Arthroscopic treatment for chondral lesions of the hip is very challenging. William Hunter FRS (23 May 1718–30 March 1783), a Scottish anatomist and physician, said “if we consult the standard chirurgical writers from Hippocrates down to the present age, we shall find, that an ulcerated cartilage is universally allowed to be a very troublesome disease; that it admits of a cure with more difficulty than carious bone; and that, when destroyed, it is not recovered.”

Understanding the etiology is paramount not only in treating hip chondral damage but also in mitigating the cause, using arthroscopic means. For the purposes of this article, the authors address chondral lesions of the hip caused by either injury or morphologic conflicts such as seen in femoroacetabular impingement (FAI). Fractures, aseptic necrosis, and metabolic or immunologic damage are not addressed. Only those methods using arthroscopic surgery for the treatment of chondral lesions are presented here.

THE CHALLENGE OF HIP ARTHROSCOPY

The treatment of chondral lesions of the hip joint presents many difficulties, considering the hip joint is deep in the body and is a spherical joint. Although modern instruments can gain access to most of the hip joint, the treatment of chondral lesions is limited to excision, debridement, microfracture, and radiofrequency treatment. Because cartilage is friable, it does not lend itself to suturing techniques to repair it back to bone unless in the case of acetabular articular cartilage, when it is intact at the labrocartilage junction. In the latter, the cartilage may be repaired, demonstrated later in this article. Advanced methods of repair involve rim trimming and labral refixation to the rim, and relocation to cover articular defects.
Access to the entire hip has not always been achieved even with high-angle scopes and steerable instruments, because of the variance in morphology and stiffness of the capsule and muscles. Therefore, this article discusses only the arthroscopic treatment of those areas that are accessible using current methods.

**Joint Preservation**

Hip preservation has become one of the hottest topics in orthopedics today as we have become aware of small changes in the normal anatomy of the hip that may lead to labral and chondral damage. Although joint preservation has been advocated in the young and active for many years, with the recognition of morphologic conflicts such as FAI, and the acknowledgment that FAI may cause early arthritis and lead to early total hip replacement, the role of both open and arthroscopic treatment of the hip have become a mainstay in attempting to correct either injurious or pathologic problems of the hip joint early in its disease. Of note, there are no publications available in the literature nor are there any presentations given at conferences to demonstrate any procedure that is able to mitigate or repair chondral damage and restore a “normal state of being.”

Since the author’s group developed the “lateral approach to hip arthroscopy” in 1984, it has used arthroscopic means to treat chondral damage to the hip joint. The author has never been able to show with certainty that treatments reverse the affects of damage of the articular surface. Many cases, however, have shown improvement of pain and function and the lack of progression of the arthritis on radiographs. The arthroscopic results dramatically improved once the concept of changing the morphologic effects of impingement were initiated in 2002.

This article should be considered as a guide to evaluating chondral defects of both the acetabulum and the femoral head, and give direction on various treatment methods for chondral damage of the hip.

**Special Anatomy**

When treating chondral lesions in the hip, there should be consideration of the influences of the nearby structures including the labrum, the notch with its transverse ligament, the ligamentum teres, and the fovea.

Ferguson and colleagues have shown that the labrum acts as a fluid seal to enable nourishment to the articular cartilage. In a finite element analysis they found that the labrum seal maintains the pressure of the synovial fluid that prevents loss of boundary lubrication or solid-on-solid contact. The loss of that seal apparently leads to further damage of the articular surface.

A poster presentation at the 2010 International Society for Hip Arthroscopy by Field and colleagues showed with a flexed hip how the synovial fluid traveled from the low-pressure peripheral compartment to the high-pressure central compartment beneath the transverse ligament and notch, with the zona orbicularis acting as a bellow.

In a biomechanical study of the notch, it was found that the size of the acetabular notch with relationship to the femoral head allows for the head to consistently seat in the horseshoe-shaped acetabulum allowing for appropriate contact forces. Moreover, with concentric narrowing of the notch such as from osteophytes or excessive volume of the notch such as congenital anomalies, the femoral head cartilage might wear prematurely, due to the increased force contact on the articular surface. There are entities in which absence of complete closure of the triradiate cartilage, leaving chondral defects and abnormalities such as a keyhole deformity or stellate lesions, may be associated with chondral injury and premature damage of the head (Fig. 1).
The Anatomy of Cartilage of the Hip

The anatomy of the cartilage in the hip is not different from cartilage in any other joint with the exception of a variation of thickness of the acetabular and femoral sides. In addition, the thickness varies over the surface of the acetabulum and over the femoral head. Hyaline cartilage is divided into 3 layers. The most superficial layer or tangential layer comprises 10% to 20% of the cartilage, with fibers arranged in arcuate layers. The next layer beneath is the middle zone that provides the bulk of the articular volume at 40% to 60%. The fibers are radially oriented. The deepest layer comprises 30% of the bulk of the cartilage and is just superficial to the tidemark of calcified cartilage, which is laminated to the subchondral bone. Many if not most of the lesions seen in the hip are at the level of the tidemark.

Types of Chondral Injury to the Hip Joint

The femoral head
In the absence of fractures of the hip joint, injuries may occur to the articular cartilage, with hip dislocation and impaction injuries sustained, for example, by an athlete when falling on his or her side, causing an osteochondral lesion of the femoral head, as shown by Byrd. The lesion may be mistaken for aseptic necrosis.

Arthroscopic excision of the fragment may be all that is necessary; however, the long-term result of leaving the defect in the head is unknown. With large defects, some have considered filling with osteochondral plugs or partial head replacements (Fig. 2).

The acetabulum
From 1984 to 2002, most chondral lesions treated with hip arthroscopy by the author’s group were debrided, excised, or abraded (Fig. 3). In the early years, many chondral lesions were mistaken for labral lesions. When looked at retrospectively there are

Fig. 1. Head damage and notch osteophyte excision. The head appears damaged by the fossa osteophyte. The radiofrequency (RF) probe is used to remove the soft tissue of the notch. A combination of arthroscopic burrs, curettes, and microfracture awls are used to remove the osteophyte and deepen the fossa.
reports on labral lesions and tears that are actually peripheral articular cartilage lesions or tears of the labrocartilage junction of the acetabulum.

Since 2002, with the advent of arthroscopic treatment for FAI, most chondral lesions are seen to be arise as a result of morphologic conflicts between an aspherical head and an overcovered rim. Prior to 2002 similar lesions were regarded as due to osteophytes and “rim syndrome.” The author has since more precisely recognized the fine details involved with damage at the labrocartilage junction of the acetabulum, discussed later in this article (Fig. 4).

**History and physical examination**
Cartilage lesions may be diagnosed prior to any diagnostic imaging by taking a proper history and doing a proper physical examination. There also needs to be an understanding of Hilton’s law, which essentially states that the sensation of a joint is transmitted through the muscles that cross the affected joint. An understanding of Hilton’s
law will explain why hip joint pain is referred to many areas about the hip. Most chondral and labral lesions may be felt as anterior groin pain; however, it also may be felt as pain referred to the trochanter and to the buttock area. On occasion it may be felt medially and along the adductor muscles and be mistaken for an inguinal hernia.

Chondral lesions may cause pain during certain activities or positions of the hip, similar to pain from labral lesions. Many patients complain of groin pain while sitting, felt anteriorly, and there may be some posterior lateral sensation of pain as well. With partial delamination or blistering of the articular cartilage of the acetabulum, the patient may feel a pinch anteriorly as seen with FAI or pain on rising from a seated position to a standing position. With blister-type delamination or full-thickness acetabular articular cartilage delamination defects, patients may complain of popping or clunking perceived anteriorly or anterior-laterally over the tensor fascia lata. The clunking or pop may be confused with a snapping iliopsoas. The difference between the two is that the iliopsoas will usually snap 100% of the time, whereas a cartilage defect will only intermittently snap or pop. The snapping iliopsoas will nearly always occur when bringing the flexed hip into extension, with hearing and feeling a pop or snap.

Patients with cartilage delamination or peel-off chondral lesions causing a large flap may occasionally feel a buckling or locking of the hip.

During the physical examination of the hip for chondral lesions, the workup may be confused by labral lesions. Conflicts between the femoral head and acetabulum may reveal a reduction in rotational movements, especially internal rotation. With partial-thickness cartilage lesions on the femoral head or acetabulum a “straight leg raising against resistance test” (which causes large compressive force across the articular surfaces) is usually negative, causing no groin pain. When there is a full-thickness articular cartilage defect down to subchondral bone, the same test may be quite painful in the groin. The patient feels the compressive forces that are not buffered by intact articular cartilage.

When performing the “impingement test,” which consists of flexion of the hip to approximately 90° and rotating the hip from external to internal rotation and adduction, the lesion may be mapped out showing the extent of the acetabular articular cartilage defect. The patient is asked to complain at the onset of pain with flexion and internal rotation. In most cases on a right hip, the lesions occur from 1 to 4 o’clock or in zones 1 and 2. With intact blistered articular cartilage, the pain may be reproduced by bringing
the hip down to more extension and internally rotating it at 6 o’clock, bringing it back up to 12 o’clock, and the patient will complain of pain at about 4 o’clock. When the articular cartilage is fragmented or there are flaps, often the pain is felt more clockwise than counterclockwise, or vice versa, depending on the flap orientation (Fig. 5).

**Imaging**
Radiographs are routinely obtained as the first study. The amount of acetabular coverage or dysplasia as well as conflicts with the head-neck junction may be evaluated with simple radiographs. These images include a low anteroposterior (AP) radiograph of the pelvis, with the coccyx seen to be less than 2 cm away from the pubic symphysis for proper pelvic orientation. A proper analysis of the joint spaces as well as the acetabular orientation and coverage may be determined. In addition, frog-leg and/or across-table laterals may show abnormalities of the head-neck junctional morphology.

Computed tomography (CT) is useful to map bony typographical anatomy, especially when treating FAI. The author cautions the use of CT because of the radiation exposure, though newer CT scanners lessen this concern. CT is beneficial, however, when looking for osteochondral lesions of the femoral head and loose bodies.

The author’s group consistently uses magnetic resonance imaging (MRI) with and without arthrography for evaluating the articular cartilage as well as labral lesions. Subtle damage to the chondral surfaces may be seen with either test, depending on the conspicuity of the study. Use of at least a 1.5-T MRI scanner with the use of surface coils over the affected hip is advised so as to demonstrate all chondral lesions. The use of gadolinium may enhance visualization of cartilage lesions, and the use of intra-articular anesthetics may further delineate the hip joint as being the source of the hip pain if the symptoms are abated while anesthesia is present.

At present, new techniques in MRI such as the dGEMRIC (delayed gadolinium-enhanced MRI of cartilage) may emerge as a reliable method to better define cartilage defects.

**Surgical mapping of chondral lesions**
There are several methods with which to map chondral lesions in the hip. The author uses either a simple clock face or a zone method. The clock face anatomically has the 12 o’clock position directly lateral or at the apex position of the notch and the 6 o’clock position directly lateral

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**Fig. 5.** Carpet delamination. The atraumatic tissue elevator is used to probe a full-thickness delamination defect that the labrocartilage junction.
position at the midpoint of the transverse ligament. The 3 o’clock position is medial on a right hip and lateral on a left hip, and 9 o’clock lateral on a right hip and medial on a left hip (Fig. 6).

The use of regional zones such as proposed by Ilizaliturri and colleagues\(^9\) allows for precise description of a lesion’s position. The author has found that most cartilage lesions from direct damage due to morphologic conflicts resulting from FAI are in zones 1, 2 and 3, whereas the indirect damage is in zones 4 and 5, such as a counter-coup lesions associated with Cam type FAI (Fig. 7).

**Classification of femoral head lesions**

In the author’s opinion, there are no consistent practical classifications of femoral head lesions of the articular cartilage other than those used for avascular necrosis; however, most damage occurs in zones 2 and 3 near the fovea and superiorly. The damage may be caused from impaction of the head to the notch and/or damage seen from dislocation. Other lesions seen in the femoral head are consistent with damage caused by demarcation zones from FAI, damage from loose bodies, and damage from subchondral cysts secondary to FAI (Fig. 8A, B).

The author’s group has proposed a new method of classifying femoral head cartilage lesions. Higher grades correlate with greater damage and a poorer prognosis. There are 2 special classifications, which include traumatic defects and demarcation zones, of damage from FAI (Box 1).

The prognosis for outcomes after repair is best at the lower grades. More aggressive treatment is necessary as the grade of damage increases. An example is an HC2 lesion, which may be treated with simple whisking of the fibrillated cartilage or thermal debridement, whereas an HC4 may require curettage and microfracture (Fig. 9).

**Classification of acetabular chondral lesions**

The Outerbridge classification\(^10\) of chondral damage has often been used to describe chondromalacic defects in the hip. Beck and colleagues\(^11\) have classified damage of the acetabular articular cartilage (Box 2); however, the author believes it does not guide treatment options.

![Fig. 6. Clock zones method of a right acetabulum. The oldest and most common method of describing locations on the acetabulum is the use of a clock face. The disadvantage of the system is that right and left hips will have different locations on the clock face with regard to the anterior and posterior positions of the defects.](image-url)
The author’s group has proposed a classification for acetabular articular cartilage lesions in an effort to create an algorithm for treatment (Box 3).

Most lesions may be classified as either substance loss of the articular cartilage (partial or full thickness) or delamination. Both types are influenced as to whether there are labrocartilage junction defects or tears. With an intact labrocartilage junction, the cartilage may be repaired with the labrum back to bone as a flap. When the junction is torn the labrum may be repaired, although the cartilage may need excision.

As with the head classification, the higher is the grade of acetabular damage, the more aggressive the treatment. An example of a lower grade defect with an anticipated good outcome is an AC1wD, which the author also calls a “full-thickness acetabular articular cartilage delamination defect” (FAACD). This defect may be treated by elevation of the cartilage defect with a flap of intact labrum, microfracture of the articular sided base bone to stimulate cartilage bonding along with labral refixation to the rim, and trimmed if needed to address a pincer lesion. Although this appears to be a lot of damage, its outcome is probably better than an AC4 where...

**Fig. 7.** Zones system of the acetabulum. The advantage is that description of a particular zone is identical for both right and left hips.

**Fig. 8.** Head demarcation zones. (A) The femoral head articular cartilage is damaged in the area of metaplastic bone overgrowth due to FAI. (B) Specific damage to the femoral head articular cartilage is caused by acetabular rim overgrowth impacting in the area of femoral head neck overgrowth, leaving a trough in the femoral head-neck junction.
a large area of exposed bone may require rim trimming to reduce the size of the defect, and microfracture that typically produces fibrocartilage and labral relocation into the defect. The outcome of the latter is usually poorer and less predictable (Fig.10).

With full-thickness articular cartilage loss that is less than 1 cm², microfracture alone may be of benefit. The author has found that if the cartilage loss is greater than 1 cm², then microfracture may be less effective and the hip will require rim trimming to reduce the size of exposed acetabular subchondral bone. The technique involves

<table>
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<tr>
<th>Box 1</th>
<th>Proposed classification of femoral head cartilage lesions</th>
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<tr>
<td></td>
<td>Intact head substrate bone with chondral damage (no avascular necrosis)</td>
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<tr>
<td></td>
<td>HC 0 = no damage</td>
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<tr>
<td></td>
<td>HC 0T = uniform thinning (T)</td>
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<td></td>
<td>HC 1 = softening</td>
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<td>HC 2 = fibrillation</td>
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<td></td>
<td>HC 3 = exposed bone</td>
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<td></td>
<td>HC 4 = any delamination</td>
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<tr>
<td>Special class:</td>
<td></td>
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<tr>
<td></td>
<td>HTD = traumatic defect (size in mm)</td>
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<td></td>
<td>HDZ = demarcation zone from FAI</td>
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**Abbreviations:** HC, femoral head cartilage; T, thinning; TD, traumatic defect; DZ, demarcation zone from FAI.

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**Fig. 9.** Head cartilage delamination. The femoral head with nearly full-thickness delamination and fibrillation of the articular cartilage shows the full extent of the damage by probing.
translocation of the labrum into the defect to reduce the surface area required for filling of fibrocartilage.

**Arthroscopic Management of Chondral Lesions**

The usual arthroscopic setup and portals are the same for either supine or lateral approaches. The author advocates the use of an extensive capsulotomy similar to open surgery extending from the base of the neck anterolateral, to proximally on the ilium adjacent to the labrum from the 12 o’clock to 4 o’clock positions. The capsular portion of the labrum is incised so as to leave a small cuff if reattachment becomes necessary (Fig. 11).

Distraction with a capsulotomy requires less force, and the scope may be driven into the central compartment under direct view, which minimizes risk of iatrogenic labral or chondral damage. The lesions are identified and may be palpated with a blunt probe or an atraumatic tissue elevator. Once the lesion is graded, appropriate treatment may be initiated.

The following are examples of methods used by the author’s group to treat chondral lesions.

**Box 2**

Beck classification of damage to cartilage

<table>
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<tr>
<th>Description criteria</th>
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<tr>
<td>Normal: macroscopically sound cartilage</td>
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<tr>
<td>Malacia: roughening of surface, fibrillation</td>
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<tr>
<td>Debonding: loss of fixation to the subchondral bone, macroscopically sound cartilage; carpet phenomenon</td>
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<tr>
<td>Cleavage: loss of fixation to the subchondral bone; frayed edges, thinning of the cartilage, flap</td>
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<tr>
<td>Defect: full-thickness defect</td>
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</table>

**Box 3**

Classification for acetabular articular cartilage lesions

| AC 0 = no damage                            |
| AC 1 = softening no wave sign               |
| AC 1w = softening with wave sign intact labrocartilage junction                       |
| AC 1wTj = softening with wave sign and torn labrocartilage junction                  |
| AC 1wD = softening with wave sign and intact labrocartilage junction with delamination |
| AC 1wTjD = softening with wave sign and torn labrocartilage junction with delamination |
| AC 2 = fibrillation                         |
| AC 2Tj = fibrillation with torn labrocartilage junction                              |
| AC 3 = exposed bone small area <1 cm²      |
| AC 4 = exposed bone large area >1 cm²      |

**Abbreviations:** A, acetabulum; C, cartilage defects; D, with delamination; Tj, Torn labrocartilage junction; w, with wave sign.
Head chondral lesions

HC0 to HC1 may require little to no treatment. HC2 (fibrillation) is treated with debridement. If there are notch osteophytes causing damage to the femoral head, they are removed with a combination of curettes, a long 4-mm hip burr, and microfracture awls (Fig. 12A).

HC4 delamination is treated with debridement and microfracture. Unfortunately, this lesion is difficult to treat because most awls cannot reach the entire lesion the prognosis is poor (see Fig. 12B).

HTD (traumatic defects) are usually the result of a fall on the side of the hip, and may be mistaken for aseptic necrosis. Simple excision of the loose fragment may be all that is necessary (Fig. 13A–D).

Fig. 10. Blistered articular cartilage with LCJ defect. The atraumatic tissue elevator is used to probe effect at the labrocartilage junction. While pushing on the defect, the blistered cartilage elevates off the substrate bone causing a “wave effect.”

Fig. 11. Hip capsulotomy. A capsulotomy similar to an open procedure is done submuscularly using an RF probe; the capsule is incised from the base of the neck near the trochanteric line to proximal cephalad to the labrum on the acetabular rim. The capsulotomy is extended lateral and medial to give exposure to the anterior labroacetabular junction external to zones 1, 2, and 3.
Fig. 12. Head fibrillation debridement and notch. (A) The fibrillated head is associated with mild to moderate arthritic changes of the hip. The RF probe is used to remove an abrasion by damaged cartilage. (B) The full-thickness articular cartilage delamination of the head is treated with abrasion chondroplasty and microfracture with a curved awl.

Fig. 13. Excision of the loose fragment from head. (A) Radiograph of osteochondral lesion femoral head from impaction injury of left hip (arrows). (B) Arthroscopic view of the femoral head and depression at the osteochondral defect. (C) The osteochondral patient has been elevated with an atraumatic tissue elevator. (D) The excised fragment.
The damage to the femoral head causing a demarcation zone is attributed to FAI. Treating the Cam bump may need to be extended to the lesion more medially in order to remove the defect (Fig. 14).

**Acetabular chondral lesions**

AC0 to AC1 essentially require no treatment. AC1w to AC1wTjD are repaired in an almost identical manner with minor variations. The concept is to identify the true lesion, which is a FAACD, first, and then create a milieu that allows for the substrate bone to heal and anneal to the separated cartilage. The same procedure may be done with or without tearing of the labrocartilage junction, except that with the latter, a stable flap of articular cartilage must be established to withstand compression and shearing of the head without being fully fixed (Fig. 15A–J).

AC2 lesions are debrided or excised to bone and may require microfracture. If it is associated with FAI, treatment of the Cam bump may prevent the recurrence and allow for healing.

If the labrocartilage junction is intact then there are several ways to treat this. Tzaveas and Villar\(^1\) have shown that this may be treated by injecting fibrin glue beneath the defect, causing adherence. There have been some reports that the defect may benefit from microfracture through the articular cartilage to obtain a healing response. The author has found that by elevating the full-thickness defect, curetting and microfracturing the acetabular subchondral bone, one may stimulate a fracture healing response beneath the full-thickness cartilage. On a second look at approximately 1 year, improvement of the “wave affect” and the articular cartilage was seen. Symptomatically, patients generally improve with this technique (Fig. 16A–C).

With labrocartilage junction tear and AC2Tj (fibrillation), close attention is required to evaluate for the pincer effect, and excess rim requires rim trimming and labral refixation in addition to debridement.

In the event of the labrocartilage junction being torn, there is one report of sewing the articular cartilage back to the labrum. The author’s group has treated this by excising the unstable portion of the articular cartilage flap and microfracturing behind the remaining flap, as well as performing rim trimming and refixation of the labrum.

**Fig. 14.** Treating the demarcation zone head. The demarcation zone of the femoral head is caused by impaction of the acetabular rim on the head-neck junction. This zone is associated with FAI and is treated with resection osteoplasty. The RF probe is used to remove soft tissue before using the arthroscopic burr.
Fig. 15. Treatment of FAACD with and without LCJ tear. (A) Outside view showing the arthroscope is in the anterolateral portal and the shaver is in an anterior portal. (B) Arthroscopic view showing the RF probe taking capsule off the anterior acetabular rim. (C) Arthroscopic view into the central compartment with a distraction. Note the darkened area of cartilage adjacent to the entry labrum, which is the area of full-thickness delamination of the cartilage. (D) Arthroscopic view of the blistered type wave effect. Note the change in color of the articular cartilage at the junction between the blister and the normal cartilage. (E) Arthroscopic view showing the atraumatic tissue elevator elevating the full-thickness acetabular articular cartilage delamination defect away from the subchondral bone. (F) Curettage is used to remove the calcific layer of the subchondral bone. (G) The area of subchondral bone is microfractured to promote healing, to be backside of the acetabular articular cartilage. (H) Using bone anchors and suture relay technique the intact labrocartilage junction is sutured to the acetabular rim at the labrocapsular junction. (I) View from the peripheral compartment after the labrocartilage junction has been refixed to the rim of the acetabulum. Note the demarcation zone of the femoral head that previously impacted the excess rim. (J) Second look in the central compartment. Note a slight bulge in the area of the blister that is now backed up by bone graft from microfracture. The labrocartilage junction remains intact after the procedure.

Fig. 16. Treatment of AC2 fibrillation defect. (A) Arthroscopic view of central compartment of right hip joint showing fibrillated cartilage at the periphery of the acetabulum at the labrocartilage junction. (B) Probing the fibrillated cartilage at the periphery. (C) Debridement of the fibrillated cartilage with the shaver.
In most cases there is a mixture of a full-thickness cartilage loss and a full-thickness articular cartilage delamination, which can be repaired in similar fashion to the previous techniques (Fig. 17A–F).

AC3 and AC4, or less than 1 cm$^2$ of exposed bone may be treated with debridement, and more than 1 cm$^2$ may be treated with microfracture; in the latter it may

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**Fig. 17.** Debridement of acetabular fibrillation, rim trimming, and labral refixation. (A) Arthroscopic view of right hip showing torn acetabular articular cartilage at the labrocartilage junction. (B) View from the peripheral compartment through a capsulotomy showing the excess bone of the anterior acetabulum before rim trimming. (C) Profile view after rim trimming of labral detachment showing extruded cartilage coming out of the central compartment. (D) Damaged articular cartilage being curetted away before microfracture and labral refixation. (E) View from the peripheral compartment before translocating the labrum into the acetabular chondral defect. (F) View from the peripheral compartment showing that the labrocartilage junction has been refixed back to the rim using bone anchors.
be necessary to relocate the labrum into the defect after rim trimming to reduce the overall size of the lesion (Fig. 18).

Postoperative protocol
Most specialists advocate a strict postoperative rehabilitation program with non-weight bearing for 6 to 8 weeks. The author has found no difference in mobilizing the patient immediately and progressing their weight bearing as tolerated, with many off crutches within 2 weeks. Only those physical therapists who have knowledge of conservative hip surgery should be involved. Range of motion, stretching, and core strengthening of the hip are essential; however, it takes weeks to months to reach a steady state. The bone needs a minimum of 6 weeks to primarily heal, and the articular cartilage may take 6 months to 2 years before either fibrocartilage or hyaline cartilage is present and durable enough for sports. Many patients return to some form of recreational activity within 6 months to 1 year; however, absolute pain relief may never be achieved in the majority of patients.

COMPLICATIONS
Although complications, such as infections, fractures, neuropraxias, and avascular necrosis (0.4%), are very low in hip arthroscopic surgery, many clinicians associate poor outcomes with complications. Because we are treating damaged cartilage, which in the purest sense may be considered varied degrees of arthritis of the hip, we must expect older age of an individual to be related to poorer outcome as well as shorter duration of symptom relief after arthroscopy. In fact, most failures that progressed to total hip replacements were anticipated, with the arthroscopic surgery acting as a bridge for those individuals who either did not have enough damage or had a high modified Harris Hip Score. The author’s group treated 2 patients who developed acute chondrolysis, one probably from overload and one due to undiagnosed rheumatoid arthritis.

OUTCOMES
The author’s group has attended to more than 1200 cases with some form of articular cartilage treatment over 26 years. The procedures done currently are vastly different to

Fig. 18. Microfracture small and large defect with and without labral relocation. (A) Arthroscopic view of left hip central compartment showing a grade AC4 lesion before being curetted. (B) Microfracture of the articular cartilage defect.
those done initially. Because of the recognition of FAI and the ability to reshape abnormal morphology, this group is taking on more challenging cases with more damage to the hip joint. The results should be considered anecdotal, and at each period they are checked the average preoperative modified Harris Hip Score is 72 with a postoperative average score of 92. Less than 10% have gone on to total hips occurring 4 months to 7 years after the hip arthroscopy, the average being 53 months.

SUMMARY

The treatment of chondral lesions of the hip are difficult and may not ever reestablish normal chondral anatomy; however, the methods described will predictably improve pain and function of damaged hips. A new method of classifying and treating full-thickness acetabular articular cartilage defects is described, offering a good solution for cartilage repair while attempting to preserve most of the cartilage matrix in the process. It is the author’s belief that the goal should be cartilage preservation, which in turn should lead to a healthier hip joint.

REFERENCES