays irrelevant for
  - Intra articular positioning
  - Tunnel direction (frontal & sagittal plane)

Pictures from Smigieski
A CT-based classification of prior ACL femoral tunnel location for planning revision ACL surgery

Robert A. Magnussen · Pedro Debieux · Biju Benjamin · Sébastien Lustig · Guillaume Demey · Elvire Servien · Philippe Neyret
FEMORAL TUNNEL

- Position depends
  - on technique
  - portal view
  - knee flexion
- ACL anatomy
FEMORAL TUNNEL

• Transtibial technique

Femoral tunnel drilled through the tibial tunnel with the knee flexed about 70-80°

Femoral positioning constrained by the tibial tunnel position and angulation
FEMORAL TUNNEL

• Transtibial technique
  → inconsistent anatomic graft placement
  → femoral tunnel too vertical
  (often in the roof and not in the wall of the notch)
FEMORAL TUNNEL

• AM portal technique
  - Independent drilling of femoral tunnel
  - Mark femoral location and drill at 120° of knee flexion
  - Risk to blow the posterior cortex
FEMORAL TUNNEL

• AM portal technique

  Limited visibility

  Better visibility using flexible drill and drill at 90° of flexion?
FEMORAL TUNNEL

• OUT-IN technique
  Independent drilling of femoral tunnel from antero-lateral portal
  Good visibility - knee flexed 90°.
  Area of the native ACL insertion easily visible (AM portal)
FEMORAL TUNNEL

- ACL footprint
  - Method reference
  - Anatomic
  - AM > PL

CLOCK-FACE REFERENCE METHOD

Several issues:

- ignores the depth of the intercondylar notch
- reference position for the 3 and 9 o’clock locations relies on no known anatomic landmarks
- cannot be used when viewing the ACL femoral attachment site through the AM portal
CLOCK-FACE REFERENCE METHOD

« The clock concept is easy to use. However it is inaccurate in describing the location of femoral tunnel placement and lead to non anatomic position »

Brown C, 2014
FEMORAL TUNNEL

• Which placement?
  Anatomic or « AM »
FEMORAL TUNNEL

• ‘anatomic’ ACL reconstruction is defined as “the functional restoration of the ACL to its native dimensions, collagen orientation and insertion sites.”

• the bone tunnels are placed at the centre of the native ACL attachment sites (at the centre of the AM and PL bundle attachment sites for DB aclR)

van Eck et al, 2014
Anatomic placement/AM placement

- ACL graft placed at the centre of the native ACL attachment sites:
  - more effective at controlling anterior tibial translation and the pivot-shift
  - more closely reproduces normal knee kinematics
- Based on biomechanical studies


Femoral tunnel

Keys for successful femoral tunnel?
• Avoid a transtibial tunnel
• Check your tunnel position via AM portal
• Anatomic center of the acl (ribbon/AM-PL bundles)

Osti et al
Am J Sports Med. 2015 Sep;43(9):2250-8
TIBIAL TUNNEL

common error
Too Anterior+++
TIBIAL TUNNEL

- Tibial guide fixed at 55° on the stump (debrided) of the acl
- Center of the tunnel is at 7 mm anterior to PCL notch in line with posterior border of the anterior horn of LM
- No!!!

Morgan et al, 1995
Jackson et al, 1994
TIBIAL TUNNEL

- Too anterior
  Notch impingement, lack of extension
  Before drilling, check the pin in extension
- Too posterior (rare)
- Too lateral/to medial
TIBIAL TUNNEL

- Role of Notchplasty should be avoided (effect on anterior stability)

- Restore anatomy
- Preserve the stump
- For the SB aclR : aim the center of acl insertion : « anatomic »
- Stump should be removed if any impingement in extension (avoid cyclops Sd)

Astur DC et al
Arthroscopy. 2013 ;29(5)Characterization of cruciate ligament impingement: the influence of femoral or tibial tunnel positioning at different degrees of knee flexion.
avoid potential mistakes
1/ failure to visualize the femoral insertion completely (use AM portal)
2/ use of wrong reference
   (clock face, anterior horn LM)
3/ anatomic tunnel (center of acl)
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