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Tips, Quips, and Pearls

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Distraction Arthroplasty With Arthroscopic Microfracture in a Patient With Rheumatoid Arthritis of the Ankle Joint

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ABSTRACT

We treated a 39-year-old female who had experienced destruction of her ankle joint owing to rheumatoid arthritis. This relatively young patient wished to avoid ankle fusion and joint replacement. Therefore, distraction arthroplasty with arthroscopic microfracture was performed to improve her symptoms and preserve motion. A microfracture procedure specifically for cartilage defects of the tibial plafond and talar dome was performed with the arthroscope, after which a hinged external fixator was applied to distract the ankle joint. The ankle joint space was enlarged by the external device and joint movement allowed. After 3 months, removal of the external device and repeat arthroscopy revealed newly formed fibrocartilage on the surfaces of both the tibia and the talus. At 2 years after the surgery, a radiograph showed that the joint space enlargement of the ankle had been maintained. The American Orthopaedic Foot and Ankle Society score improved from 37 points preoperatively to 82 points at 2 years postoperatively. Our findings suggest that good clinical results can be achieved with distraction arthroplasty and arthroscopic microfracture in a relatively young patient with rheumatoid arthritis.

Rheumatoid arthritis (RA) is characterized by systemic chronic inflammation, followed by subsequent joint destruction. Synovial hyperplasia and pannus formation occur from inflammatory cytokines that include tumor necrosis factor-α and interleukin-6, which invade the articular cartilage and bone by activation of osteoclasts and secretion of degrading enzymes (1). Currently, with RA very well controlled systemically by several agents, including biologic reagents such as tumor necrosis factor-α or interleukin-6 blockers, the most important factor is preservation of the arthritic joint for activities of daily living (2,3). Arthrodesis or total ankle arthroplasty is a common treatment for the rheumatic ankle (4). Arthrodesis has been established for the relief of pain and improvement of activities of daily living. However, this procedure will have a detrimental effect on the range of motion of the talocrural joint (ideally, it will eliminate this motion altogether) and can be complicated by bony union failure and arthritic changes in the adjacent subtalar joints after ankle fusion (5,6). Another treatment of end-stage rheumatism of the ankle is total ankle replacement. Also, although the outcomes of total ankle replacement have improved, the risk of infection, prosthetic wear, and prosthetic loosening from osteoporotic bone in patients with RA remains high (7,8). For young patients with RA, alternative treatments that aim to preserve the joint should be considered.

For the arthritic ankle, especially a post-traumatic osteoarthritic joint, the effectiveness of distraction arthroplasty has been appreciated. Distraction arthroplasty is commonly performed on several joints, including the hips, knees, and ankles, to preserve the joint space and decrease the weightbearing load by distraction using an external fixator (9–14). van Valburg et al (14) demonstrated successful results using Ilizarov joint distraction in 11 patients with advanced post-traumatic osteoarthritis (OA). Bone marrow-stimulating techniques have also been commonly used for articular cartilage repair, and the combination of this procedure with articulated joint distraction could possibly improve articular cartilage repair. Deie et al (11) reported good clinical outcomes for knee OA using the articulated distraction arthroplasty device combined with subchondral drilling. The concept underlying this is that distraction will allow continuous joint movement, which is essential for cartilage regeneration, and that

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Fig. 1. Preoperative radiographs of the ankle. Anteroposterior *(A)* and lateral *(B)* radiographs showing loss of joint space in the ankle joint.

it reduces overloading, protecting fibrocartilage regeneration. In previous reports, distraction arthroplasty for the ankle joint had overall good results; however, these reports included fixed and hinged external fixators (9,10,12–17). Saltzman et al (12) showed that the result of motion distraction arthroplasty was better than that of fixed distraction for OA of the ankle. Thus, several reports have demonstrated that distraction arthroplasty for advanced OA can have beneficial effects. However, the effect of distraction arthroplasty on inflamed joints such as those affected by RA remains unclear. We hypothesized that distraction arthroplasty, combined with the bone marrow-stimulating effect of microfracture, for patients with RA could be a useful treatment. In the present report, we describe the results of this technique in an adult female with RA.

Case Report

A 39-year-old Japanese female with a 5-year history of RA had been treated for severe erosive arthritis with 12 mg/wk of methotrexate. She complained of left ankle pain and left elbow pain that was especially notable when she experienced left ankle pain. The left ankle was swollen, with local heat and limited range of motion (passive dorsiflexion of only 10° and plantar flexion of 25°). A plain radiograph in the standing position revealed diminished joint space of the tibiotalar and talocalcaneal interfaces, with the narrowing classified as Larsen grade 4 (Fig. 1). Magnetic resonance imaging scans showed articular cartilage loss in the tibiotalar joint (Fig. 2). The American Orthopaedic Foot and Ankle Society hindfoot-ankle scale score was 37 points (18,19). She was forced to apply a patella tendon weightbearing cast and use crutches when walking because of severe ankle pain. She was advised to undergo ankle arthrodesis at another hospital, but she declined because of the associated loss of all ankle range of motion. She also declined total ankle replacement, because of concerns associated with the potential complications. Therefore, to ameliorate her ankle pain while preserving, or even improving, her range of motion, we chose to perform distraction arthroplasty with microfracture on her left ankle.

Before surgery, the patient's systemic methotrexate use was stopped for 2 weeks, and corticosteroid supplementation was not used during that period. A 1-g dose of cefazolin sodium hydrate as a prophylactic antibiotic was given intravenously before surgery; a total

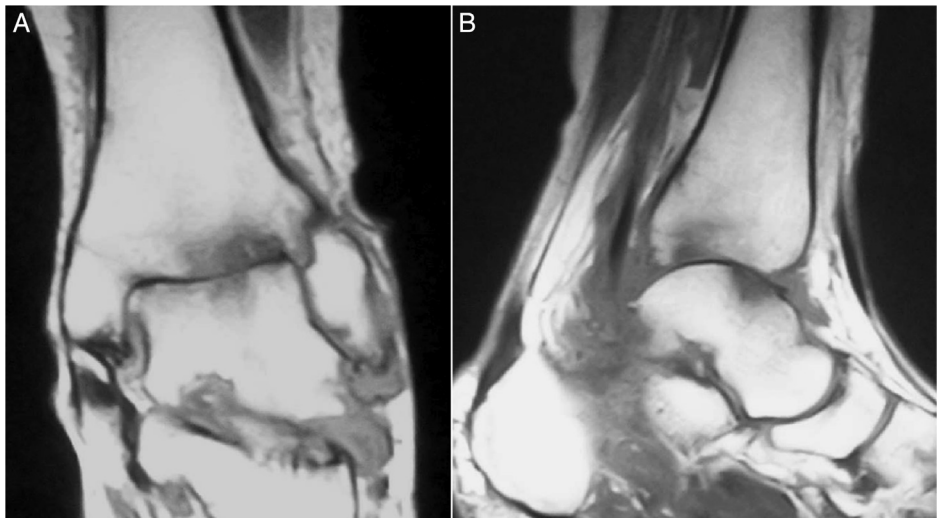

Fig. 2. Preoperative magnetic resonance imaging scan of the ankle. Coronal *(A)* and sagittal *(B)* magnetic resonance imaging scan revealing articular cartilage disappearance and a T_1-weighted low-intensity area in the subchondral bone of the talus and tibia, indicating the change in the subchondral bone structure associated with cartilage degeneration.