Uncommon Fibular OCD Repair with Minimally Invasive Novel Osteoconductive Bone Graft Substitute: A Case Study

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Statement of Purpose

Talar dome osteochondral defects (OCD) have been well documented and are the most common within the foot and ankle complex. In 2015, You et al found that a coexisting osteochondral lesion of the distal tibia or fibula is not rare on MRI, but remains less often diagnosed. Other studies have described incidence of Talar OCDs being greater than that of lesions of the distal fibula by 20:1 odds. There is still minimal literature on the management of a fibular OCD. This case report documents the treatment of an uncommon fibular OCD with a minimally invasive novel osteoconductive injectable bone graft substitute.

Literature Review

Osteochondral defects (OCD) are a pathological process in which there is a fissure in the articular cartilage with extension deep into the subchondral bone (1). An untreated OCD is one of the causes of chronic ankle pain and osteoarthritis (6). A talar dome lesion has been well documented and is the most common within the foot and ankle (2). With more clinical and academic awareness of OCDs, the reported incidence is steadily increasing (4). Most lesions are found on the posteromedial (58%) or anterolateral (42%) part of the talar dome (4). Less reported are lesions of the tibia and fibula. Among those with a talar OCD, incidence of a coexisting lesion of the tibia or fibula can be between 15.8-20.5% (5). There are numerous surgical approaches to treating symptomatic OCDs with arthroscopic debridement and bone marrow stimulation being the most commonly performed procedures (4). To augment these procedures it is not uncommon to find use of bone graft substitute to serve as a buttress for known bone defects (3). Osteoconduction provides a scaffold allowing the ingrowth of new bone. Several osteoconductive bone graft substitutes are available for clinical use including calcium phosphate (3). Calcium phosphate has similar compressive strength when compared to cancellous bone, resorbs quickly over 4-12 weeks, and can be used as an injectable (3). As an injectable, calcium phosphate may be placed immediately following completion of articular reduction and internal fixation (3). This allows for more immediate weight bearing during the postoperative period (3). The fibula bears 6.4% of weight during gait, making a bone graft substitute a more viable option for repair and immediate weight bearing post operatively (3,5).

Case Study

57-year-old male presents with chronic left ankle impingement and intermittent pain for 25 years. Patient is an active runner and states pain has become more consistent. Physical exam revealed pain localized to the left lateral ankle overlying the ATFL and lesser the CFL with no distal fibula pain noted. Preoperative X-rays were normal with no obvious osseous abnormalities (Figure 1-2).

Figure 1: Anteroposterior X-Ray Left Ankle

Figure 2: Lateral X-Ray Left Ankle

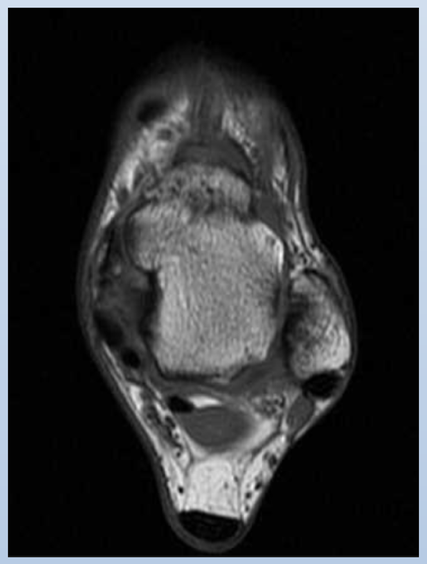

Figure 3: Axial T1 MRI Left Ankle

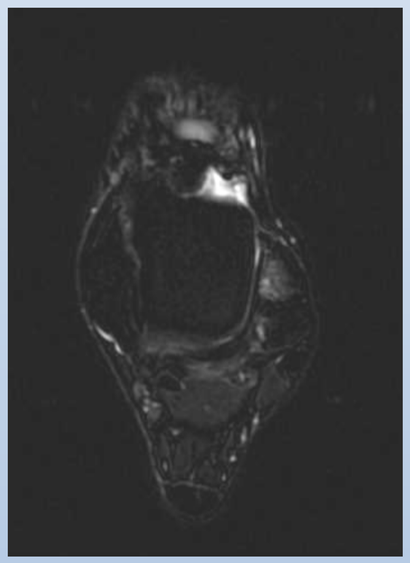

Figure 4: Axial T2 MRI Left Ankle

Figure 5: Coronal T2 MRI Left Ankle

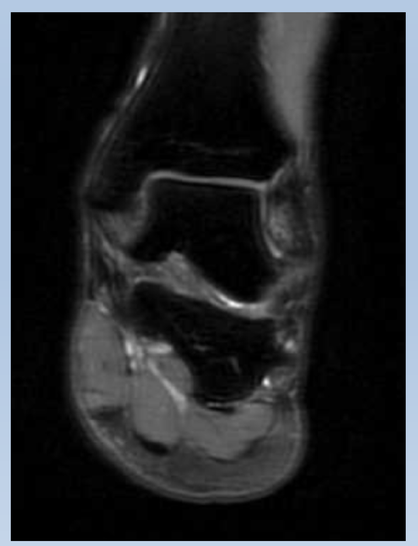

Figure 6: Coronal T2 MRI Left Ankle

Case Study Continued

MRI is positive for osteochondral lesion and bone marrow edema of the fibula at the talar articulation (Figure 3-6). After failed conservative treatment, it was determined to proceed with surgical repair of the fibula via a minimally invasive novel osteoconductive injectable bone graft substitute in order to fill the bone void and increase overall stability. The bone graft substitute was made of hyaluronic acid enhanced calcium phosphate. Under fluoroscopic guidance, a guidewire was introduced into the fibular lesion. After proper preparation, 0.5mL of the bone graft substitute was then infiltrated into the defect. The cannula was removed and the incision site was reapproximated utilizing steri-strips. Immediately, the patient was allowed to be full weight-bearing. There were no complications or adverse events during the postoperative period. At the second follow up, the patient reported zero pain and was able to transition to a regular shoe. The patient has been able to return to running and full activity, maintaining pain free activity at one year follow up.

Analysis & Discussion

Osteochondral lesions of the fibula remain less often diagnosed and less often reported in literature. However, with better clinical awareness and improved diagnostic techniques, the incidence of fibular osteochondral defects is increasing. Our case report describes an active patient who presented with chronic left ankle impingement with a positive MRI for a distal fibular osteochondral lesion. After failed conservative treatment, minimally invasive novel osteoconductive injectable bone graft substitute was utilized for the fibular OCD. At the 1 year follow up, the patient had made an uneventful recovery and returned to pain free activity. Joint ROM improved without crepitation and pain. He returned to full activity after 3 weeks. Previous studies have shown that it is vital to consider fibular OCD secondary to chronic ankle pain with a history of trauma. Left untreated, osteochondral lesions may cause chronic pain and swelling, and may eventually limit the motion of the joint. Thus, this diagnosis should be considered in patients presenting with chronic ankle pain particularly with a history of an inversion injury. The purpose of this report is to raise awareness of this condition.

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Financial Disclosures: None

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AML 900-164/A