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TECHNIQUE

Patellofemoral Osteochondral Autologous Transfer

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ABSTRACT

Osteochondral autograft transfer is a cartilage repair technique in which an osteochondral plug is transferred from an area of less contact pressure to the full-thickness, focal chondral defect. Although the osteochondral autograft transfer has been described for the treatment of femoral condylar chondral lesions, the application to the patellofemoral joint has not been described. The purpose of the article is to describe the technical aspects involved in osteochondral autograft transfer for isolated chondral lesions of the patella.
Keywords: osteochondral autograft, patellofemoral joint

HISTORICAL PERSPECTIVE

Focal patellar chondral lesions in the knee joint have been treated with a multitude of techniques, including abrasion chondroplasty,[1,2] subchondral drilling,[3,4] and microfracture[5,6] in the past; however, patellofemoral chondromalacia has historically been difficult to provide reliable and consistent symptomatic relief. The emergence of autologous osteochondral transplant has provided an alternative treatment option that has been demonstrated to be effective in isolated femoral condyle lesions.[7] Patellar osteochondral lesions are best visualized by magnetic resonance imaging (MRI; Fig. 1) and have technical challenges that make these lesions different from condylar lesions. These challenges include (1) multiplane articular surface, (2) hard sclerotic subchondral bone that requires reaming, and (3) inability to arthroscopically treat and requires an open procedure. In this section, the technique for proper autologous osteochondral transplant for an isolated patellar lesion will be described.

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Patient is positioned supine on the operating room table, and a nonsterile tourniquet is placed on the proximal thigh but not inflated at this time. The leg is prepared with povidone iodine (Betadine) and then draped in standard surgical fashion. Physical examination under anesthesia is performed to assess range of motion, patella tracking, and ligament stability.

An Esmarch bandage is used to exsanguinate the lower extremity, and the tourniquet is inflated to 350 mm Hg. Using a no. 10 scalpel blade, a standard parapatellar incision is made, beginning at the inferior pole of the patella and ending at the superolateral border of the patella staying just distal to the vastus lateralis. The incision is carried down through the lateral retinaculum. Once the arthrotomy is complete, the patella is everted, and the articular surface is meticulously examined to characterize the location, size, and Outerbridge grade of the chondral and subchondral pathology (Fig. 2A).

Recipient Site Preparation

Using the osteochondral autograft transfer system (OATS, Arthrex, Inc, Naples, Fla), a guidewire is drilled in the central portion of the cartilage defect, making sure to be perpendicular to the articular surface (Fig. 2B), and the appropriately sized flat acorn reamer is carried down to the subchondral bone of anterior cortex over the guidewire (Fig. 2C). A punch guide with a diameter that is large enough to encompass the chondral defect in its entirety is selected. The recipient punch guide is tapped down to the subchondral surface of the patella (Fig. 3A), a curette is used to clean up the defect of any remaining bone (Fig. 3B), and the depth of the osteochondral plug is measured (Fig. 3C).

Donor Site Preparation

The donor site should be harvested from areas of less contact pressure, and studies have shown that the superior aspect of the lateral trochlea or intercondylar notch experiences less pressure than other articular surfaces.[8]

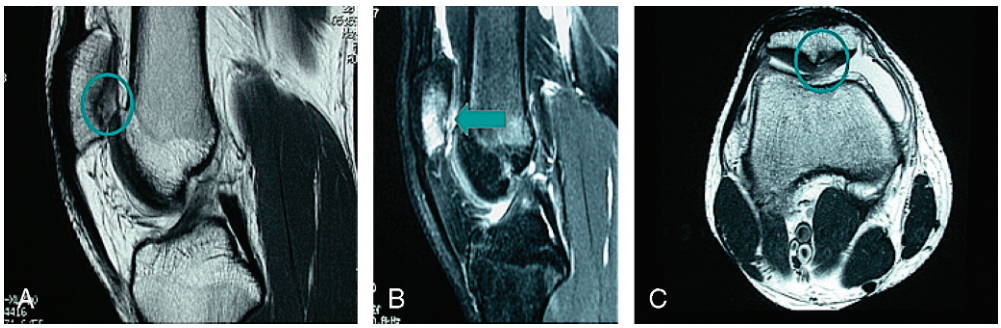

FIGURE 1. MRI images of osteochondral lesion of the patella. **(A)** Sagittal T1-weighted MRI showing loss of articular cartilage of the patella. **(B)** Sagittal fat suppression MRI showing edema of the underlying bone. **(C)** Axial view MRI showing osteochondral lesion of the medial facet.

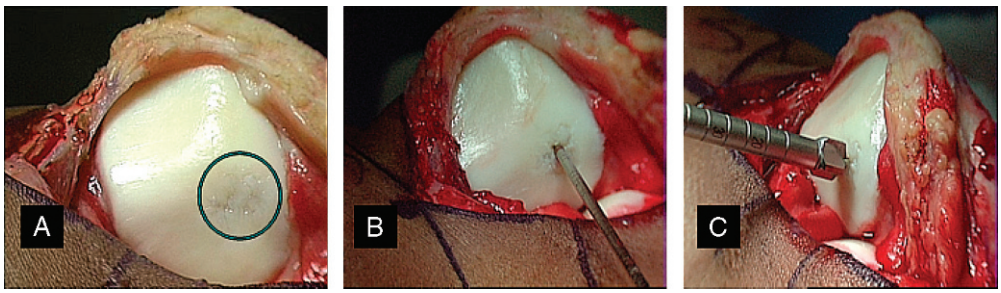

FIGURE 2. Initial assessment and drilling of lesion. **(A)** Chondral lesion of the medial facet of the patella. **(B)** Insertion of guide pin perpendicular to the plane of the articular cartilage. **(C)** Drilling of the lesion with a flat acorn reamer and stop at the far cortex.

Using the donor punch guide of the same diameter, the guide is malleted down to the same depth as the recipient plug, and the plug is removed (Fig. 4A).

Although the lateral trochlea and intercondylar notch are recommended donor sites, these areas are not free from contact pressure, and the donor sites may be painful or stiff or may degenerate.[9] TruFit CB biosynthetic plugs (Osteobiologics, Inc, San Antonio, TX) consist of polylactide-co-glycolide, calcium sulfate, and polyglycolide fibers. The same diameter as the donor site is selected. The plug applicator is assembled, and the back of the applicator is inserted into the donor site defect to determine the depth. The amount of the cylindrical biosynthetic plug that protrudes from the applicator is the depth of the donor site and is cut with the knife (Fig. 5A). The biosynthetic plug is then press-fit into the donor site and contours with the surrounding surface (Fig. 5B).

Placement of Donor Plug into the Patellar Defect

The donor osteochondral plug can be press-fit into the recipient site and gently impacted with a mallet until continuous with the surrounding articular surface

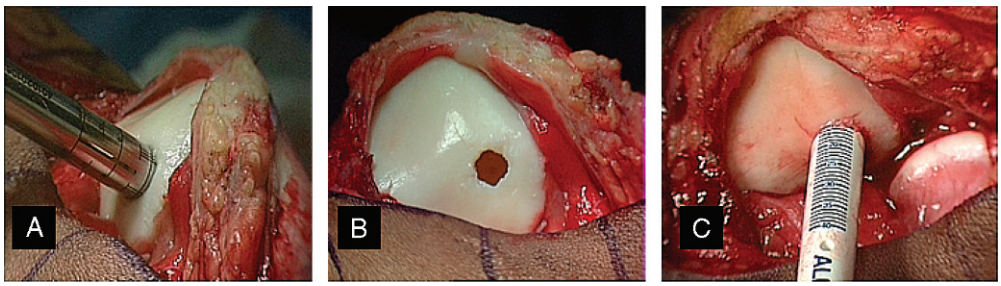

FIGURE 3. Completion of defect and depth measurement. **(A)** Insertion of cannulated chisel to remove excess bone. **(B)** Final defect after removal with chisel and debris removal with curette. **(C)** Record depth of defect.

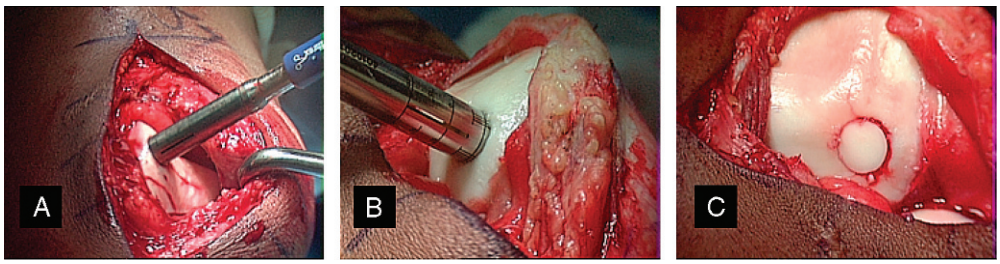

FIGURE 4. Harvest osteochondral plug and placement of plug in the patella. **(A)** Removal of appropriately sized osteochondral plug from the superior lateral portion of the lateral femoral condyle based on previous measurements. **(B)** Cannulated insertion guide for placement of osteochondral plug. **(C)** Final result with osteochondral plug in place on the medial facet of the patella.

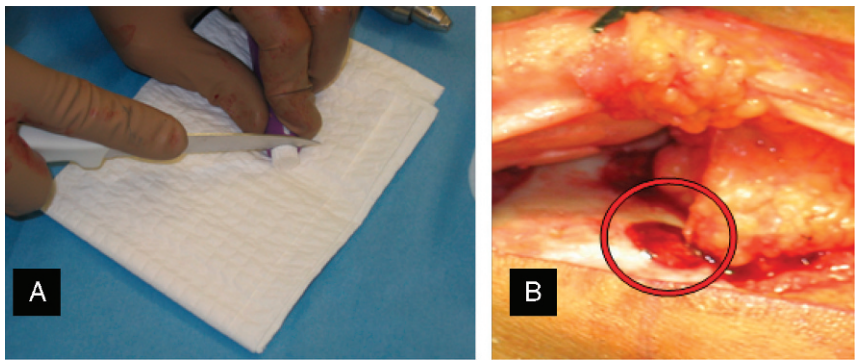

FIGURE 5. Biosynthetic plug. **(A)** Measure the depth of the donor site lesion with the applicator, and cut the TruFit CB biosynthetic plugs (Osteobiologics, Inc) to the measured depth. **(B)** Biosynthetic plug used to backfill the lateral trochlea donor site.

(Fig. 4B). It is important that the plug does not alter the overall contour of the facet with the final product (Fig. 4C) in line with the surrounding articular cartilage.

The patella is confirmed to be well seated in the central ridge without excessive tilt or translation. The tourniquet is taken down, and adequate hemostasis is achieved. The wound is copiously irrigated with normal saline. The parapatellar arthrotomy is generally closed with 0 Vicryl suture (Ethicon, Inc, Somerville, NJ), but the lateral retinacular release can be preserved if the patellofemoral joint appears to be overloaded. The subcutaneous tissue is reapproximated with 2-0 Vicryl suture, and the overlying skin is closed with subcuticular 2-0 Prolene sutures (Ethicon, Inc). A sterile gauze dressing followed by a Robert Jones bulky cotton dressing overwrapped with an ACE bandage is applied. A hinged knee brace (Bledsoe Brace Systems, Grand Prairie, TX) is placed on the operative lower extremity.

POSTOPERATIVE MANAGEMENT

The patient should receive adequate analgesia and begin continuous passive motion in the recovery room. The continuous passive motion is initially set to a range of 0 degree of extension and 60 degrees of flexion, and the settings may be advanced as tolerated to a goal of at least 90 degrees of flexion. The patient should be toe-touch weight bearing and may ambulate with the assistance of crutches. At the 6-week postoperative visit, the patient is advanced to full weight bearing out of the brace. Patients should continue physical therapy with an emphasis on quadriceps strengthening and open chain knee extension exercises.

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