

# Preoperative Medial Tightness and Narrow Medial Joint Space Are Predictive Factors for Lower Extremity Alignment Change Toward Varus After Opening-Wedge High Tibial Osteotomy

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# Financial disclosure

- Nothing to disclosure

# Alignment change after OWHTO

## Serial Assessment of Weight-Bearing Lower Extremity Alignment Radiographs After Open-Wedge High Tibial Osteotomy

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- Investigate weight bearing line (WBL) ratio, Hip-knee-ankle (HKA) angle serial change over 2 years
- **Mean WBL ratio: 64.6% → 61.3%**
- **Mean HKA angle: valgus 3.9° → 2.9°**
- **WBL ratio progressively shifted medially**

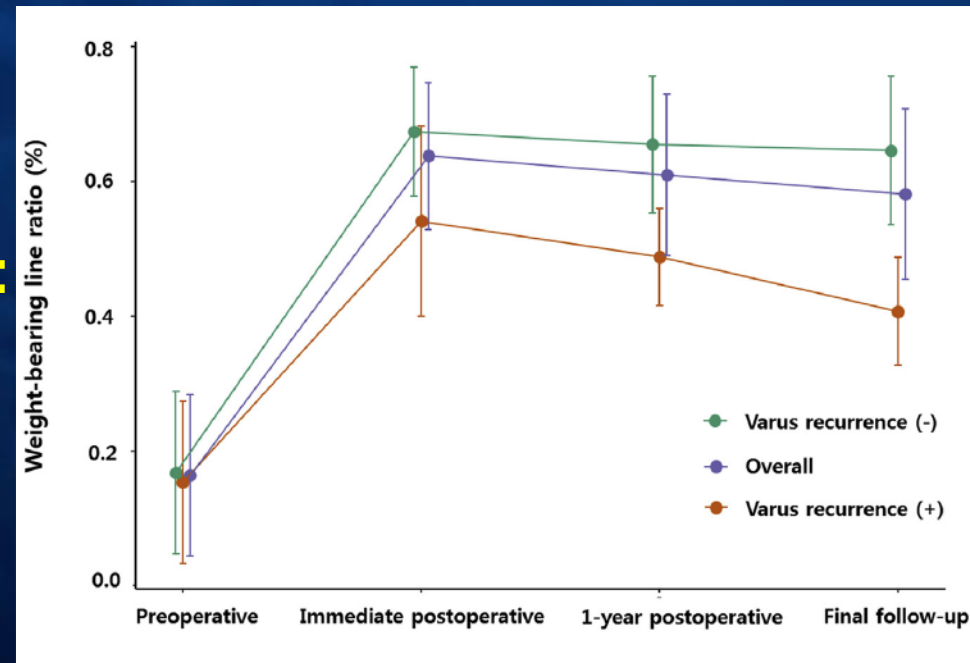
# Alignment change after OWHTO

## Insufficient Correction and Preoperative Medial Tightness Increases the Risk of Varus Recurrence in Open-Wedge High Tibial Osteotomy

Ju-Ho Song, M.D., Seong-Il Bin, M.D., Ph.D., Jong-Min Kim, M.D., Ph.D., Bum-Sik Lee, M.D., Ph.D., Jung-Su Choe, M.D., and Hyung-Kwon Cho, M.D.

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- Mean f/u: 49.7 months
- Overall WBL ratio change: 63.8% → 58.1%
- Serially change toward varus



# Purpose of our study

- Can we predict alignment change after OWHTO?



- Purpose
  - Investigate time-dependent alignment change
  - Identify **predictive factors for postoperative alignment change**

# Patients

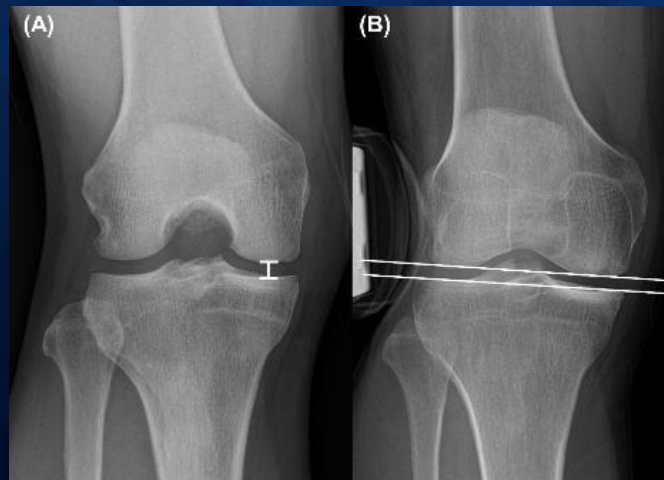
- **March 2010 – September 2018**
- **Inclusion criteria**
  - symptomatic medial compartment osteoarthritis or medial femoral condyle osteonecrosis
  - flexion contracture  $< 15^\circ$
  - absence or minimal osteoarthritic changes in the lateral compartment.
  - clinically followed-up for a minimum of 2 years with adequate clinical and radiographic data
- **Exclusion criteria**
  - aged  $> 65$  years
  - underwent concomitant surgeries, such as ligament reconstruction

# Patients

- Enrolled patients: 142 knees (133 patients)
- Mean f/u: 42 months
- Divided two group
  - Change in the HKA angle from 3 months to final follow up
  - Change group: HKA angle change  $> 1^\circ$
  - No change group: HKA angle change  $\leq 1^\circ$

# Clinical, radiographic assessment

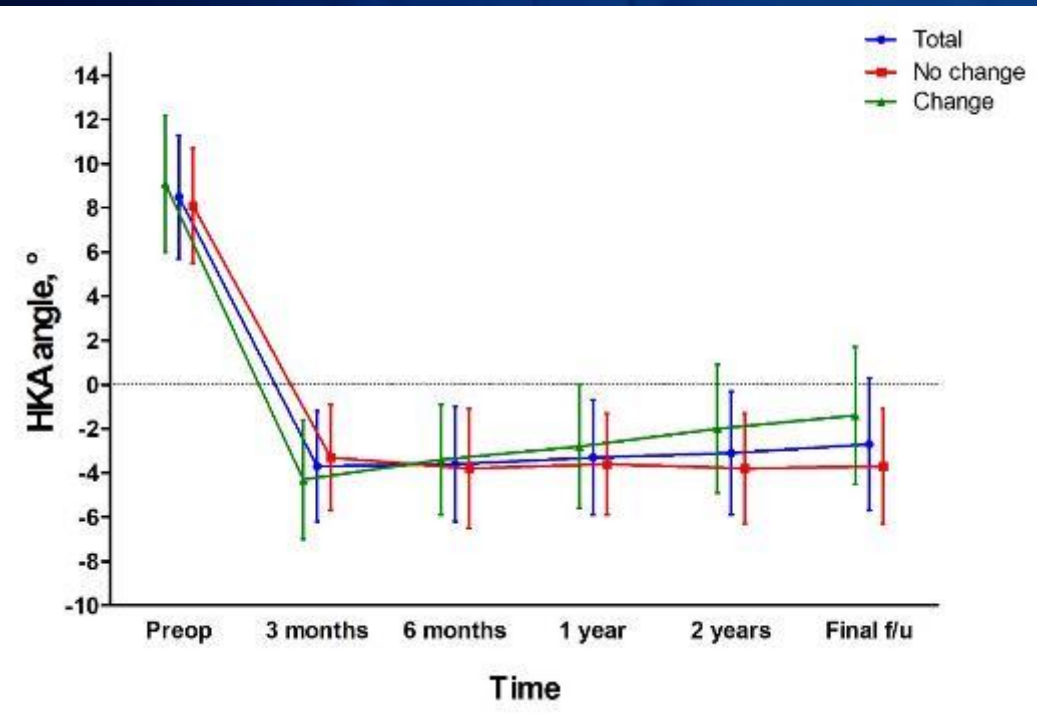
- Range of motion
- IKDC subjective score
- KOOS – pain, symptoms, activity of daily living, sports and recreation, quality of life
  
- HKA angle
- Tibial slope
- Medial proximal tibial angle (MPTA)
- Medial joint space width on Rosenberg view
- Valgus stress joint line convergence angle (JLCA)





# Time dependent HKA angle

- Change more than 1°
  - 59 (42%)
- Change amount
  - Overall: 1.0°
  - Change group: 2.8°
  - No change group: -0.4°



# Predictive factors

Dependent variable	Independent variables	Non-standardized Coefficients		Standardized Coefficients	P-value
		B	SE	B	
Change amount of HKA angle (3 months → final follow up)	Age	0.091	0.022		0.997
	Sex	0.405	0.371		0.277
	Body mass index	0.022	0.044		0.616
	Follow up period	0.004	0.011		0.756
	Preoperative HKA angle	0.118	0.063		0.065
	Postoperative HKA angle (3 months)	-0.085	0.072		0.238
	Preoperative tibial slope	0.023	0.042		0.579
	Preoperative MPTA	0.058	0.07		0.41
	<b>Preoperative valgus stress JLCA</b>	<b>0.257</b>	<b>0.082</b>	<b>-0.263</b>	<b>0.002</b>
	<b>Preoperative medial joint space width</b>	<b>-0.325</b>	<b>0.144</b>	<b>-0.188</b>	<b>0.026</b>

- **Tight medial on valgus stress, narrow medial joint space** were predictive factors for change amount of HKA angle.

# Comparison postoperative data

	No change group	Change group	P-value
Range of motion, degrees	136.6 ± 8.5	135.0 ± 8.6	0.275
IKDC subjective score	58.7 ± 19.4	53.4 ± 18.5	0.118
<b>KOOS</b>			
Pain	72.4 ± 23.3	65.5 ± 20.0	0.086
Symptoms	51.8 ± 26.3	38.9 ± 24.6	0.046
Activity of daily living	80.0 ± 19.6	72.6 ± 19.0	0.035
Sports and recreation	51.8 ± 26.3	38.9 ± 24.6	0.006
Quality of life	61.2 ± 26.2	55.1 ± 20.9	0.169
HKA angle (3 months), degrees	-3.3 ± 2.4	-4.3 ± 2.7	0.026
HKA angle (final follow up), degrees	-3.7 ± 2.6	-1.4 ± 3.1	<0.001
Tibial slope, degrees	77.4 ± 12.7	79.4 ± 5.2	0.261
MPTA, degrees	94.2 ± 3.2	94.9 ± 3.2	0.56
Valgus stress JLCA, degrees	-0.4 ± 2.4	1.2 ± 2.3	<0.001
Medial joint space width, mm	2.3 ± 1.3	1.3 ± 0.9	<0.001

- **Change group**

- **more corrected at 3 months**

- However, **less valgus at final follow up**

- Tight medial and narrow medial joint space

# Conclusion

- The overall postoperative HKA angles **progress serially toward varus** angles after OWHTO.
- **42%** of OWHTO showed a correction loss of more than 1°.
- **Preoperative medial tightness** and **less medial joint space width** were **predictive factors for greater alignment change toward varus** after OWHTO.

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