International Journal of Research in Orthopaedics
Jung WH et al. Int J Res Orthop. 2026 May;12(3):780-783
http://www.ijoro.org

DOI: https://dx.doi.org/10.18203/issn.2455-4510.IntJResOrthop20261230

Case Report

Symptomatic fibular non-union after hybrid lateral closing wedge high tibial osteotomy: a report of two cases

Woon-Hwa Jung, Harshit Khare*, Kaushik Are, Dong-Hyun Kim

Department of Orthopaedics, Murup Hospital, Changwon, South Korea

Received: 14 February 2026
Revised: 04 April 2026
Accepted: 07 April 2026

***Correspondence:**
Dr. Harshit Khare,
E-mail: drkhareharshit@gmail.com

ABSTRACT

Fibular osteotomy is an essential step in hybrid lateral closing wedge high tibial osteotomy (LCW-HTO), allowing adequate tibial correction in patients with varus malalignment. Although radiological fibular non-union following LCW-HTO is relatively common, it is predominantly asymptomatic and rarely affects clinical outcomes or requires further intervention. Consequently, fibular non-union is often considered a benign radiographic finding. We report two unusual cases of symptomatic fibular non-union following hybrid LCW-HTO. One patient developed non-union after an oblique mid-diaphyseal fibular osteotomy, while the other followed segmental fibular excision. Both patients presented more than one year postoperatively with persistent, localized lateral leg pain associated with a characteristic pricking sensation during weight bearing, despite satisfactory tibial osteotomy union and good knee function. Clinical examination revealed focal tenderness over the fibular site with no neurological deficits. Plain radiographs and CT confirmed fibular non-union in both cases. Given the duration of symptoms and lack of radiological union, surgical intervention was planned. Both patients underwent fibular plate fixation with autologous iliac crest bone grafting. Radiological union was achieved in both cases within 6 months, with complete resolution of pain and return to full function. This report highlights that, although fibular non-union after hybrid LCW-HTO is usually asymptomatic, a small subset of patients may develop persistent, clinically significant symptoms. Recognition of symptomatic fibular non-union is important, as timely surgical stabilization with bone grafting provides reliable union and excellent clinical outcomes.

Keywords: Fibular non-union, Closing wedge high tibial osteotomy, Hybrid HTO, Fibular osteotomy, Bone grafting

INTRODUCTION

Lateral closing wedge high tibial osteotomy (LCW-HTO) is a well-established procedure for the treatment of medial compartment knee osteoarthritis with varus malalignment. Hybrid LCW-HTO is effective in treating severe varus deformity combining the principle behind medial open wedge and lateral close wedge osteotomy with rigid fixation. Adequate shortening of the fibula is mandatory to aid tibial correction and is commonly achieved either by excision or oblique osteotomy. Fibular non-union after LCW-HTO has been frequently reported in the literature, with incidences ranging from 10–20%.[1-3] However, the majority of these non-unions remain asymptomatic and do not affect the functional outcome. Large series, including our previously published cohort, have shown that only a small minority of fibular non-unions become painful and require revision surgery.[4]

Symptomatic fibular non-union is therefore uncommon and sparsely reported. When present, it may manifest as localized pain, tenderness, or a pricking sensation during weight bearing due to abnormal motion, poor fragment contact, or mechanical irritation of surrounding soft

tissues. This case report describes two patients with persistent symptoms more than one year after hybrid LCW-HTO, each representing a different fibular osteotomy technique, and discusses the possible etiological factors leading to symptom development.

CASE REPORT

Case 1: symptomatic non-union after oblique fibular osteotomy

A 61-year-old male patient underwent hybrid LCW-HTO for medial compartment osteoarthritis. Standard surgical protocols were used. Fibular shortening was achieved using an oblique mid-diaphyseal osteotomy. The immediate post-operative course was uneventful, and tibial osteotomy site united satisfactorily with good correction.

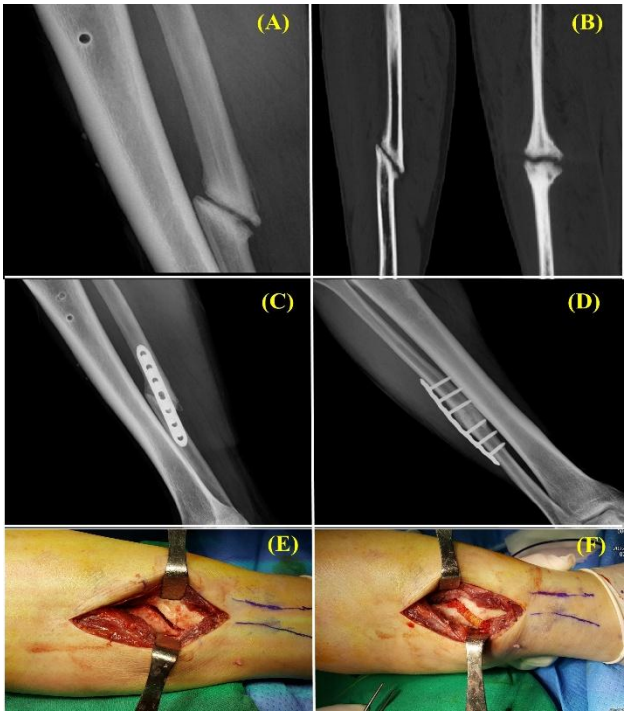

Figure 1: (A) fibular non-union at oblique osteotomy site at 1 year post-operatively, (B) CT images of fibular non-union at 1 year post-operatively, (C),(D) fibular non-union managed with ORIF + BG with complete union seen at 6 months post-operatively and (E),(F) intra-op images of fibular non-union and bone grafting with iliac crest cancellous bone graft.

At 12 months post-operatively, when planning for tibial plate implant removal, the patient complained of persistent, localized lateral leg pain associated with a sharp pricking sensation during walking. There were no neurological symptoms. Clinical examination revealed mild focal tenderness over the fibular osteotomy site without signs of infection. The tibial osteotomy site was asymptomatic. Plain radiographs demonstrated a fibular non-union. Computed tomography confirmed absence of bridging callous with hypertrophic callous formation and minimal fragment contact. Given the chronic symptoms and radiological findings, surgical intervention was planned. The patient underwent fibular non-union revision with open reduction, debridement and plate fixation with autologous iliac crest bone grafting. At 6-month follow-up, radiographs confirmed union, and the patient reported complete resolution of pain and pricking sensation (Figure 1).

Case 2: symptomatic non-union after segmental fibular excision

A 62-year-old female patient underwent hybrid LCW-HTO with fibular shortening performed by segmental excision of approximately 2–2.5 cm of the mid-diaphyseal fibula.

Figure 2:(A and B) fibular excisional osteotomy immediately post-operative after hybrid LCW-HTO, (C and D) fibular non-union at 1 year post-operatively and (E and F) CT images of fibular non-union at 1 year post-operatively.

Tibial alignment correction and union progressed uneventfully. Despite satisfactory knee function, the patient presented at 12 months post-operatively with persistent lateral leg pain and discomfort localized to the fibular region, described as pricking sensation during ambulation (Figure 2).

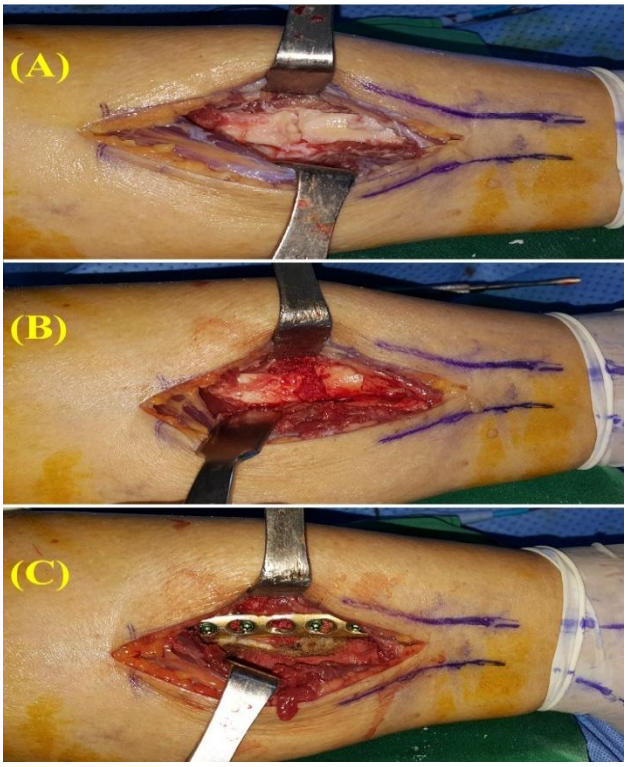

Figure 3:(A and B) Immediate post-operative fibular non-union management with ORIF + BG and (C and D) CT and radiograph image showing complete union of fibular non-union at 6 months post-operatively.

Figure 4:(A-D): Intraoperative images of fibular non-union management with iliac crest cancellous and strut bone graft with ORIF.

Clinical examination again revealed point tenderness over the fibular defect. Radiographs and CT scans demonstrated a well-established fibular non-union with a segmental gap and no evidence of callous formation (Figure 2). Given the persistence of symptoms beyond one-year, surgical management was undertaken. Revision surgery consisted of fibular plating spanning the defect with autologous iliac crest cancellous and strut bone grafting (Figure 3). At 6 months, complete radiological union was achieved, and the patient was symptom-free, with no recurrence of pain at final follow-up (Figure 4).

DISCUSSION

Fibular non-union is the most frequent complication related to fibular management in LCW-HTO, yet it is predominantly a radiological finding without clinical symptoms and significance. In our previously published series on fibular management in hybrid LCW-HTO, only approximately 5% of fibular non-unions were symptomatic and required revision surgery. The rarity of symptoms suggests that additional mechanical or biological factors are necessary for a fibular non-union to become painful. Recent literature further supports this concept. Most cases remain asymptomatic due to compensatory stability from surrounding soft tissues once union is achieved. Symptomatic non-union tends to present late in the post-operative course, often beyond one year, and is unlikely to resolve spontaneously. In such cases, surgical stabilization is justified based on persistent focal symptoms rather than radiographic findings alone.[5]

Ramanoudjame et al demonstrated that progression from fibular non-union to subsequent symptom development is strongly influenced by both mechanical and patient-related factors. These include reduced obliquity of the fibular osteotomy plane resulting in more horizontal cuts, insufficient fragment contact (<50%), higher body mass index, and excessive micro motion at the osteotomy site, all of which compromise stability and biological healing potential. Alternative methods of fibular management, such as proximal fibular head osteotomy and proximal tibio-fibular joint separation, have been described to avoid diaphyseal fibular non-union. However, concerns regarding peroneal nerve injury and proximal tibio-fibular joint instability have limited the routine use of these techniques, and diaphyseal fibular osteotomy or excision remains the most commonly employed approach.[2-6]

From a biomechanical perspective, horizontal or minimally oblique osteotomies result in reduced contact area and increased shear forces, leading to instability and non-union. In segmental excision, the absence of fragment contact leads to loss of intrinsic stability, which may permit micro motion and mechanical irritation. Symptomatic presentation, such as pricking or sharp pain, is likely due to abnormal motion at the non-union site, local periosteal irritation, or interaction with adjacent soft tissue. Once symptoms persist beyond one year and there is no radiological progression of union, spontaneous

resolution is unlikely. Surgical revision with stable plate fixation and biological augmentation using autologous cancellous and/or strut bone graft reliably addresses both mechanical instability and biological deficiency. Consistent with previous literature, both of our patients achieved complete union and symptomatic resolution within 6 months following revision surgery.[7-10]

CONCLUSION

Although fibular non-union after hybrid LCW-HTO is common, it is rarely symptomatic. Persistent localized pain or pricking sensation beyond one year should prompt evaluation for symptomatic fibular non-union. Both oblique osteotomy and segmental excision techniques can result in symptomatic non-union under unfavourable mechanical conditions. Plate fixation combined with autologous iliac crest bone grafting is an effective and reliable treatment, leading to predictable union and excellent clinical outcomes.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: Not required

REFERENCES

1. Ramanoudjame M, Vandenbussche E, Baring T, Solignac N, Augereau B, Gregory T. Fibular nonunion after closed-wedge high tibial osteotomy. Orthop Traumatol Surg Res. 2012;98(8):863-7.
2. Kurosaka M, Tsumura N, Yoshiya S, Matsui N, Mizuno K. A new fibular osteotomy in association with high tibial osteotomy: a comparative study with conventional mid-third fibular osteotomy. Int Orthop. 2000;24(4):227-30.
3. Bicer EK, Basa CD, Gunay H, Aydogdu S, Sur H. The fate of fibular osteotomies performed during high tibial osteotomy. Arch Orthop Trauma Surg. 2016;136(8):1085-90.
4. Saini PK, Jung WH, Kim DH, Bhatia A, Yadlapalli S, Takeuchi R. Peroneal palsy and non-union after closing wedge high tibial osteotomy: does surgical technique matter?. Int J Orthop Traumatol. 2025;7:91-6.
5. Ueda D, Yasuda K, Kaibara T, Watanabe M, Mochizuki T, Kanto R, et al. High rate of radiographic union at the fibular osteotomy site with no complications after an acute oblique osteotomy and ligation procedure to shorten the fibula in high tibial osteotomy. Orthop J Sports Med. 2022;10:23259671221117480.
6. Özcan Ö, Eroglu M, Boya H, Kaya Y. Proximal tibiofibular joint pain versus peroneal nerve dysfunction: clinical results of closed-wedge high tibial osteotomy performed with proximal tibiofibular joint disruption. Knee Surg Sports Traumatol Arthrosc. 2017;25(9):2936-41.
7. Schmal H, Brix M, Bue M, Ekrol I, Gupta S, Tetsworth K, et al. Nonunion: consensus from the 4th annual meeting of the Danish Orthopaedic Trauma Society. EFORT Open Rev. 2020;5(1):46-57.
8. Stewart SK. Fracture non-union: a review of clinical challenges and future research needs. Malays Orthop J. 2019;13(2):1-10.
9. Mills LA, Aitken SA, Simpson AHRW. The risk of non-union per fracture: current myths and revised figures from a population of over 4 million adults. Acta Orthop. 2017;88(4):434-9.
10. Einhorn TA, Gerstenfeld LC. Fracture healing: mechanisms and interventions. Nat Rev Rheumatol. 2015;11(1):45-54.

Cite this article as: Jung WH, Khare H, Are K, Kim DH. Symptomatic fibular non-union after hybrid lateral closing wedge high tibial osteotomy: a report of two cases. Int J Res Orthop 2026;12:780-3.