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A Novel Open Wedge Osteotomy Fixator Gives Satisfactory Outcomes In Medial Opening Wedge High Tibial Osteotomy

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Disclosure

- ✓ TST Medical Devices Company, Istanbul



Introduction

- ✓ Medial opening wedge high tibial osteotomy (MOWHTO)
 - widely performed procedure in gonarthrosis with varus malalignment
 - most commonly used fixation method is plate-screw osteosynthesis

Smith JO et al. *Knee* (2013)



Introduction

✓ Plate and screw osteosynthesis in MOWHTO

Advantages

- Acute correction
- Better tolerated by patients
- Less frequent follow-up requirement

Disadvantages

- Correction cannot be changed postoperatively
- Increasing posterior tibial slope
- Patella baja
- Lateral cortex disruption
- Possibility of intraarticular fracture

Introduction

✓ External fixator in MOWHTO

- Mono-axial Ex-Fix
- Hybrid Ex-Fix
- Circular Ex-Fix

Advantages

- Allow dynamic postoperative corrections
- Early weight-bearing

Disadvantages

- Complex implants
- Frame associated morbidity
- Patient noncompliance

Purpose

- ✓ ... was to evaluate the safety and efficacy of a novel open wedge osteotomy fixator (OWO-FIX) for MOWHTO in patients with symptomatic varus osteoarthritis



Material & Method

- ✓ Between 2013-2015
- ✓ 12 knees of 11 patients (8 females, 3 males)
- ✓ At the time of surgery
 - mean age - 52.1 (37-59) years
 - mean BMI - 26.5 (24-30) kg/m²
- ✓ OA grade (Kellgren-Lawrence (K-L) scale)
 - Grade 1 – 8 knees / Grade 2 – 4 knees
- ✓ All patients had relatively good knee ROM
- ✓ No previous history of surgical treatment

Material & Method

Radiographic evaluation

- Standing long-leg x-ray (AP and lateral)
- Femorotibial angle (FTA)
- Weight bearing line (WBL) on the tibial plateau
- Amount of correction
- Patellar height (PH) by Insall-Salvati method
- Posterior tibial slope angle (PTSA)

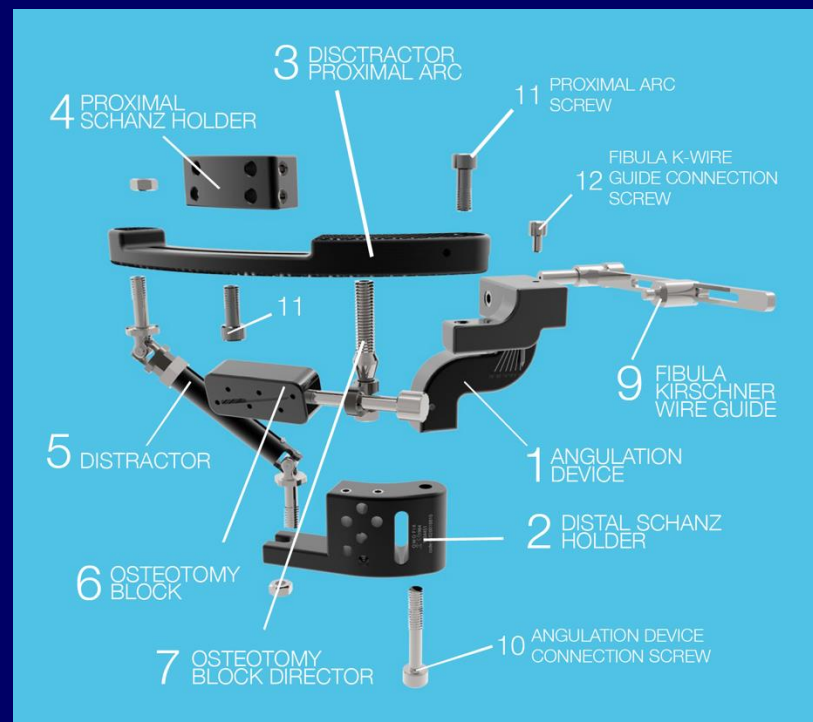
Clinical evaluation

- WOMAC
- Knee Society Score

Material & Method

Surgical procedure

- All patients underwent arthroscopy before MOWHTO
- Under fluoroscopy, OWO-FIX application by using half pins
- Osteotomy just proximal to the tibial tubercle after OWO-FIX application
- Osteotomy gap was filled with autograft (n:7) or allograft (n:5)



Material & Method

- ✓ According to the radiographic control; OWO-FIX was adjusted for residual correction (over or under) on the first postoperative day
- ✓ Partial weight-bearing allowed as tolerated
- ✓ At the 3rd week, full weight-bearing was allowed



Material & Method

- ✓ All radiographic and clinical evaluations were performed by two of the authors who did not involve in the clinical care of the patients
- ✓ Mean values were used
- ✓ All complications related to the index surgery were recorded
- ✓ Statistical analysis
 - SPSS.....
 - Student t test and ki square test
 - Statistical significance – $p < 0.05$

Results

- ✓ Average follow-up - 27.7 (24-40) months
- ✓ Mean amount of desired correction $10,8^{\circ}$ (8° - 15°)
- ✓ Mean amount of achieved correction $10,1^{\circ}$ ($7,5^{\circ}$ - $14,3^{\circ}$)
- ✓ Postoperative residual correction - 3 patients (5° overcorrection)
- ✓ Average removal time of OWO-FIX - 9.9 (8-16) weeks
- ✓ Complications
 - Pin tract infection - 1 patient (9 %)
 - Nonunion - 1 patient (9 %)

Results

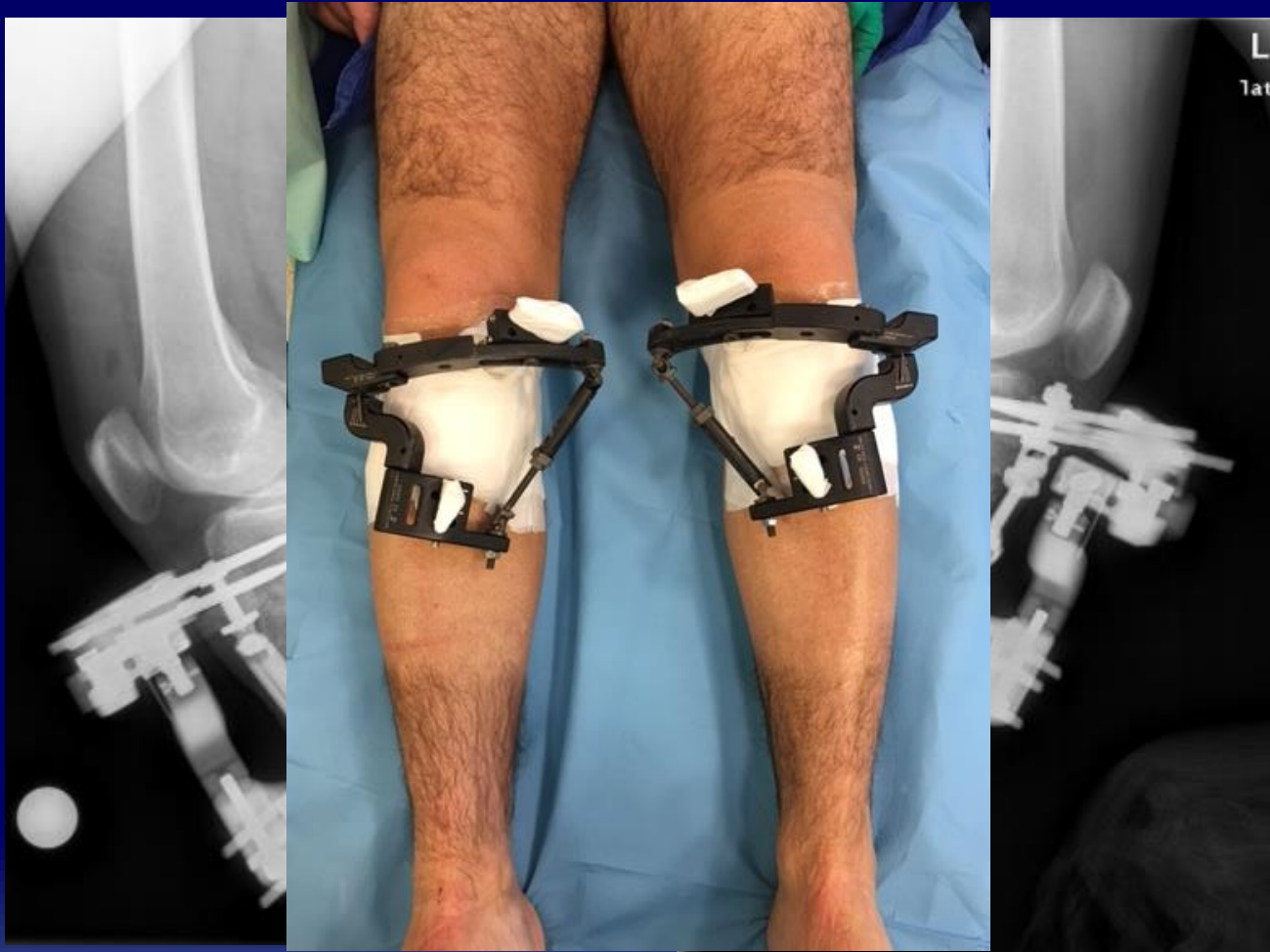
	Preoperative	Immediate postoperative	Final follow-up	p value
Femorotibial angle	5° ± 3,8° varus (0°-11° varus)	4,8° ± 0,6° valgus (4°-6° valgus)	2,8° ± 0,8° valgus (0-6° valgus)	0,005
Weight-bearing line (%)	16,6 ± 12 (0-38)	55 ± 4 (48-62)	52 ± 3 (42-60)	0,005
Patellar height	1 ± 0,06 (0,9-1,1)	1 ± 0,07 (1-1,2)	1 ± 0,09 (1-1,2)	0,1
Posterior tibial slope angle	8,6° ± 1,1° (7,3°-10,5°)	9,2° ± 1,02° (8°-10,8°)	9,1° ± 0,91° (8°-10,3°)	0,1
WOMAC score	54,6 ± 6,13 (38,5-60)	-	8,4 ± 2,79 (5,2-15)	0,005
KSS score	66,8 ± 2,97 (62-72)	-	88,5 ± 4,67 (78-96)	0,005

E.G., 48 years-old , Male



E.G., 48 years-old , Male

Early postoperative.



E.G., 48 years-old , Male

Postoperative one week



E.G., 48 years-old , Male

Postoperative 3 weeks



E.G., 48 years-old , Male

Postoperative 6 weeks



E.G., 48 years-old , Male

Postoperative 6 weeks



E.G., 48 years-old , Male

Postoperative 8 weeks



E.G., 48 years-old , Male

Postoperative 10 weeks



E.G., 48 years-old , Male

Preoperative.



Postoperative 10 weeks



Conclusion

- ✓ Reducing operation time with easy fixation
- ✓ Gradual and controlled distraction during and after osteotomy
- ✓ Allowing immediately weight-bearing
- ✓ Provide adjustment of correction postoperatively (if necessary)

OWO-FIX is easy and safe novel fixator in HTO

Thank you