Point/Counterpoint
Transtibial ACL Femoral Tunnel Drilling

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Current ACL Drilling Techniques
- Transtibial
- Anteromedial Portal
- Outside In

What is our goal?
- Restore native anatomy
- Recreate knee joint stability
- Return to sport and functional activities
Is there a gold standard?

- Transtibial femoral tunnel drilling considered the “gold standard” in past
- Good to excellent functional results
- Why change?

ACL Anatomy

- Two bundles
  - Anteromedial
  - Posterolateral

Femoral Footprint Anatomy

Fu et al, Arthroscopy
Femoral Footprint

ACL Reconstruction
- Regardless of technique goal of surgeon should be placement of graft in center of anatomic footprint

Transtibial ACL
- Vertical graft reproduces AM bundle
- Stable pivot shift
- ??? Continued rotational instability
  Fu et al
Transtibial ACL Reconstruction

- Numerous studies demonstrating excellent long term functional results
- Low re-tear rates (5-25%)

Long Term Outcomes

- Bach et al, Rush Orthopedics
- >2400 primary ACL’s using TT
- 1.5% failure rate

Why Change?

- “there is no evidence that restoring normal anatomy leads to better clinical outcomes, and other authors argue that nonanatomic tunnel placement can lead to excellent outcomes.”
  
  Lubowitz et al, Arthroscopy
Transtibial Drilling

- **Advantages**
  - Endoscopic transtibial ACL technique requires a single incision and is less invasive than a 2-incision technique.
  - Transtibial ACL technique effects an isometric, or near-isometric, graft throughout knee ROM.
  - Transtibial ACL technique results in a stable Lachman test in most patients.
  - Transtibial ACL technique results in axes of the femoral tunnel similar to the ACL graft axes, which may minimize graft tunnel orifice impingement and minimize graft intercondylar notch impingement.

  - *Lubowitz et al, Arthroscopy*

Anteromedial Portal Drilling

- **Disadvantages**
  - Difficulty visualizing in hyperflexion possibly leading to iatrogenic chondral injury.
  - Posterior-wall blowout.
  - Technically demanding.
  - Short or bicortical sockets, which may limit fixation options.
  - Higher revision rate.
  - Increased risk of injury to common peroneal nerve.
  - Extension loss during stance phase.
  - Hyperflexion requires an assistant.

  - *Lubowitz et al, Arthroscopy*

Transtibial vs AM drilling

- *Mulcahey et al, Arthroscopy 2014*

- No difference KT measurements between groups.
- No difference any outcomes scores measured.
How do we get there?

- Standard transtibial technique may put tunnel too posterior and proximal.
- Modify tibial tunnel to get anatomic femoral position.

Modified Transtibial Drilling

- Tibial tunnel starts superior to pes and anterior to MCL.
- Femoral tunnel drilled at 90° flexion with anterior drawer and varus stress.
- Position of tunnel and obliquity similar to medial portal technique.

Lee et al, AANA meeting

Modified Transtibial Technique

- No difference in tunnel position, obliquity, widening.
- Lee et al, JBJS 2014.
Modified Transtibial Technique

- Modified transtibial versus anteromedial portal technique in anatomic single-bundle anterior cruciate ligament reconstruction: comparison of femoral tunnel position and clinical results
- Youm et al, AJSM 2014
- Level I study
- Clinical outcomes and KT-1000 equal between 2 groups
- 3D-CT showed anatomic femoral tunnel placement with both techniques

AM Portal

- Danish registry
- Higher risk of revision 4.7% compared to 2.6% with TT at 3 years

- Rahr-Wagner L, Thillemann T, Mehnert F, et al. Increased risk of ACL revision after anteromedial compared to transtibial technique for femoral drill hole placement during ACL reconstruction. Result from the Danish registry of knee ligament reconstruction
AM Portal
- Autologous Hamstring Anterior Cruciate Ligament Graft Failure Using the Anteromedial Portal Technique With Suspensory Femoral Fixation
- A Case Series of 7 Patients
- Galdi et al, OJS 2015
- Level 3 cohort study
- 465 TT technique with cross pin fixation – failure rate 0.4%
- 69 AM portal with suspensory fixation – 10.1% failure rate

Summary
- TT technique excellent long term results
- Anatomic femoral tunnel placement possible with modified technique
- Several studies show equal results to AM portal

Summary
- AM portal drilling is technically challenging
- Requires hyperflexion
- Results in short oblique tunnel
- Regardless of technique goal should be anatomic tunnel placement