Midterm results of arthroscopic anterior cruciate ligament reconstruction with simultaneous medial opening wedge high tibial osteotomy in patients with genu varum deformity

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Disclosure

• I have no financial conflicts to disclose.
Introduction

- Combined HTO with ACLR is indicated in young patients with varus malalignment with ACL deficiency however isolated HTO with delayed ACLR may be indicated in older patients\(^1,2\).
- An increased tibial slope predispose to ACL failure and should be addressed for a successful ACLR\(^3\).
- **Advantages of concomittant HTO+ACLR\(^4\):**
  2. Adjustment of tibial slope.
  3. Non interference between the tibial tunnel and osteotomy plate screws.
  4. Reduced costs compared with staged surgery.
- **Disadvantages\(^4\):**
  1. Long learning curve.
  2. Increased costs.
  3. Longer rehabilitation.
Combined HTO and ACL reconstruction or revision

- Medial-compartment OA (Ahlbäck grades 1-3) + varus malalignment + ACL tear (with symptomatic anteroposterior instability)
- Medial-compartment OA (Ahlbäck grades 1-3) + varus malalignment + failed ACL reconstruction
- Failed ACL reconstruction because of increased tibial slope
- Double or triple varus and ACL tear (with symptomatic anteroposterior instability)
- Varus malalignment + ACL tear + chondral or meniscal injuries (requiring cartilage repair or meniscal transplant)

Isolated HTO (with possible delayed ACL reconstruction)

- Longstanding ACL deficiency + double or triple varus
- Longstanding ACL deficiency + varus malalignment + symptomatic medial-compartment OA
- Longstanding ACL deficiency + double or triple varus + symptomatic medial-compartment OA

ACL, anterior cruciate ligament; HTO, high tibial osteotomy; OA, osteoarthritis.

Opening Wedge High Tibial Osteotomy and Anterior Cruciate Ligament Reconstruction or Revision

Davide Edoardo Bonasia, M.D., Federico Dettoni, M.D., Anna Palazzolo, M.D., and Roberto Rossi, M.D.

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Point Y (50% of width of TP) line to center of FH, and line to center of ankle. Angle between 2 lines is angle of correction (b). Osteotomy line (ab) starts medially (4 cm below joint line) to 1 cm below lateral joint line). BC = opening of osteotomy & size of tooth of spacer plate.

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Surgical Technique

- **Preoperative planning:**
  - AP/Lateral long leg radiographs.
  - Medial opening wedge high tibial osteotomy (MOWHTO) is planned for over correction (3-5°) with mechanical axis passing at point 62.5% of width of Tibial plateau.
  - Tibial slope is assessed on lateral views (0-18°). If >10°, must be decreased to decrease tension on ACLR.

1. Trible or quadripole Soft tissue graft (Hamstring) was used.
2. Knee scope with addressing the concommittant meniscal and chondral injuries.
3. Femoral tunnel (AM Transportal inside-out tunnel) is prepared.
4. **Lateral cortical suspension endbutton** (Smith & nephew) is used.
5. **MOWHTO:** A guidewire is drilled from medial to lateral starting distally 4 cm below joint line aiming proximal at tip of fibular head 1 cm below joint line under flouroscopic guidance. Thin oscillateing saw is used to cut Medial,Ant,Posterior cortices and completed with thin osteotomes preserving the lateral cortical hinge.
6. **Osteotomy site is opened and fixed using Puddu plate** with metal block equal to preplanned BC line.
Surgical Technique

• HTO plate is positioned posteriorly with following advantages: A-
  decreasing tibial slope so decreasing excessive tension on ACL graft. B-
  leaving more room on AM aspect of tibia for ACL tibial tunnel drilling.

• HTO plate screws are all inserted except proximal anterior screw that is
  fixed after ACL graft passage.

• Tibial Tunnel drilling: Under arthroscopic guidance, Tibial guide is placed at
  tibial ACL footprint. The distal tibial aperture is anterior to HTO plate on
  the proximal tibial fragment.

• Completion of osteotomy fixation: A bony metal dilator is inserted in tibial
  tunnel to avoid interference between tibial tunnel and HTO anterior
  proximal screw fixation.

• The metal dilator is removed, and shuttle suture from femoral tunnel is
  withdrawn from tibial AM aperture. The ACL graft is pulled into place. After
  flipping the endbutton on lateral cortex, the tibial screw 1-2 mm larger than
  tibial tunnel is placed.
MOWHTO with Puddu plate insertion without anterior proximal screw fixation and before ACL tibial tunnel drilling

6 months postoperative follow up with osteotomy site showing union
Results

• The mean follow up was 36+/- 5.26 months.
• The mean subjective IKDC score improved from 42.9+/-1.2 preoperatively to 80.3+/-2.4 postoperatively (Statistically Significant).
• Lysholm score increased from 57.3+/- 6.1 to 92.0+/- 3.9.
• KT-1000 decreased from 6.4+/- 2.2 mm to 2.9+/-1.3.
• The mean HKA angle was $173.4 \, ^\circ +/- 2.5 \, ^\circ$ and became $181.4 \, ^\circ +/- 1.7 \, ^\circ$. 
Conclusion

The simultaneous ACL reconstruction with high tibial osteotomy provided better outcomes regarding the correction of the varus deformity, restoring the knee stability, with minimal complications and delaying the need for arthroplasty.
References


