
Surgical Technique: Arthroscopic Labral Reconstruction Using Iliotibial Band Autograft or Allograft

95

Marc J. Philippon and Dominic Carreira

Contents

Introduction	1157
Indications	1158
Graft Choice	1158
Arthroscopic Technique	1158
Autograft Technique	1158
Allograft Technique (Carreira Shuttle Technique)	1159
Summary	1162
References	1163

Abstract

Labral tears cannot always be repaired. When the labrum tear is complex or previous debridement has left limited function tissue, labral reconstruction is indicated. Labral reconstruction of the hip has been demonstrated to be a safe and effective technique, with high patient satisfaction rates, improved pain, and improved patient outcome scores. Tissue for the labral reconstruction can be either autografts or allografts. This chapter described labral reconstructions using iliotibial band autograft and allograft.

Introduction

The treatment of labral tears of the hip has evolved rapidly as a better understanding of the outcomes of various procedures has been gained. During the earlier stages of the evolution of hip arthroscopy, labral debridements demonstrated good to excellent outcomes in 62 % of cases at mean follow-up of 8.4 years [1]. More recently, several studies have demonstrated improved outcomes in patients with repairs when compared to debridements [2–5]. However, similar to the meniscus of the knee, when the labrum tear is complex and cannot be repaired or previous debridement has left limited function tissue, debridement or repair is not an option. Labral reconstruction of the hip has been demonstrated to be a safe and effective technique, with high patient satisfaction rates,

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M.J. Philippon (✉)

Department of Hip Arthroscopy, Center for Outcomes-based Orthopaedic Research, Steadman Philippon Research Institute, Vail, CO, USA
e-mail: drphilippon@sprivail.org

D. Carreira

Broward Health Imperial Point, Orthopedic Surgery – Foot and Ankle, Broward Health Medical Center, Fort Lauderdale, FL, USA
e-mail: dcarreira@gmail.com

improved pain, and improved patient outcome scores [6–9]. In this chapter, two all-arthroscopic techniques for reconstruction of the labrum are presented, utilizing autograft or allograft fascia lata.

Indications

The type and extent of tearing contribute to the ability to repair the tissue, with more complex and radial tears considered a relative indication. A greater extent of degeneration, typically demonstrated by yellowish discoloration and friability of the tissue, also is a relative indication for reconstruction. Other factors include the extent of bruising, the extent of instability, and the size of the tissue before (hypoplasia) and after debridement to stable tissue. Commonly, reconstruction is performed in the setting of previous hip arthroscopy and labral debridement.

Graft Choice

The advantages and disadvantages of allograft versus autograft tissue are similar to other reconstructive procedures in sports medicine. In the case of the hip, the labrum does not serve as a ligament resisting stress, but increases the surface area of articulation on the side of the acetabulum and creates a suction seal for improved joint mechanics. Advantages of autograft tissue compared to allograft include cost and the avoidance of the risk of disease transmission. Other potential advantages include speed of graft incorporation and the avoidance of sterile reactions to allograft tissue. Potential disadvantages of autograft tissue include donor site morbidity (pain and infection) and time in surgery.

Arthroscopic Technique

Regional anesthesia in the form of lumbar plexus block or epidural block may be administered for perioperative analgesia. Patients are placed on a fracture table in a supine position, and traction is

placed with the operative hip flexed 10° and neutral abduction/adduction and with the contralateral leg placed in 40° abduction. Paralysis is maintained while the patient is in traction. Standard arthroscopic portals are established atraumatically: the anterolateral portal first and the midanterior portal under direct visualization with needle guidance.

A diagnostic arthroscopy is performed and a capsulotomy is routinely performed. Associated pathologies are identified and treated, which include rim trimming and/or femoral osteoplasty for FAI, debridement of ligamentum teres tears, removal of synovitis, removal of loose bodies, and articular cartilage debridement or microfracture. The size of cartilage lesion at the chondrolabral junction can be reduced when performing the rim trimming (Fig. 1). Using a probe, the quality and stability of the labral tissue is examined as well as the extent of damage. Reconstruction of the labral tissue may extend up to the 3 (right) or 9 (left) o'clock position anteromedially and to the 8 (right) or 4 (left) o'clock position posterolaterally. Once native, healthy tissue has been established at the anteromedial and posterolateral extents, the damaged segment in between may be removed using a beaver blade and shavers. A border of native labral tissue is necessary to help create a suction seal once the reconstructed labrum is fixated (Fig. 2). It is not always necessary to suture between the native and reconstructed labrum in order to create a suction seal; however, this may be determined during a dynamic exam after the graft is in place. After removal of the labral tissue, rim trimming (Fig. 3) and treatment of the articular cartilage during labral reconstruction are facilitated with improved visualization.

Autograft Technique

Upon completion of the diagnostic arthroscopy and confirmation that the labrum is not repairable, the remnant labrum is resected, the acetabular rim is prepared with a mechanical burr, and the defect site is measured. The graft is harvested with the leg in extension through a longitudinal incision

Fig. 1 An articular cartilage lesion at the chondral labral junction (*arrow*). The overall size of the lesion was decreased by the rim trimming

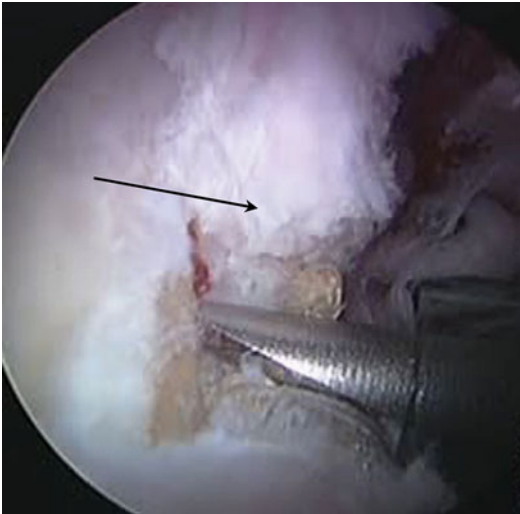
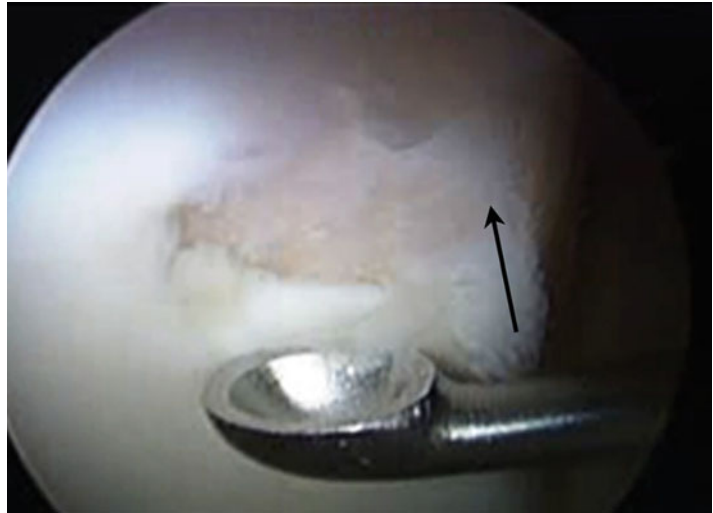


Fig. 2 After debridement of deficient labrum, a border of healthy native labrum (*arrow*) is the starting point for anchoring the graft

centered over the greater trochanter. A graft, measuring approximately 60 mm by 15 mm, is harvested from the central and posterior third of the iliotibial band. The length of the graft is determined by the size of the defect. Unless tension is seen in the iliotibial band, the defect is typically closed. A suture anchor is placed at the anterior-most aspect of the defect. The graft is tubularized and advanced into the joint through the midanterior portal (Fig. 4). A suture anchor is then placed at the posterior aspect of the defect

and the graft is secured. Suture anchors are then placed along the graft to ensure stability and apposition of the graft (Fig. 5). Sutures can be looped around the graft or passed through the graft. Sutures looped through the graft tend to evert the labrum and sutures passed through the labrum tend to invert it. Using a combination of these sutures to manage the position of the graft results in better restoration of the suction seal. Traction is released and a dynamic exam is performed to ensure the suction seal has been restored. The dynamic exam should include moving the hip through full range of motion to ensure adequate seal (Fig. 6). If the graft appears unstable, additional suture anchors can be placed.

Allograft Technique (Carreira Shuttle Technique)

For this allograft technique, an accessory distal portal is created for the shuttling of allograft tissue and for anteromedial anchor placement. The fascia lata is tubularized on a back table using a baseball stitch with 2-0 Vicryl (Fig. 7).

Key steps:

1. A percutaneous anchor is placed through the accessory distal portal (ADP) at the anteromedial extent of the labrum reconstruction. This anchor is placed with a striped suture

Fig. 3 Prepared rim for labral reconstruction. With no labrum the rim trimming can be done with increased precision

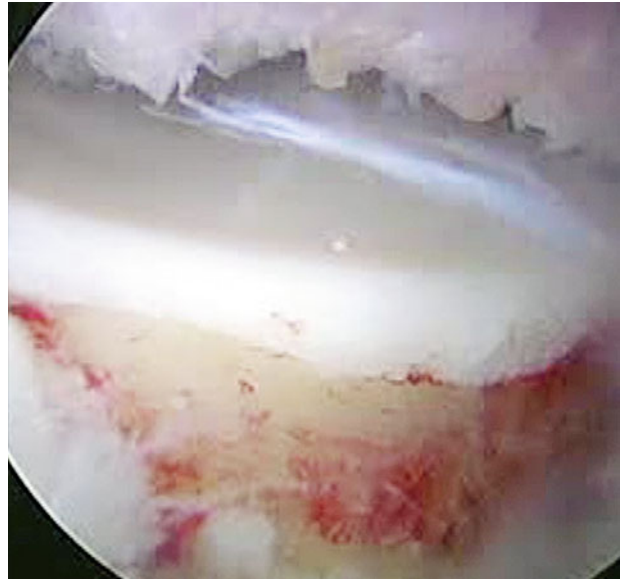


Fig. 4 The tubularized autograft coming into the joint through the midanterior portal



- to allow for measuring of the length of the defect once the second anchor has been placed.
2. While visualizing from the midanterior portal (MAP), a second anchor is placed through a labral repair cannula at the anterolateral portal (ALP) at the posterolateral extent of the reconstruction. This suture is clamped with a hemostat to provide tension on the suture to prevent suture crossing.

One of the sutures from the anteromedial anchor is passed through the ALP. Using a knot pusher, the limb from the anteromedial anchor located in the ALP is used to measure the number of crossing lines between the two anchors. The overall length can then be calculated. For example, if the length between the stripes on the suture is 3 mm and the 10 stripes are counted between anchors, the chord length is 30 mm.

Fig. 5 Suture anchors placed along the acetabular rim to secure graft in place

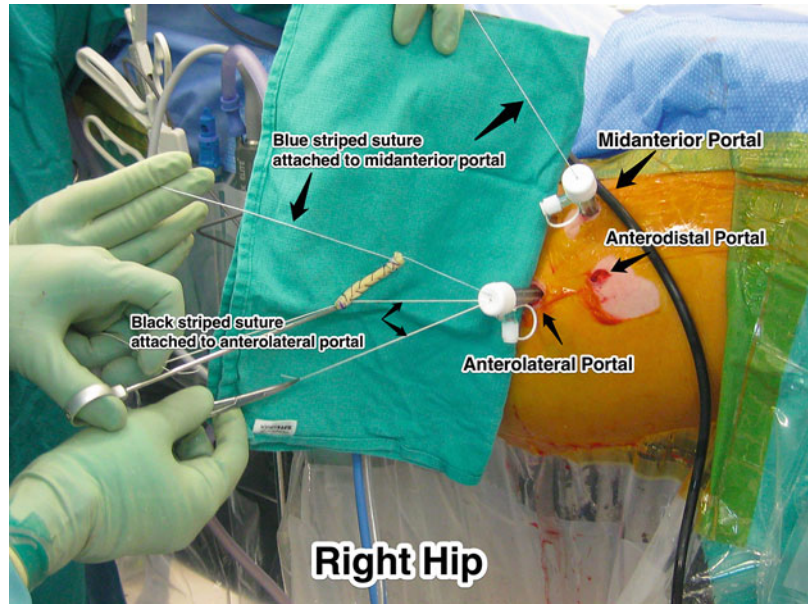


Fig. 6 Arthroscopic view of the dynamic exam. The labral autograft recreates the seal with the femoral head

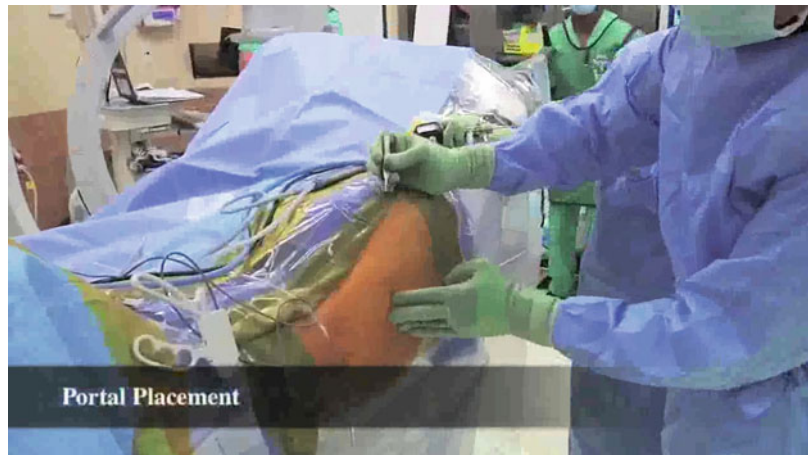


- The chord length is then multiplied by 1.3 to determine the arc length, i.e., the graft length.
3. The camera is then placed in the ADP portal; a second labral repair cannula is placed at the MAP. The limb of suture from the percutaneous anchor placement is then passed into the labral repair cannula in the MAP. A free needle is used to pass the suture material through the graft outside of the joint. One limb from each suture anchor passing through the ALP is tied securely to the graft, allowing enough length of suture material to allow for suture tying.
 4. The limb from the MAP portal is pulled and the graft is introduced halfway into the joint. Prior to fully seating the anteromedial extent of the graft, sutures are visualized to make sure they are not crossed. The second limb from the anteromedial anchor is then passed into the MAP. The ends of the labrum reconstruction are tied using a standard knot-tying technique.
 5. Similar to a standard labral repair, the segment in between is secured with suture anchors.

Fig. 7 Setup for the insertion of the labral allograft



Video 1 Labrum Allograft Reconstruction Technique (Carreira Shuttle Technique)



A video of the labrum allograft reconstruction technique (Carreira Shuttle Technique) is provided online (Video 1).

Summary

Labral reconstruction is indicated when the type and extent of tearing do not allow the labrum to be repaired, as with more complex and radial tears. The advantages and disadvantages of allograft

versus autograft tissue are similar to other reconstructive procedures in sports medicine. The remnant labrum is resected, the acetabular rim is prepared with a burr, and the size of the graft needed is measured. The graft is harvested, prepared, and sutured into the defect. A dynamic exam is performed to show the graft is stable. Labral reconstruction is a technical procedure which has shown excellent midterm follow-up. Although there are no current published outcomes using an allograft, it is a viable option in many cases.

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