The Use of a Cryopreserved Fresh Osteochondral Allograft for Repair of an Osteochondral Defect of the First Metatarsal Head: A Case Presentation

Nilin M. Rao, DPM, PhD1; Brett D. Sachs, DPM, FACFAS2; Dustin L. Kruse, DPM, MA, FACFAS3; Paul A. Stone, DPM, FACFAS4

1 Second Year Resident (P2-2), Highlands-Physician’s St. Luke’s Podiatric Medicine and Surgery Residency Program, Denver, CO  
2 Attending Surgeon, Highlands-Physician’s St. Luke’s Podiatric Medicine and Surgery Residency Program, Denver, CO  
3 Director of Research, Highlands-Physician’s St. Luke’s Podiatric Medicine and Surgery Residency Program, Denver, CO  
4 Residency Director, Highlands-Physician’s St. Luke’s Podiatric Medicine and Surgery Residency Program, Denver, CO

Abstract

Cryopreserved osteochondral allografts provide a promising option for the repair of osteochondral defects. The purpose of this case report is to present a surgical technique for repair of an osteochondral defect using fresh cryopreserved allografts. The patient presented to the clinic with complaints of pain, swelling, and bruising of the left first metatarsal area. Diagnosed with an osteochondral defect, the patient was treated using a fresh osteochondral allograft. The surgical procedure was performed under general anesthesia, and the patient tolerated the procedure well. The patient was non-weight-bearing for 2 weeks and then progressed to partial weight-bearing. At 6 months postoperatively, the patient was able to return to all normal activities without restrictions. The case demonstrates the use of fresh cryopreserved allografts for the repair of osteochondral defects. This case report provides evidence that fresh cryopreserved allografts are a viable option for the repair of osteochondral defects.

Case Report

A 34-year-old female presented with pain and swelling of the first metatarsal head of the left foot. She had recently injured her left first metatarsal head while playing tennis, and the pain persisted for several weeks. She presented to the clinic with complaints of pain, swelling, and bruising of the left first metatarsal area. The patient reported immediate pain, swelling, and bruising of the left first MTPJ area. She was treated by another podiatric physician, who placed her in a CAM boot, which she wore for approximately 3 months. She reported relief from pain, swelling, and bruising of the left first MTPJ area. She was treated by another podiatric physician, who placed her in a CAM boot, which she wore for approximately 3 months. She reported relief from pain, swelling, and bruising of the left first MTPJ area.

Introduction

Osteochondral defects (ODDs) are focal areas of articular cartilage and subchondral bone damage that can lead to significant pain, decreased motion, and impaired function. Cartilage restoration techniques have evolved significantly over recent years, and advancements in technology and surgical technique now allow repair of damaged cartilage with autografts and allografts. This case demonstrates the use of a cryopreserved, fresh osteochondral allograft that uses the functional cells and growth factors of the allograft to regenerate chondral tissue and repair an osteochondral defect in the first metatarsal head. At the 14-month follow-up after surgery, the patient had complete resolution of symptoms.

Cryopreserved osteochondral allografts are a viable option for the repair of osteochondral defects. The purpose of this case report is to present a surgical technique for repair of an osteochondral defect using fresh cryopreserved allografts. The patient presented to the clinic with complaints of pain, swelling, and bruising of the left first metatarsal area. Diagnosed with an osteochondral defect, the patient was treated using a fresh osteochondral allograft. The surgical procedure was performed under general anesthesia, and the patient tolerated the procedure well. The patient was non-weight-bearing for 2 weeks and then progressed to partial weight-bearing. At 6 months postoperatively, the patient was able to return to all normal activities without restrictions. The case demonstrates the use of fresh cryopreserved allografts for the repair of osteochondral defects. This case report provides evidence that fresh cryopreserved allografts are a viable option for the repair of osteochondral defects.

Procedure

The surgical technique involved the patient positioned on the operative table in the supine position. The procedure was performed under general anesthesia and local anesthesia was obtained about the left foot. A sterile ankle tourniquet was applied at 250 mmHg and a linear incision was made on the dorsal aspect of the left first MTPJ. Next, standard osteochondral drilling was performed and the osteochondral lesion was identified. The lesion measured approximately 4-6 mm in diameter and 10-12 mm in depth. The subchondral bone was debrided to allow the cartilage graft to sit flush with the native cartilage. A layer of fibrin glue was then placed at the base of the lesion and allowed to partially dry (Fig. 4). Next, the allograft graft was placed within the osteochondral lesion site (Fig. 6). An additional layer of fibrin glue was placed on the superior surface of the graft and allowed to completely dry (Fig. 7). The wound was then flushed and closed in a standard layered technique. Postoperatively, the patient was kept non-weight-bearing in a posterior splint for 2 weeks followed by partial weight-bearing in the CAM boot as tolerated. At 6 months postoperatively, the patient was able to return to all normal activities without restrictions.

Discussion

Cryopreserved osteochondral allografts maintain viable chondrocytes and osteoblasts along with mineralized matrix. This case report demonstrates the use of fresh cryopreserved osteochondral allografts for the repair of an osteochondral defect in the first metatarsal head. The patient reported complete resolution of pain, swelling, and bruising at 6 months postoperatively. The surgical technique involved the patient positioned on the operative table in the supine position. The procedure was performed under general anesthesia and local anesthesia was obtained about the left foot. A sterile ankle tourniquet was applied at 250 mmHg and a linear incision was made on the dorsal aspect of the left first MTPJ. Next, standard osteochondral drilling was performed and the osteochondral lesion was identified. The lesion measured approximately 4-6 mm in diameter and 10-12 mm in depth. The subchondral bone was debrided to allow the cartilage graft to sit flush with the native cartilage. A layer of fibrin glue was then placed at the base of the lesion and allowed to partially dry (Fig. 4). Next, the allograft graft was placed within the osteochondral lesion site (Fig. 6). An additional layer of fibrin glue was placed on the superior surface of the graft and allowed to completely dry (Fig. 7). The wound was then flushed and closed in a standard layered technique. Postoperatively, the patient was kept non-weight-bearing in a posterior splint for 2 weeks followed by partial weight-bearing in the CAM boot as tolerated. At 6 months postoperatively, the patient was able to return to all normal activities without restrictions.

References