



Effect of Meniscal Tear Patterns and Preoperative Cartilage Status on Joint Space Width After Medial Opening-Wedge High Tibial Osteotomy

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Faculty Disclosure Information

- **Nothing to disclosure**



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Introduction & Purpose

- Medial opening wedge high tibial osteotomy (MOWHTO) is a surgical treatment option

[Furumatsu T et al. J Orthop Sci. 2017]

- Most patients with medial OA in their knee joints have a MM tear

[Bonasia DE et al. Curr Rev Musculoskelet Med. 2014]

- Timing of changes in joint space width(JSW) after MOWHTO and the factors affecting them is insufficient
- We hypothesized that the change in JSW would be significant when a root tear was accompanied by a MM tear
- We examined the association of medial compartment OA with the pattern of MM tear and the cartilage status

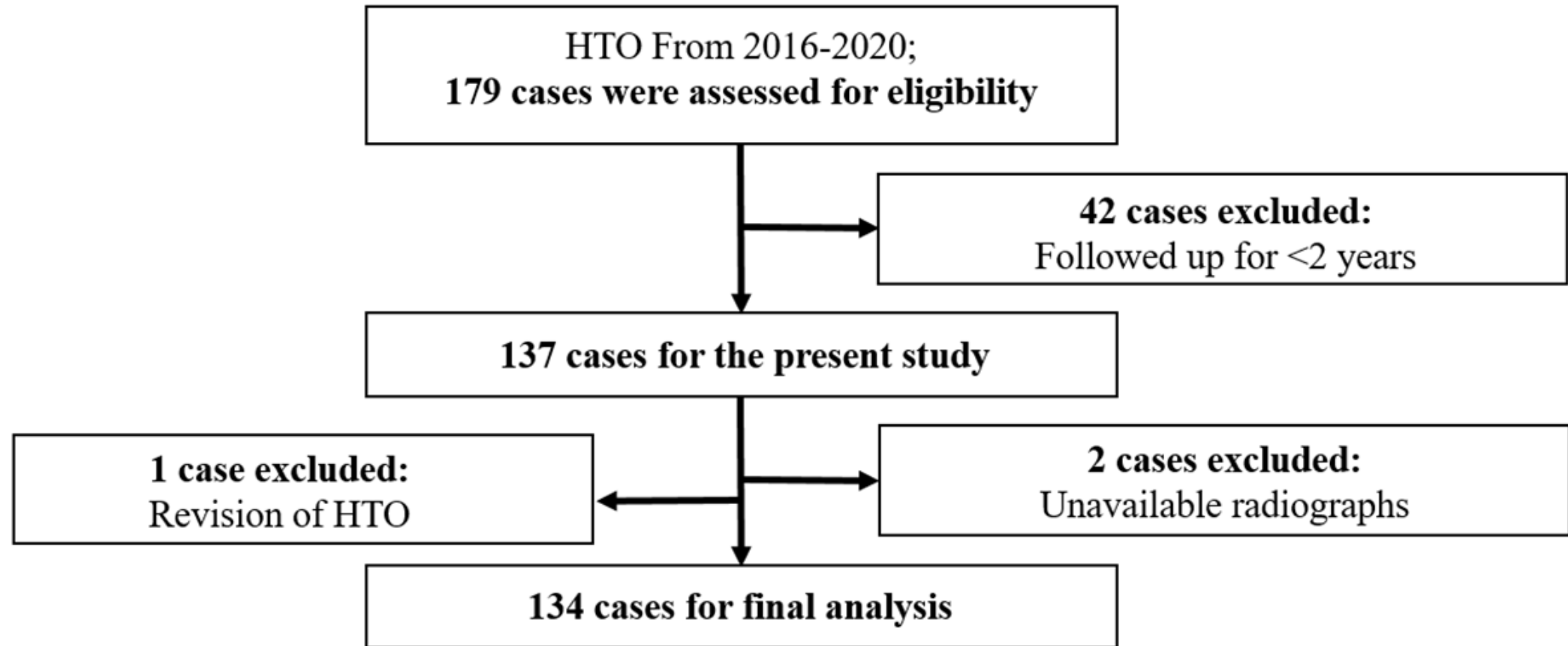


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Materials and methods - Patients



Radiologic evaluation and cartilage status

- Bilateral weight-bearing radiographs at different time points
 - preoperative, postoperative, 3 months, 6 months, 1 year, and 2 years
 - HKA angle, LDFA, MPTA, JLCA
- The arthroscopic findings were recorded in a previously used electronic database using the modified outer-bridge grading system
- Presence of a meniscus tear
 - As observed in the preoperative arthroscopy
 - Group I : Intact group
 - Group II : Tear group (Root tear, Non-root tear)
- ***The changes in JSW before and after surgery in each group were compared at different time points***

[R. Wright et al. JBJS am. 2014]



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Patient demographics

| Parameters | Patient Data |
|----------------------|--------------------------|
| All cases | 134 |
| Age(year) | 55±5.97[32-64] |
| Sex(%) | |
| Men | 36(26.87) |
| Women | 98(73.13) |
| Average F/U (months) | 43.4±23.00 [25-117] |
| Side(%) | |
| Right | 58(43.28) |
| Left | 76(56.72) |
| Height(m) | 1.59±0.08 [1.43-1.80] |
| Weight(kg) | 66.02±10.67 [44.7-92.4] |
| BMI | 26.00±3.13 [20.10-34.03] |

Table 2. Patient demographics

| | Intact group | Non-root tear group | Root tear group | P value |
|----------------|--------------|---------------------|-----------------|---------|
| Pre-OP | 57.0±4.9 | 55.0±6.2 | 53.4±8.2 | 0.181 |
| 1-year Post OP | 83.4±4.3 | 82.6±4.8 | 81.3±4.6 | 0.325 |
| 2-year Post OP | 84.2±4.4 | 82.4±4.3 | 81.2±4.2 | 0.210 |

Table 3. Mean IKDC scores

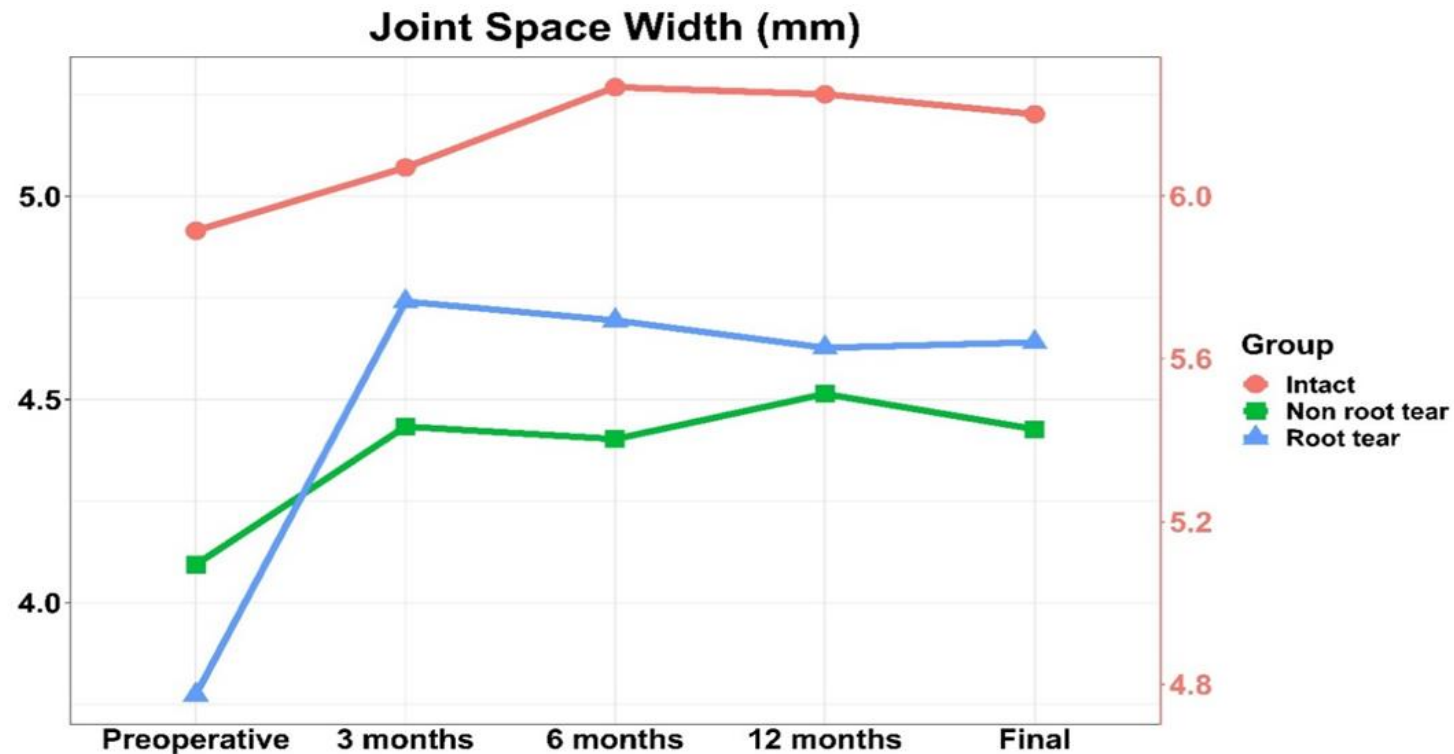


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Change in JSW according to meniscal pattern



- The JSW significantly increased six months postoperatively in the intact group
- In the tear groups (root tear and non-root tear), JSW increased three months postoperatively

There was a difference in the level of change in JSWs between the groups ($p < 0.005$)

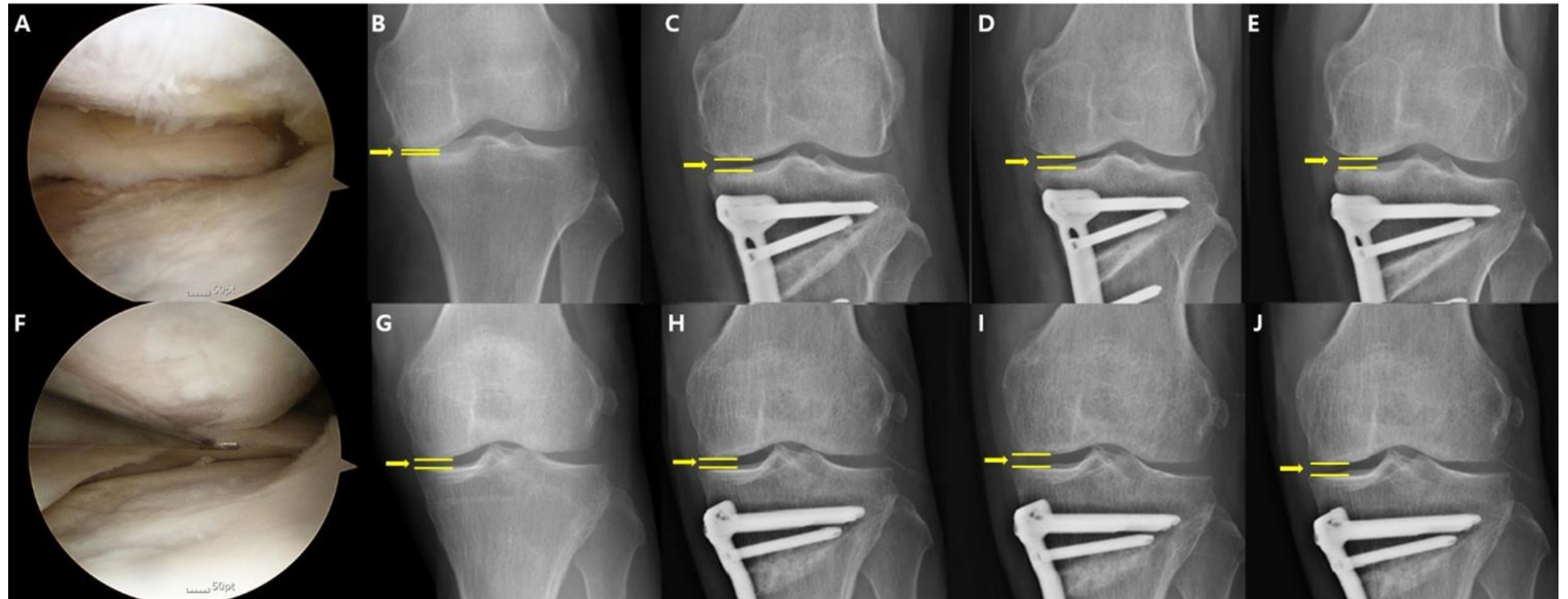


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Change in JSW according to meniscal pattern



- (A) A 54-year-old female patient with root tear. (B) JSW is 1.25 mm. (C) 4.76 mm at three months post-surgery. (D) 4.64 mm at six months post-surgery. (E) One year postoperatively show no change. (F) A 56-year-old male patient in the intact group. (G) JSW is 2.27mm. (H) JSW is 5.12 mm. (I) At six months increased to 5.44 mm. (J) One year postoperatively JSW reduced to 5.31 mm.



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Pre OP cartilage status and adjusted JSW analysis

Table 5. Cartilage status assessed using Outerbridge grading system.

| Cartilage grade | Intact group(29) | Non-root tear group(58) | Root tear group(47) | P-value |
|-----------------|------------------|-------------------------|---------------------|--------------|
| MFC | | | | 0.006 |
| 1 | 2(6.90%) | 1(1.72%) | 0(0.00%) | |
| 2 | 7(24.14%) | 8(13.79%) | 3(6.38%) | |
| 3 | 13(44.83%) | 16(27.59%) | 13(27.66%) | |
| 4 | 7(24.14%) | 33(56.90%) | 31(65.96%) | |
| MTC | | | | 0.000 |
| 1 | 4(13.79%) | 1(1.72%) | 0(0.00%) | |
| 2 | 10(34.48%) | 7(12.07%) | 5(10.64) | |
| 3 | 7(24.14%) | 23(39.66%) | 10(21.28%) | |
| 4 | 8(27.59%) | 27(46.55%) | 32(68.09%) | |

MFC, medial femoral condyle; MTC, medial tibial condyle.

Differences between JSWs of tear groups with adjusted cartilage grades

| | Intact group | Non root tear group | Root tear group | P-value |
|-----------------------|--------------|---------------------|-----------------|---------|
| MFC*tear group | | | | |
| Preoperative | 5.87±1.24 | 4.07±1.01 | 3.79±1.12 | 0.003 |
| 3-month postoperative | 6.03±1.21 | 4.41±1.01 | 4.75±1.01 | 0.008 |
| 6-month postoperative | 6.25±1.12 | 4.38±0.99 | 4.70±1.03 | 0.026 |
| Final follow-up | 6.17±1.120 | 4.41±0.97 | 4.64±0.99 | 0.022 |
| MTC*tear group | | | | |
| Preoperative | 6.25±1.20 | 4.07±1.01 | 3.79±1.12 | 0.238 |
| 3-month postoperative | 6.17±1.11 | 4.41±1.01 | 4.75±1.01 | 0.293 |
| 6-month postoperative | 6.25±1.20 | 4.38±0.99 | 4.69±1.03 | 0.241 |
| Final follow-up | 6.17±1.11 | 4.41±0.97 | 4.64±0.99 | 0.301 |

MFC,medial femoral condyle; medial tibial condyle.

*The relationship with three factors(tear group, MFC,MTC) at each time point when JSW was analyzed.

A difference in JSW changes was observed in the three groups that were adjusted for MFC. In other words, MTC did not affect JSW, but MFC affected JSW (P = 0.003)

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Conclusion

- After MOWHTO, the increase in medial JSW was observed six months postoperatively in the intact group and three months postoperatively in the root tear and non-root tear groups
- The cartilage grade of MFC before surgery was associated with changes in JSW

