

# What is an acceptable limit of weight bearing line ratio following medial open wedge high tibial osteotomy



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# Conflict of interest

**Cho RK, MD.  
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We have no financial conflict to disclose.

# Introduction

- ◆ Medial opening-wedge HTO (MOWHTO)
  - Reliable and established surgical method for medial compartment OA *Ji W 2019 Arch Orthop Trauma Surg*
  - The reduction of pressure and stress in the medial compartment
    - ✓ Treatment basis that can delay & prevent the OA progression
    - ✓ Possibility of cartilage restoration in the medial compartment *Jung WH 2014 Arthroscopy*

# Introduction

- ◆ Fujisawa point
  - Weight bearing line(WBL) passes through the 62.5% point of the tibial plateau width, measured from the medial side
  - Traditionally, the target point of MOWHTO

*Fujisawa, Y. 1979 The Orthopedic clinics of North America*

- ◆ Undercorrection and overcorrection are associated with poor clinical outcomes

*Alemayehu, D. G 2021 Archives of Orthopaedic and Trauma Surgery*

# Purpose

- ◆ There is still a lack of research on acceptable ranges after MOWHTO.



- ◆ To investigate the effect of postoperative WBL ratio on patient reported outcome measures(PROMs) after MOWHTO.
- ◆ To determine an acceptable range of WBL ratio based on PROMs.

# Materials and Methods

- ◆ Retrospective review (March, 2014 ~ December, 2019)
  - 251 patients with 2-year follow-up
  - Exclusion Criteria(N=32)
    - ✓ Inflammatory or traumatic OA: 2
    - ✓ Osteonecrosis: 2
    - ✓ Lateral or patellofemoral OA: 5
    - ✓ Incomplete data: 11
    - ✓ Follow-up loss: 12
  - Finally, a total of 219 MOWHTO patients

# Materials and Methods

- ◆ The acceptable range of the postoperative WBL ratio was set as 55-70%.
  - According to the WBL ratio, it is divided into three groups
    - ✓ Undercorrection(N=44), Normocorrection(N=164), Overcorrection(N=11)
- ◆ Patient reported outcome measures(PROMs)
  - WOMAC score
    - ✓ Preoperatively and at 2 years postoperatively
    - ✓ Validated, 24-item disease-specific questionnaire

# Materials and Methods

- ◆ The achievement rates of WOMAC the minimal clinically important differences (MCID) and the substantial clinical benefit (SCB) were also compared.
- MCID and SCB for the WOMAC were set as 16.1 and 25.3 points for the total using the results of previous study.

*Kim MS 2021 AJSM*

- ◆ The ROC curve was used to evaluate whether the WBL ratio could discriminate the achievement of WOMAC MCID and SCB, which means the acceptable limit of WBL ratio.



# Results:

		<b>Undercorrection (N=44)</b>	<b>Normocorrection (N=164)</b>	<b>Overcorrection (N=11)</b>	<b>P-value</b>
<b>Preoperative</b>	Pain	9.8	10.2	10.1	0.882
	Stiffness	4.0	3.9	4.6	0.595
	Function	36.0	35.7	40.5	0.404
	Total WOMAC†	49.9	50.1	54.8	0.629
<b>POD 2 years</b>	Pain	7.3	4.5	5.4	0.001
	Stiffness	3.5	2.2	2.7	0.001
	Function	25.8	16.8	18.1	0.001
	Total WOMAC†	35.7	23.6	26.3	< 0.001

# Results: Post hoc analysis

## Multiple Comparisons Bonferroni

Time	Dependent Variable	Generation grouping		Mean difference	P value
POD 2Y	WOMAC Pain	Undercorrection	Normocorrection	2.7	0.001
			Overcorrection	1.8	0.682
		Normocorrection	Overcorrection	-0.9	0.936
	WOMAC Function	Undercorrection	Normocorrection	8.9	<0.001
			Overcorrection	7.7	0.338
		Normocorrection	Overcorrection	-1.3	0.989
	WOMAC Total	Undercorrection	Normocorrection	12.1	<0.001
			Overcorrection	9.4	0.436
		Normocorrection	Overcorrection	16.5	0.965

# Results:

		<b>Undercorrection (n=44)</b>	<b>Normocorrection (n=164)</b>	<b>Overcorrection (n=11)</b>	<b>P-value</b>
<b>WOMAC MCID achievement rate</b>	<b>≥ 16.1</b>	8 (18.2%)	116 (70.7%)	8 (72.7%)	<0.001
<b>WOMAC SCB achievement rate</b>	<b>≥ 25.3</b>	7 (15.9%)	87 (53.0%)	7 (63.6%)	<0.001

The lower limit of WBL ratio of the ROC curve

using MCID : 49.3% (AUC 0.674, p < 0.01)

using SCB: 51.1% (AUC 0.644, p < 0.01).

# Conclusion

- ◆ The acceptable range of WBL ratio of MOWHTO can be more flexible than 55-70%.
- ◆ The WBL ratio did not have a negative effect on the PROMs 2 years after MOWHTO, up to 49.3% using MCID and 51.1% using SCB.

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