The Effects of Trans-Tibial versus Anteromedial Femoral Drill Portal Technique on Tibial Tunnel Position in Anatomical Single-Bundle ACL Reconstruction Using X rays

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Introduction

- Anterior Cruciate Ligament (ACL) Reconstruction
- Femoral tunnel is drilled either through:
  - Antero-Medial (AM) portal or
  - Tibial tunnel (Trans-Tibial -TT).
AM portal technique

- Enables femoral tunnel
  - Low
  - Posterior
  - Horizontal
  - Not limited (compromised) by the orientation of the tibial tunnel
AM portal technique

• Left knee 90° flexion
Trans Tunnel technique

- May limit femoral tunnel positioning and Drilling

Anterior Location of Tibial Tunnel May limit femoral tunnel – Too Anterior

Freddie H. Fu Picture
Trans Tunnel technique

• May limit femoral tunnel positioning and Drilling

Anterior Location of Tibial Tunnel May limit femoral tunnel – Too Anterior
Trans Tunnel technique

• May limit femoral tunnel positioning and Drilling

Too Anterior femoral tunnel
Aim

• Did AM technique for Femoral Drilling Influence:
  • Tibial tunnel Orientation
  • Antero- posterior location

Trans Tibial tunnel technique.
Hypothesis

• AM will result in:
  – More anterior tibial placement
  – Steeper orientation

• Previous trans tibial technique may have resulted in too posterior Tibial Tunnel
Method

• Post Operative X rays of 100 Consecutive ACL Reconstruction
• Until June 2009, TT technique
• Since June 2009 AM technique.
Tibial Tunnel – TT

- Tibial tunnel was drilled first through the anatomical Tibial ACL insertion in 90° of flexion.
- The femoral tunnel was created next in 90° flexion through the tibial tunnel.
- Aiming at the 10:30 or 01:30 position in the notch.
Antro Medial Trans Portal – AM

- Femoral tunnel was drilled first through the AM portal.
- Aiming to the same position in the notch while the knee in full flexion.
- Tibial tunnel was created next in 90° flexion.
- Aiming at the same anatomical Tibial ACL insertion.
same jigs

• Femoral and Tibial were used.
• Tibial accufex jig was set to 55 degrees in all patients.
X-Ray Measurements

• PACS Tools..
Tibial Slope
Tibial Tunnel – Tibial Axis Angle
Tibial Tunnel – Tibial Slope Angle
Tibial Tunnel
- Eminence Tip Distance
Results

• Group A (TT) - 43 patients operated between January 2009 to June 2009
• Group B (AM) 48 patients operated between July 2009 to December 2011
Tibial Tunnel vertically relative to tibial shaft

AM Tibial Tunnel More vertical
Student T test p<0.005
Tibial Tunnel vertically relative to Medial Tibial Plateau (MTP) slope

AM Tibial Tunnel More vertical
Student T test p<0.05
Tibial Tunnel Distance to tibial eminence Tip (mm)

No Difference
Not Significant
Conclusions

• Usage of AM technique for the femoral tunnel
• changes the orientation of the tibial tunnel to be more vertical.
• Tibial Insertion site was the same
• Trans Tibial Technique does not compromise Tibial Insertion site
Points for discussion

- Does stability change?
- Is range of motion decreased?