Osteochondral Lesions of the Tibial Plafond: A Restorative Procedure for Cystic Defects

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Background: Osteochondral lesions of the tibia plafond (OLTPs) are an uncommon problem that can generate pain.

Indications: Arthroscopic techniques can provide symptomatic relief and improved outcomes when conservative management has failed.

Technique Description: We present our arthroscopic technique for managing osteochondral lesions of the distal tibia with subchondral cyst formation. By addressing the lesion with bone marrow aspirate concentrate mixed with micronized cartilage matrix and sealing with fibrin glue, we achieve stable restoration of the osteochondral lesion in a competitive athlete.

Results: This operative intervention has been shown in clinical series to improve American Orthopaedic Foot & Ankle Society ankle-hindfoot scores postoperatively.

Discussion/Conclusion: This restorative procedure for OLTP cystic defects has been shown to produce good to excellent results and is a viable, minimally invasive option in the competitive athlete.

Patient Consent Disclosure Statement: The author(s) attests that consent has been obtained from any patient(s) appearing in this publication. If the individual may be identifiable, the author(s) has included a statement of release or other written form of approval from the patient(s) with this submission for publication.

Keywords: articular cartilage; ankle arthroscopy; osteochondral lesion; biologic augmentation; athlete

VIDEO TRANSCRIPT

Listed here are our disclosures, none are relevant to this talk.

BACKGROUND

Osteochondral lesions of the tibia plafond (OLTPs) are uncommon and can generate pain. Arthroscopic techniques can provide symptomatic relief and improved outcomes.

We present our arthroscopic technique for managing osteochondral lesions of the distal tibia with subchondral cyst formation. By addressing the lesion with bone marrow aspirate concentrate mixed with micronized cartilage matrix and sealing with fibrin glue, we achieve stable restoration of the osteochondral lesion in a competitive athlete.

INDICATIONS

This is a 17-year-old male football player who presented after failed conservative management of left ankle pain after a twisting injury 9 to 10 months prior.

On examination, he has a slightly antalgic gait, with pain when ambulating on tiptoes, heels, and hopping. He has pain to palpation along the anterolateral aspect of the ankle with some pain anteromedially, with no posterior pain, pain in the midfoot, or pain in the forefoot. Range of motion is decreased in this ankle, particularly in inversion and eversion. Strength is slightly decreased at extremes of plantar and dorsiflexion due to pain. The ankle is stable to inversion and eversion stress tests. Neurovascular examination is intact.

Radiographs demonstrate no arthritis or malalignment. There is a subtle irregularity of the lateral aspect of the tibial plafond, so magnetic resonance imaging (MRI) was obtained.

The MRI demonstrates a chronic osteochondral lesion of the lateral tibia plafond measuring 9 × 6 × 7 mm. We

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will routinely obtain a computed tomography (CT) scan to more accurately size the lesion. The CT demonstrates a multiloculated cystic lesion of the lateral tibia plafond measuring 11 × 7 × 3 mm. The size difference between MRI and CT imaging arises because CT eliminates the edema, while MRI measurements often reflect the edema around the lesion.

The axial view demonstrates a centrolateral lesion, based on the quadrant system by Elias et al.[2]

In a recent systematic review by Rikken et al,[4] this is not the most common location for OLTPs. They are most commonly seen centromedial, followed by the anterolateral quadrant.

Indications for surgical management are failure of conservative management, absent arthritis, malalignment, instability, a unipolar lesion, and the patient being of age to tolerate the reconstructive procedure.

TECHNIQUE DESCRIPTION

We begin supine on the operating room table to harvest bone marrow aspirate concentrate. The technique utilizes a percutaneous incision and extraction with a Jamshidi needle under sterile conditions as described by Allahabadi et al.[1] Bone cores may also be obtained by varying passes of the Jamshidi needle and stored on the back table if needed.

We then reposition the patient with a thigh positioner and a heel stirrup with the ankle under distraction. We use ankle distraction in every case, as it creates space to perform the restorative procedure while minimizing the risk of iatrogenic damage to the surrounding cartilage.

A thigh tourniquet is inflated, and this is key for keeping dry visualization during the procedure.

Access is obtained through anteromedial, anterolateral, and posterolateral arthroscopic portals. Fluid inflow is predominantly from the posterolateral portal, but this can also be used as a working portal for debridement. The picture on the right demonstrates our operating room setup.

Here we are with the arthroscopic in place with a probe in the area corresponding to preoperative imaging. Palpation confirms cartilaginous irregularity, and the probe falls in readily with cystic contents expelling from the region. With additional probing, we can see the area that has unstable cartilage that readily peels away. It can be useful to have a 70° arthroscopic available to visualize some lesions.

We will then take a shaver and debride surrounding synovitis, as well as the loose cartilage that was exposed from probing.

Having a dedicated inflow portal vastly helps attain this proper debridement.

A curved curette further debrides the loose cartilage. Care must be taken that we shave these loose fragments so they are not retained in the joint.

We can also use a grasper to retrieve loose cyst contents.

A cup curette is further used to debride the cyst. It is important to release the cystic membrane and evacuate its contents to achieve proper healing.

Here we can see that the lesion can be deeper than it appears from our point of view.

This is a biter that has a suction attached that can tidy up the margins of our lesion.

We will then probe the lesion and, with the markings, obtain official measurements.

Finally, we will take this K-wire to perform bone marrow stimulation. We space these out throughout the lesion. Then we turn off inflow, which allows us to dry the joint completely for the remainder of the procedure. Once the fluid is evacuated, we will take cottonoid swabs and really dry the environment for implantation of cartilage. We can often put a Fraser tip at the end of the cottonoid swab. We then bring in this applicator, which allows us to feed in the micronized cartilage mixed with bone marrow aspirate concentrate. This will first fill the deeper aspects of the lesion, and then we plane this out to the level of the surrounding cartilage with an instrument such as a freer elevator. Once satisfied, we will place fibrin glue in the area and hold traction for 5 minutes as the glue sets. We will then release traction, close the portals with 4-0 nylon, and place the patient in a splint or cast.

RESULTS

Our postoperative management consists of keeping the patient in a short leg splint or cast for 2 weeks. We begin range of motion (ROM) exercises at 2 weeks postoperatively, but the patient remains protected in a removable splint for an additional 2 weeks. During this period, the patient removes the splint 2 to 3 times daily for gentle ROM, focusing primarily on dorsiflexion and plantarflexion. They remain nonweightbearing for 4 weeks, transition to partial weightbearing for 2 weeks, and reach full weightbearing by 6 weeks. Impact activities such as running and jumping are avoided for the first 6 months. We anticipate a return to high-level sports no sooner than 8 to 9 months postoperatively, depending on the patient's progress.

We do not do an additional CT or MRI until 6 to 12 months postoperatively.[5]

DISCUSSION/CONCLUSION

In competitive athletes, we evaluate several factors before determining the surgical timeline, including the severity of the lesion, response to conservative treatment, and the athlete's competition schedule. We aim to balance the need for surgical intervention with the optimal timing to ensure the best recovery and long-term performance.

The outcomes are described by Mologne and Ferkel.[3] They had 17 cases total, wherein 11 were osteochondral lesions of the distal tibia and 6 were bipolar lesions. With a mean follow-up of 44 months, they were able to attain an improvement in American Orthopaedic Foot & Ankle Society score from a preoperative score of 52 to a postoperative score of 87.

These are our references.

Thank you for your attention.

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