

Outcomes of Simultaneous Open Wedge HTO and ACL Reconstruction in ACL Deficiency with Medial Unicompartmental Osteoarthritis

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I have no financial conflict to disclose.

INTRODUCTION

- **A varus-angulated ACL deficient knee**
 - High adduction movements of the knee
 - Increased med compartment loading & high stresses on LLC
 - **Varus is major reason for failure of ACL reconstruction**

Noyes FR, Barber-Westin SD et al. Am J Sports Med 2000

- **Reconstruction of ACL alone in varus knee**
 - Excessive forces across graft
 - Failure & recurrence of instability

***** Rationale of tibial osteotomy in varus knees with instability**

Nitin P et al. Knee Surg Sports Traumatol Arthrosc 2002

Giffin JR et al. Sports Med Arthrosc Rev 2007

INTRODUCTION

- **Advantage of HTO**

- Correct the varus alignment → Offloads med compartment
- Improve the results of ligament reconstruction

Insall JN, Jacobson et al. JBJS Am 1985

Noyes FR, Barber-Westin SD et al. Am J Sports Med 2000

- **Advantage of open wedge HTO**

- Avoid peroneal N injury and compartment syndrome
- Simpler & easier than close wedge
- **Combine with other procedure**

PURPOSE

To evaluate the clinical and radiological outcomes after simultaneous open wedge HTO and arthroscopic ACL reconstruction for ACL deficiency and medial unicompartmental OA with varus deformity

METHOD

- From April 2004 to March 2010, 35 knees
- Diagnosed as ACL injury and varus deformity
 - : P/E, MRI, standing plain radiograph
- Minimum F/U duration : 4 yrs (mean 5.6 yrs)
- Exclusion criteria
 - lateral compartment OA
 - lateral meniscus tear
 - PCL injury
 - ROM limitation

<Demographic data>

	Open wedge HTO +ACL (35)
Mean age (years)	27.0 (14 - 51)
Gender (male/female)	25/10
Sx duration (months)	8.2 ± 2.13
F/U duration (yrs)	5.6 (4.2 – 8.1)
Medial comp OA (gr I/II)	7/28
M-A axis deviation	6.1° ± 2.4 ° varus

METHOD

Clinical evaluation (preop & postop)

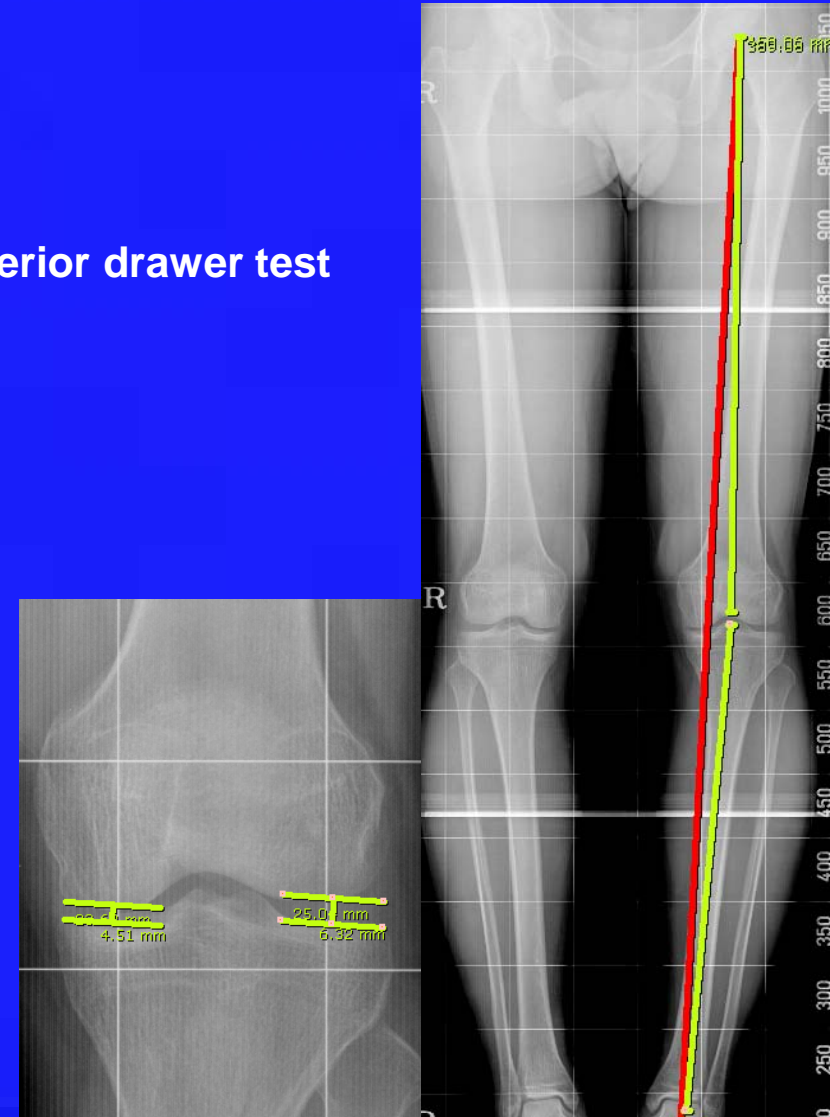
- Lysholm Knee score
- Tegner activity scale score
- Physical examination

: Range of motion, Lachman test, Pivot shift test & anterior drawer test

Radiologic evaluation

- MA (varus correction angle)
- Joint space distance change (on standing teleo)
- Tibial posterior slope
- Medial instability & STSD using Telos® device

Postoperative complications



METHOD

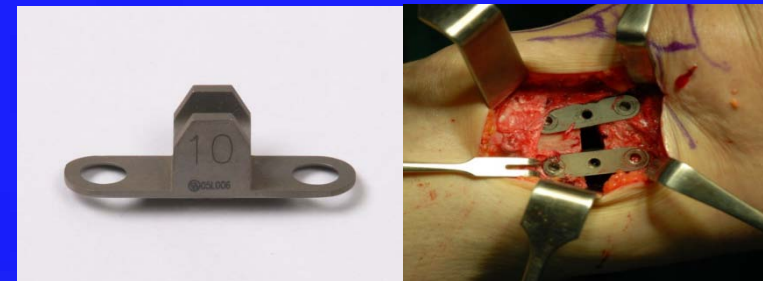
Procedure by a single surgeon

Arthroscopic ACL reconstruction ; Single bundle

- Tibialis anterior allograft
- Femoral side fixation : Endobutton CL® (Smith & Nephew, Andover, Ma, USA)
- Tibial side fixation : Bioabsorbable interference screw
(Linvatec®, Large, HI, USA) & staples

Corrective Osteotomy ; HTO

- Correction of Mechanical Axis (MA) : corrected to neutral angle w/o valgus overcorrection
- Internal fixation : Aescula® open wedge plate x2 (B. Braun Aesculap, Korea)



METHOD

Postop management after Open wedge HTO + ACL reconstruction

- Postop 1 day : active full ROM under knee brace
- Postop 8 wks : partial wt bearing with crutch (10-15%) until united under brace
- Postop 8-12 wks : progressive wt bearing
- Full activity : 3 mos
- Sports activity : after at least 9 mos

Combined procedure

	HTO + ACL reconstruction
None	4 (11%)
Partial menisectomy	24 (69%)
Med meniscal repair	5 (14%)
LCL and capsular repair	2 (6%)

RESULT

Clinical Outcomes

	Pre op	Post op	p-value
Lyslom Knee Score	72.1 ± 6.1	93.8 ± 4.5	0.04
Tegner activity scale	1.45 ± 0.8	4.65 ± 1.1	0.001

Wilcoxon signed rank test < 0.01

Lachman & Pivot shift test

Grade	Lachman test		Pivot-shift test	
	Pre op	Post op	Pre op	Post op
0	2	23	0	27
I	6	12	22	8
II	20	0	9	0
III	7	0	4	0

RESULT

Radiologic evaluation

	Pre op	Post op	p-value
Mechanical axis deviation	6.1 ± 2.4	-0.3 ± 2.0	0.01
Joint space distance			
medial	3.55 ± 0.8	3.84 ± 0.9	0.11
lateral	5.75 ± 0.9	5.6 ± 1.1	0.36
Posterior slope	8.1 ± 1.7	8.2 ± 1.8	0.71

Telos® Stress Radiography (anterior drawer)

	Pre op	Post op	p-value
15 N	7.75 ± 3.7	2.6 ± 2.0	0.03
20 N	9.8 ± 4.6	3.9 ± 2.3	0.002

Wilcoxon signed rank test < 0.01

RESULT

Postoperative Complications

- Major complications
 - ✓ No happened
 - ✓ Major N injury, Deep infection, Non-union, Fixation failure, Graft failure
- Minor complications

	Open-wedge HTO +ACL(35)
Hypersensitivity	3
Local infection	0
Skin irritation	1
Total	4 (11%)

Conclusion

- **Simultaneous open wedge HTO & ACL reconstruction** showed satisfactory correction angle and improved knee joint function without any serious complications