Single, Double & Triple Bundles, Footprints, Robotics:
Is It Just Alphabet Soup?

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ACL Reconstruction

- Restore stability and function
- Reduce chance of further injury
- Improve chance to get back to previous activity
Tunnel placement

The key is:
Location, Location, Location

-Lord Samuel
ACL Femoral Footprint

- Lateral Intercondylar Ridge
- Lateral Bifurcate Ridge
- AM
- PL
Tibial Footprint
Tunnel Malposition
An anatomical femoral tunnel location on the medial wall of the lateral femoral condyle.

Vertical ACL Graft

12 o'clock position at top of intercondylar notch.

RIGHT KNEE
Lachman
Lachman

(Vertical graft/AM bundle restoration)
Lachman
Pivot Shift
Native ACL
Anterior translation AND Rotational control
Single vs Double Bundle
Robotic studies: Double bundle more accurately restores knee kinematics
Double-Bundle Reconstruction
Triple-Bundle ACL
• MRI depiction and 3D visualization of three ACL bundles (Otsubo et al, Clin Anatomy, Dec, 2016): 92%

• Radiological evidence for the triple bundle ACL (MacKay et al, Clin Anatomy, 2014): 20%
Double vs Single-Bundle

- DB improves rotational (and often) anterior instability over SB reconstruction
- Gap between the two narrows over time
- Subjective scores (IKDC) are inconsistent, but generally do not show any significant differences in the long term
Robotics

- Is it necessary for accurate tunnels?
Computer-assisted planning and robot-assisted Surgery in ACL Reconstruction


- Reliably prevented notch and wall impingement
- Went as far as to say, “that robot-assisted ACL recon has become the standard care.”
Precision of ACL tunnel placement using traditional vs robotic techniques

Burkhart et al, Comput Aid Surg, 2001

- Robotic had more consistent tunnels, but overall accuracy no better than the most experienced surgeons
Robotic ACL-Reconstruction

- No studies have shown clinically significant improvement in long term outcomes after ACL Reconstruction
Robotics

- Essential....
- ...or creepy?
Summary

- Optimal outcomes derive from optimal positioning
- Respect and achieve anterior AND rotational stability
Thank-you
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