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Statement of Purpose

Osteochondral lesions of the talus (OLT) can be difficult to treat, especially if there is a larger fracture fragment, or if involving an athlete. Often these injuries can lead to avascular necrosis (AVN) of the fracture fragment and/or post traumatic arthritis, hindering the patient's long-term activity level. Our case study presents an OLT in a young athlete that was surgically repaired with a novel technique utilizing bioabsorbable poly-L-lactide (PLLA) chondral darts.

Literature Review

It has been demonstrated that up to 50% of patients with OLT injuries failed to resolve their symptoms with conservative treatment.¹ Surgical treatment of OLTs include arthroscopic debridement and bone marrow stimulation, autologous osteochondral or chondrocyte transplantation/implantation, and varying fixation techniques.¹⁻⁴ Reilingh et al completed a study of 37 pediatric patients with OLTs. All patients were initially treated with 6 months of conservative care. 34 of the 37 patients went on to require surgical treatment with 70% undergoing arthroscopic debridement with bone marrow stimulation and 30% undergoing fixation of the fragment. These results support primary fixation of a larger fragment, having the advantages of restoring the natural congruency and subchondral bone while maintaining the hyaline cartilage.²

Case Study

A healthy 15 year old male presented with complaints of pain, swelling and inability to weight bear to his right ankle. Patient twisted his ankle during a fall while running at track practice two days earlier. Upon physical examination there was extensive ecchymosis present to the medial and lateral ankle with maximal pain upon palpation to the anteromedial ankle and pain with maximal dorsiflexion. CT scan revealed an 8 x 15 x 5 mm fracture fragment of the anterior medial talar dome with 2 mm of anterior displacement. Conservative vs surgical treatment options were discussed with the patient, and his parents. They decided to move forward with open reduction internal fixation of the talar fracture fragment. PLLA chondral darts were chosen for fixation in order to decrease his chances of post traumatic arthritis, AVN, and to increase his rate of recovery and return to sport.



Figure 1: Initial ER films, ankle mortise and lateral views showing medial OLT.



Figure 2: CT scan revealed an 8 x 15 x 5 mm fracture fragment of the anterior medial talar dome with 2 mm of anterior displacement.



Figure 3: Intraoperative photographs demonstrating (A). Medial talar fracture fragment via ankle arthrotomy (B). Placement of PLLA chondral dart with dart inserter and temporary fixation of fragment via Kirschner wire (C). Internal fixation of medial talar fracture fragment with PLLA chondral darts x 3 sitting just deep to the articular surface. Darts measured 18 mm long x 1.3 mm diameter.

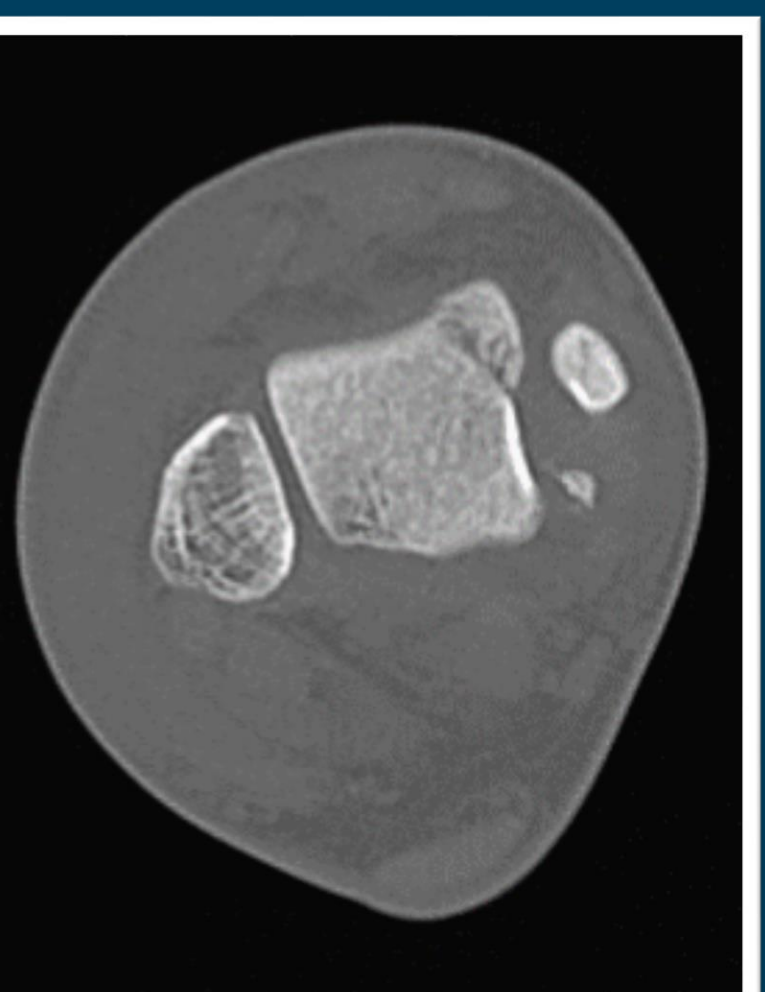


Figure 4: Intraoperative radiographs, ankle mortise and lateral views status post ORIF with PLLA chondral darts.

Figure 5: Animated depiction of OLT repair with PLLA chondral dart fixation.

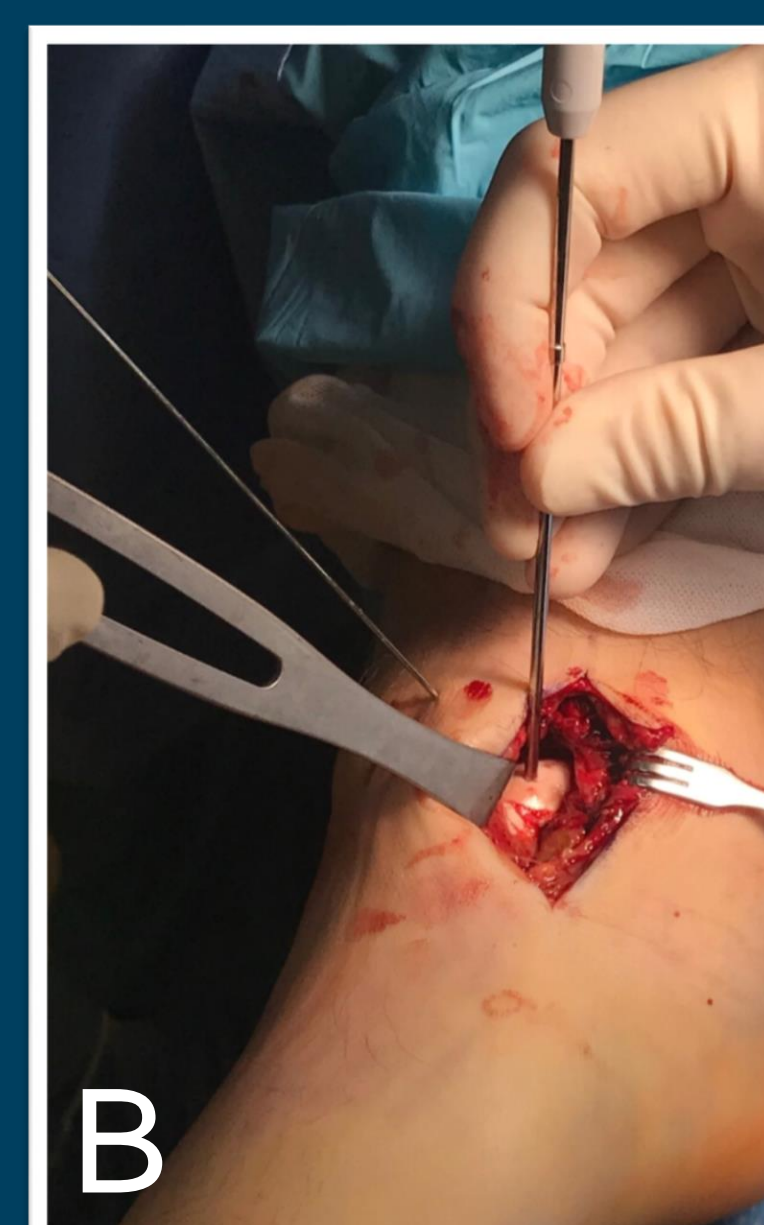


Figure 7: Ankle mortise and lateral radiographs taken 10 months post op.

Figure 6: Ankle mortise and lateral radiographs taken 2 months post op.

Results

ORIF of the medial OLT was successfully performed utilizing 3 PLLA chondral darts for fixation. Patient began range of motion exercises at 3 weeks and remained strict non-weight bearing for 6 weeks. Patient was advised not to return to full sport activity until 12 weeks, but he returned to basketball and baseball at 8 weeks post op and denied any pain or swelling at that time with strenuous activities. 2-month post op radiographs show excellent alignment of the fracture fragment with evidence of healing at the fracture site. 10-month post op radiographs show complete healing of the fracture with continued excellent alignment and no evidence of avascular necrosis. AOFAS Ankle-Hindfoot Scale significantly improved from 17 points at his initial appointment to 100 points at his 10 month follow up. Patient has remained pain free to the right ankle and has continued to participate in multiple sports at a high level without any limitations.

Analysis & Discussion

As demonstrated in our case study, primary fixation of an OLT in a pediatric athlete with PLLA chondral darts is a viable option. It allows for excellent alignment, minimal iatrogenic trauma of the cartilage, stable fixation of the fragment, and quicker return to sport when compared to traditional conservative treatments. Although research is very limited with PLLA chondral dart fixation. Recently, Nakasa et al. showed 18 OLTs repaired with PLLA darts, which had a 1 year follow up with MRI and arthroscopic second look. Results of the study showed significant improvement of AOFAS scale, good incorporation of the fracture fragment in 17 ankles and fair in 1, good articular congruity in 16 ankles and fair in 2, with no signs of synovitis or dart breakage in any of the ankles. There was however enlargement of bone marrow lesion of the talus with bone absorption around the darts in 5 of the 18 ankles.³ These are promising short-term results, however larger studies with longer follow-up are needed.

References

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