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Case Report

Use of Biodegradable Fixation Devices and a Fresh, Minced Allograft to Treat a Case of Bifocal Juvenile Osteochondritis Dissecans

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Abstract

Juvenile Osteochondritis Dissecans (JOCD) is characterized by the separation of an area of subchondral bone and overlying cartilage from the surrounding tissue in a pediatric patient. The treatment of JOCD varies widely from non-operative treatments to several different surgical approaches. In this case report, we describe a patient who had bifocal JOCD lesions in his right knee. One lesion was fixed with four biodegradable nails whereas the other defect was filled with a fresh, minced allograft. Four months after the surgery, the patient developed synovitis. As a result, he underwent a second arthroscopy to remove one particularly prominent and yet-unresorbed nail, after which the synovitis resolved. Twenty-five months after the initial procedure, an MRI confirmed that both lesions were healing well, and the patient reported that he had returned to playing sports.

Keywords: Allograft; Biodegradable nails; Juvenile osteochondritis dissecans

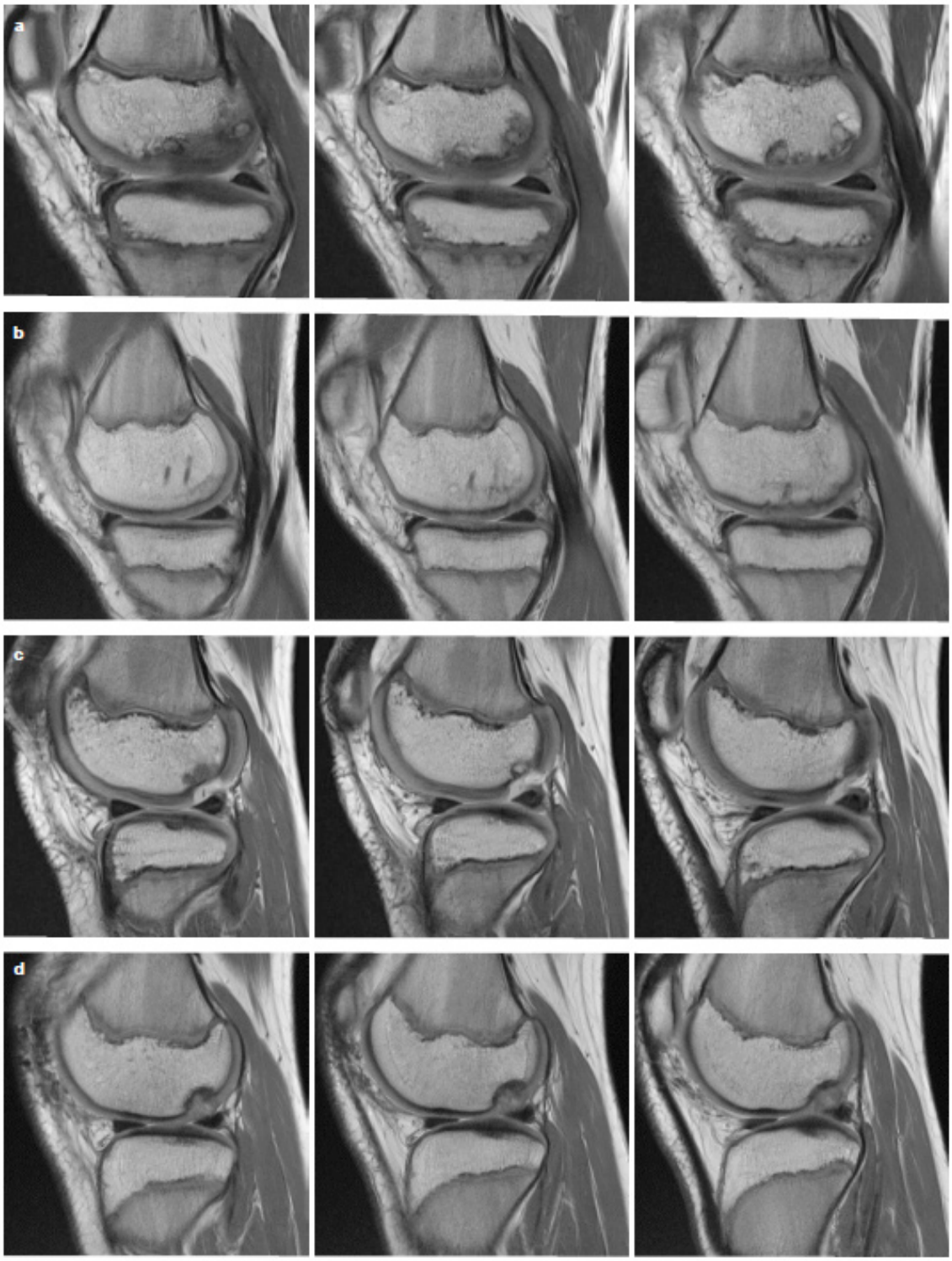
Introduction

JOCD of the knee is a localized pathologic process in which an area of subchondral bone, along with its overlying cartilage, separates from the surrounding bony tissues [1-3]. Treatments for JOCD include non-operative options as well as a variety of surgical techniques such as drilling, microfracture, the removal of loose bodies, allografting to replace lost tissue, autologous chondrocyte implantation and the use of bone pegs, biodegradable pins, and cannulated screws to reattach tissues [4-6]. We report a case in which a pediatric patient with two separate JOCD lesions in his right knee received two different surgical treatments: (1) SmartNail poly-L-lactic acid (PLLA) biodegradable fixation devices in the Medial Femoral Condyle (MFC) and (2) a fresh, minced, DeNovo allograft in the Lateral Femoral Condyle (LFC).

Case Report

A 10 year old skeletally immature male presented with right knee pain. He had experienced intermittent swelling in both knees for the past three years following a fall, but three weeks ago developed severe pain with swelling in his right knee. The patient is a high-level lacrosse, basketball, soccer, and football player who participates in supervised sports 3-4 times per week.

An MRI of the medial compartment showed a deep chondral defect along the central and posterior weight-bearing aspect of the MFC with the formation of a small chondral flap (Figure 1a). The same MRI also showed a full-thickness chondral defect along the posterior weight-bearing aspect of the LFC that was approximately 15 x 12 mm (transverse x AP) (Figure 1c) as well as a similarly-sized intra-articular loose body within the anterior intercondylar notch. The patient was diagnosed with atypical, multifocal JOCD and underwent a diagnostic arthroscopy.



Figures 1 (a-d): Series of three consecutive image slices of pre- and 25 months post-operative MRIs of the lateral (LFC) and medial femoral condyles (MFC). **(a)** Pre-op MFC, **(b)** post-op MFC where SmartNails were used to affix the fragment, **(c)** pre-op LFC, **(d)** post-op LFC where a DeNovo allograft was used to fill the defect.

During surgery, inspection of the medial compartment revealed an unstable lesion on the MFC. The area behind the fragment was debrided and curetted before the fragment was secured with four biodegradable 1.6 mm tacks (Figure 2). Inspection of the LFC identified an articular cartilage defect. The chronic-appearing loose body was friable and felt not to be amenable to fixation. The scar tissue was removed, and the borders of the defect were debrided to a stable rim. Afresh allograft of fibrin glue and minced skeletally immature cartilage was placed in the defect via arthrotomy (Figure 3).

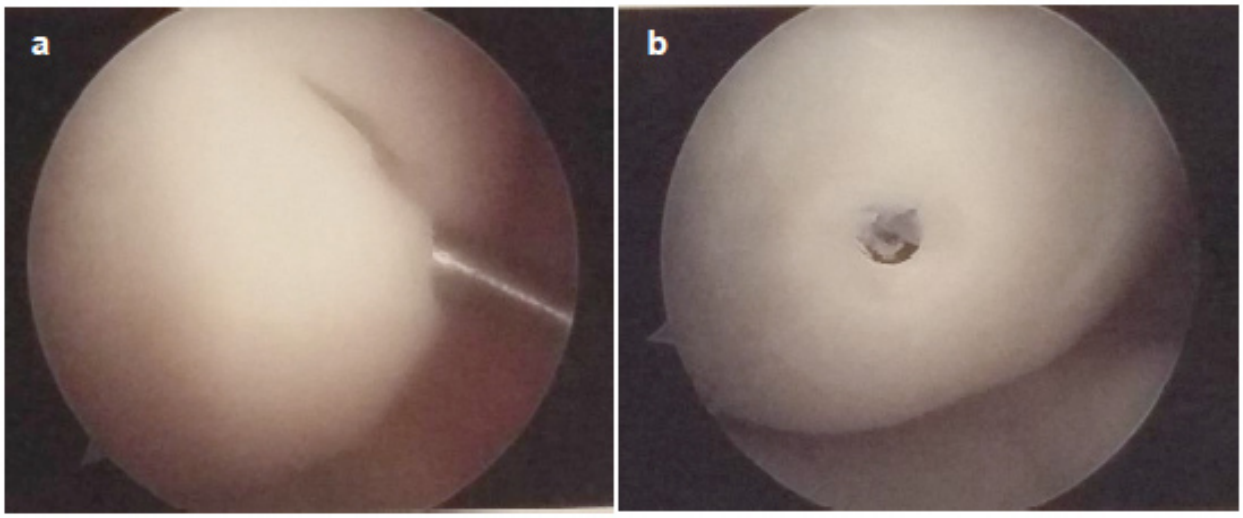


Figure 2: Intra-operative images of the MFC showing (a) the chondral defect and (b) one of four SmartNails used to fix the defect in place.

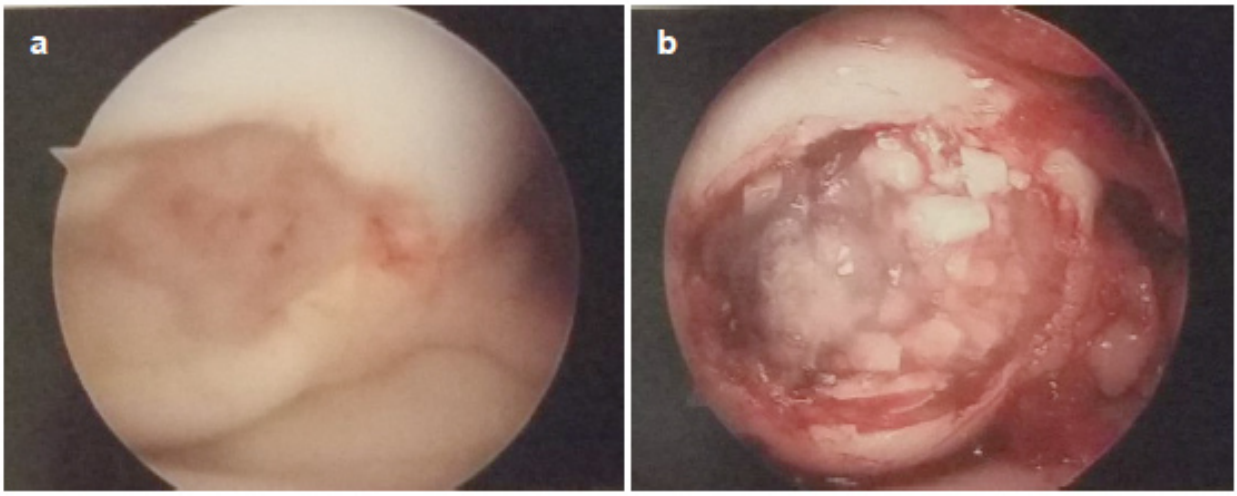


Figure 3: Intra-operative images of the LFC showing (a) the chondral defect and (b) the fresh, minced allograft used to fill the defect.

At his one-week post-operative follow-up, the patient was doing well and was cleared to begin physical therapy. At his three month follow-up, the patient returned with a significant effusion in his right knee. His range of motion was 5-100 degrees and there were no signs of infection. Based on a recent MRI, the patient was diagnosed with suspected synovitis from the resorbable implants. The patient returned a month later with worsening effusion and discomfort at the extremes of motion due to severe synovitis. As a result, he was scheduled for a second arthroscopic surgery to remove any remaining implants.

The scope confirmed synovitis in the suprapatellar pouch with irritated synovium in the medial and lateral gutters. One of the fixation devices was very prominent and this tack was removed. It was also noted at this time that the allograft had filled the chondral defect. There was an area of slight overgrowth along the edge of the allograft patch and a chondroplasty was performed to shave down this overgrowth.

Ten months after the second surgery, the patient had full range of motion with no pain, swelling, or apprehension. At a follow-up visit 21 months after his second surgery, the patient was participating in sports and MRIs were taken of his right knee. An MRI at this time showed that the lesion on the MFC appeared to be incorporated (Figure 1b) and the allograft in the LFC appeared to be in place with good fill of the defect (Figure 1d). An X-Ray taken 2 years and 9 months after the initial surgery showed that the lesions were continuing to heal.

Discussion

Fragment fixation and filling a lesion with fresh, minced allograft are two surgical techniques used to treat JOCD cartilage injuries. The patient in this report received both of those treatments, one on each femoral condyle of the right knee.

One of the biodegradable tacks had to be surgically removed four months after the original procedure because the patient developed synovitis. While an advantage of biodegradable implants is that they do not require a second surgery for removal, the risk of an immune reaction has been well-documented [7]. Inflammatory reactions resulting from the implantation of biodegradable fixation devices have been described in the knee, shoulder, and following maxillofacial surgery [7-9]. A 1994 study by Tegnander et al. reported that 6 out of 24 patients who underwent fixation of an OCD lesion using PLLA implants experienced diffuse swelling and a prolonged postoperative course [7]. A retrospective cohort study examined the records of 52 patients two underwent arthroscopic stabilization of the shoulder using PLLA tacks and found that 19% developed synovitis within 8 months of surgery [9].

In this case study, the synovitis resolved after removal of one of the implants. Twenty-one months after implant removal and 25 months after the original surgery, both lesion sites appeared incorporated on MRI and the patient had returned to playing sports. Ultimately, biodegradable tacks and the use of fresh, minced allograft were successful treatments for this patient.

References

1. Crawford DC, Safran MR (2006) Osteochondritis dissecans of the knee. J Am Acad Orthop Surg 14: 90-100.
2. König F (1888) Über freie körper in den gelenken. Dtsch Z Chir 27: 90-109.
3. Paget J (1870) On the production of some of the loose bodies in joints. St. Bartholomew's Hosp Rep 6: 1-4.
4. Cahill BR, Phillips MR, Navarro R (1989) The results of conservative management of juvenile osteochondritis dissecans using joint scintigraphy. A prospective study. Am J Sports Med 17: 601-605.
5. Emmerson BC, Gortz S, Jamali AA, Chung C, Amiel D, et al. (2007) Fresh osteochondral allografting in the treatment of osteochondritis dissecans of the femoral condyle. Am J Sports Med 35: 907-914.
6. Cole BJ, DeBerardino T, Brewster R, Farr J, Levine DW, et al. (2012) Outcomes of autologous chondrocyte implantation in study of the treatment of articular repair (STAR) patients with osteochondritis dissecans. Am J Sports Med 40: 2015-2022.
7. Tegnander A, Engebresten L, Bergh K, Eide E, Holen KJ, et al. (1994) Activation of the complement system and adverse effects of biodegradable pins of polylactic acid (Biofix®) in osteochondritis dissecans. Acata Orthop Scand 65: 472-475.
8. Bergsma JE (1995) Late complications using poly (lactide) osteosyntheses. *In vivo* and *in vitro* tests.
9. Freehill MQ, Harms DJ, Huber SM, Atlihan D, Buss DD (2003) Poly-L-lactic acid tack synovitis after arthroscopic stabilization of the shoulder. Am J Sports Med 31: 643-647.