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Valgus Ankle Degenerative Arthritis with an Isolated Deltoid Insufficiency and Tibial Varus: A Case Report

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ABSTRACT

We report a case of valgus ankle degenerative arthritis due to chronic isolated deltoid insufficiency combined with tibial varus that was treated successfully with ankle joint preserving surgery. A 63-year-old male complained of right lateral ankle pain with 10 minutes of maximal pain-free walking time. The assessed American Orthopaedic Foot and Ankle ankle-hindfoot scale score was 33 points. The ankle joint showed 18° of valgus deformity with 6° of tibia varus. Medial displacement calcaneal osteotomy, supramalleolar open wedge osteotomy, and deltoid ligament imbrication were performed. At the 2-year follow-up examination, the ankle joint showed 10° of valgus and the tibial plafond showed flattening. The hindfoot showed 7° of valgus. He could run for 2 hours on the treadmill without pain. The American Orthopaedic Foot and Ankle ankle-hindfoot scale score was 90 points. In conclusion, valgus ankle degenerative arthritis with isolated deltoid insufficiency and tibial varus could be treated successfully with realignment using a double osteotomy and additional deltoid imbrication.

Primary ankle osteoarthritis is rare, with a prevalence of 1% in the adult population (1). Post-traumatic arthritis is the most common cause of ankle osteoarthritis that develops after an ankle fracture or ligament injury. The most common cause of post-traumatic arthritis is rotational ankle fracture, followed by recurrent ankle instability (2,3). Acute ankle sprains, with lesion of ligament injuries, are the most common sports injuries. When left untreated, such injuries can alter the ankle mortise and result in chronic ankle instability (4,5). Chronic ankle instability can further cause ankle joint degeneration (6,7). Degenerative ankle joints can be initially treated conservatively. However, if conservative treatment is ineffective, surgical procedures such as ankle joint preserving surgery, ankle fusion, or total ankle arthroplasty can be considered (8–10). The latter 2 procedures are joint sacrificing. Ankle arthrodesis is associated with functional restriction and adjacent joint degeneration (11). Total ankle arthroplasty is also known to have a high revision rate and uncertain long-term results (12–14). Ankle joint preserving surgery using corrective osteotomy is suitable for eccentric cartilage loss by realigning the mechanical axis and redistributing the joint load (15,16). Good mid- to long-term results have been reported (17,18). We reported a case of valgus ankle degenerative arthritis due to chronic isolated deltoid insufficiency combined with tibia varus that was successfully treated with ankle joint preserving surgery.

Case Report

A 63-year-old male visited the orthopedic outpatient department, complaining of right lateral ankle pain in April 2014. He was a mechanical engineer who often worked on uneven ground, on which he had sustained multiple ankle sprains. He had experienced persistent ankle pain for >5 years that had become aggravated 1 year before presentation. He could walk pain free for ≤10 minutes. Sit to stand transfers and stair negotiation were the primary causes of severe pain. He had no other disease, except for hypertension. He had received several years of conservative treatment (oral medications, physical therapy, and injections) from a local clinic but had been referred for surgical treatment because of insufficient improvement.

Physical Examination

The physical examination revealed that his right ankle was mildly swollen, without any signs of infection. On standing, increased heel valgus and forefoot pronation were noted. He could perform a single heel rise test and heel inversion was noted. Dorsiflexion and

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plantarflexion range of motion (ROM) was 15°, which was decreased relative to the 30° on the contralateral side. Anterior impingement pain was not noted with full dorsiflexion. The subtalar joint presented with 20° of inversion and 10° of eversion. He also experienced shoe wear isolated to the medial side. On palpation, positive ankle joint line tenderness was noted on the medial and lateral aspects. The valgus stress test findings were positive and the manual anterior and varus stress test had negative findings. The visual analog scale (VAS) score was 9 points. The American Orthopaedic Foot and Ankle ankle-hindfoot scale score was 33 points.

Imaging Studies

On weightbearing plain radiographs, the tibial varus was 6° on the complete lower leg standing view (Fig. 1). The lateral distal tibial angle (LDTA) was 100° (Fig. 2). The valgus ankle deformity was 18° with incongruence (19). The center of rotation of angulation was in the talus body. The lateral tibial plafond was impacted proximally and had a 30° angulation to the LDTA. The lateral shoulder of the talus dome made contact, with a 5-mm joint gap noted on the medial side. Osteophytes were seen on the distal anterior margin and medial malleolus of the tibia. An island bone fragment was present on the inferior aspect of the medial malleolus. Also, 18° of hindfoot valgus was identified on the Saltzman hindfoot view (20) (Fig. 3). The calcaneal pitch angle was 17°, and the lateral talo-first metatarsal angle was 9°. The anterior distal tibial angle (ADTA) was 80° (Fig. 4).

On the computed tomography scan, multiple small osteophytes were noted around the ankle joint, with no osteochondral lesions.

Operative Methods and Rehabilitation

A double osteotomy was planned to correct the hindfoot valgus and distal tibia varus with the patient in the supine position under

Fig. 1. Complete lower leg standing anteroposterior view showing 6° of genu varus.

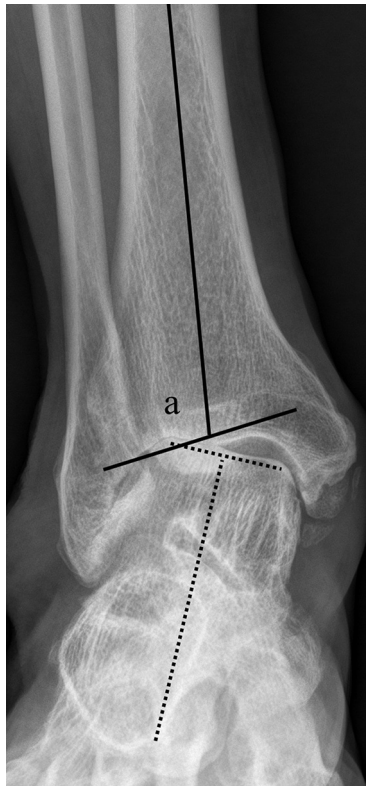

Fig. 2. Standing anteroposterior view of the right ankle showing valgus tilted talus and impaction of the lateral tibial plafond. Osteophytes in the medial malleolus are visible. The lateral distal tibial angle *(a)* was 100° between the tibial axis and tibial plafond *(solid line)*. A valgus ankle deformity of 18° is evident between the tibial and talar axes.

Fig. 3. Hindfoot view (Saltzman) on plain radiograph showing valgus tilt. The angle between the tibial axis *(solid line)* and calcaneal axis *(dotted line)* was 18° (*b*), consistent with valgus ankle deformity.