

# A Subchondral Bone-Sparing Retrograde Drilling Technique Preserving Residual Cartilage in Talar Osteochondral Lesions: A Retrospective Case Series

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**INTRODUCTION:** Bone marrow stimulation (BMS), including microfracture, is widely used to treat osteochondral lesions of the talus (OLT). However, these techniques involve intentional perforation of the subchondral bone plate, disrupting its structural integrity and raising concerns about long-term joint deterioration.

As an alternative to BMS, retrograde drilling (RD) was introduced to preserve the joint surface and subchondral bone. Yet in clinical practice, many patients present with partially detached cartilage and concurrent ankle instability—conditions that fall outside the traditional indication for RD, which assumes intact cartilage and localized bone changes.

To overcome these limitations, we developed a novel retrograde drilling technique that minimizes subchondral bone damage and preserves partially detached cartilage as a natural scaffold. When instability is present, anatomical ligament repair is performed concurrently.

This retrospective study aimed to clarify the clinical efficacy and safety of this anatomically-informed, subchondral bone-sparing approach by evaluating mid-term outcomes.

**METHODS:** We retrospectively reviewed patients with symptomatic OLT who underwent RD between 2015 and 2021 at a single academic institution. Inclusion criteria included lesion diameter  $\leq 12$  mm, subchondral bone involvement, and minimum 12-month follow-up.

Under fluoroscopic guidance, 1.4–1.6 mm K-wires were inserted retrogradely without violating the cartilage or breaching the subchondral bone plate. Partially detached cartilage was preserved and used as a biologic scaffold. In cases of ankle instability, mini-open anatomical ligament repair was performed.

Primary outcomes included return to sport (RTS), revision surgery, and complications.

**RESULTS:** Fifty-three patients (33 males, 20 females; mean age 27.1 years) were included. The mean follow-up duration was 54.5 months. The mean lesion diameter was 9.8 mm (range: 3.4–12.0 mm). Among 39 patients who had participated in sports preoperatively, 38 (97.4%) returned to their sport postoperatively. One patient discontinued sports for personal reasons unrelated to surgery. No patients required revision surgery, and no complications related to the ligament repair were observed.

**DISCUSSION AND CONCLUSION:** This retrospective study clarified the clinical utility of a novel subchondral bone-sparing retrograde drilling technique for osteochondral lesions of the talus, based on mid-term outcomes.

By minimizing damage to the subchondral bone and preserving partially detached cartilage as a natural scaffold, the procedure supports structural preservation and joint integrity.

The high return-to-sport rate and absence of revisions or complications suggest that this anatomically-informed technique is a safe and effective joint-preserving option, even in cases that fall outside the traditional indications for RD.

