

**OLT**

# OLTs

*J Am Acad Orthop Surg 2010;18:*

616-630

- Management is is challenging, given the poor healing potential of articular cartilage and limited access to the ankle joint.
- Arthroscopic procedures (eg, débridement, drilling/microfracture) rely on marrow stimulation to fill the osteochondral defect with fibrocartilage that is not as durable as the native hyaline cartilage.
- Open reconstructive procedures (ie, osteochondral autograft transfer [OAT], autologous chondrocyte implantation [ACI], structural allograft reconstruction) are techniques that fill the defect with near-normal hyaline cartilage.
- However, they are technically demanding, require extensive exposure, and carry a risk of donor site morbidity (autograft) or disease transmission (allograft).

## Indications

- **1. Fail to respond to nonsurgical measures.** (stages I through III) should have a trial of nonsurgical management consisting of immobilization and non–weight bearing.
- **2. Lesions with displaced fragments** (stage IV, and stage III lesions in skeletally mature patients) should be considered for acute surgical management without a trial of nonsurgical treatment because of the low chance of spontaneous resolution.

## Contraindications

- **1. infection and medical comorbidities**
- **2. OLTs associated with diffuse ankle arthrosis**
- **3. In our opinion, ankle malalignment or instability should be surgically corrected at the same time as the OLT is treated.**
- **4. Lesions that are identified incidentally or that are not confirmed to be the source of the symptoms should be managed with observation.**

# Assessment

Diagnostic ankle injection.

If pain does not resolve transiently with intra-articular anesthetic injection, then the contribution of the OLT to the patient's ankle pain is suspect.

After the OLT has been established as a source of pain, it is staged to guide treatment.

MRI is sensitive in detecting OLTs, it often exaggerates the zone of involvement in the talar dome because of its ability to detect associated marrow edema.

CT is important in the treatment decision-making process.

## **Berndt and Harty**

- I     small subchondral compression;
- II    Partial fragment detachment;
- III   Complete fragment detachment without
  - displacement;
- IV,   Complete
  - fragment detachment with displacement.

Ferkel CT-based classification system:

stage I      cystic lesion in the talar dome with an intact roof;

stage IIA    cystic lesion with communication to the talar dome surface;

stage IIB    open articular surface lesion with an nondisplaced fragment

stage III    nondisplaced lesion with lucency;

Stage IV    displaced fragment.

Loomer added stage V to account for an

- OLT with a subchondral cyst.

- Ferkel [arthroscopic]

- grading: A    smooth and intact but soft;

- B,              rough surface;

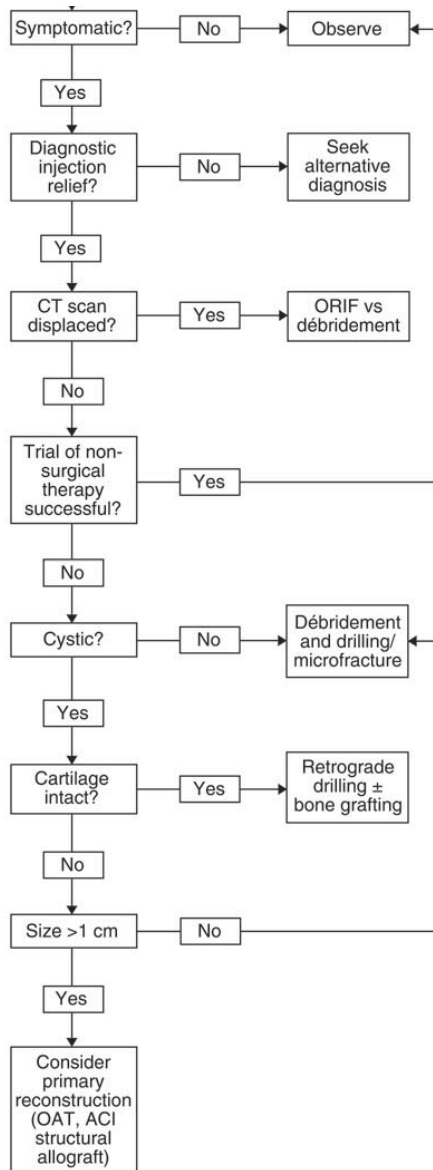
- C,              fibrillation/fissures;

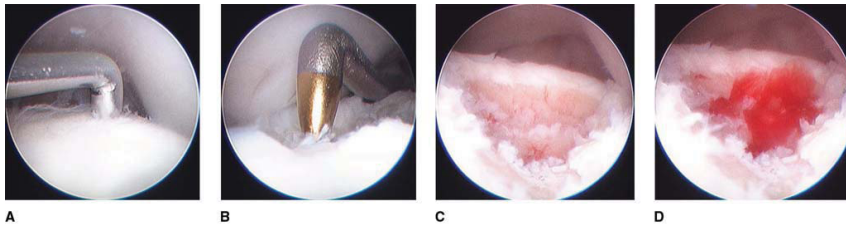
- D,              Flap present or bone exposed;

- E,              loose, nondisplaced fragment;

- F,              displaced fragment.)

# OTL Rx





- Arthroscopic débridement and microfracture. **A, Identification of the osteochondral lesion of the talus with a probe.**
- **B, Following débridement of the lesion, a microfracture awl is used to penetrate the subchondral bone.**
- **C, Completion of débridement and microfracture of the lesion. D, Bleeding through subchondral bone after tourniquet**
- release and stopping inflow. Bleeding from the channels created in the subchondral bone facilitates migration of
- mesenchymal cells into the defect to form fibrocartilage.

# Retrograde Drilling and Bone Grafting

- When diagnostic arthroscopy reveals that the articular surface over the defect is intact and stable, retrograde drilling and, potentially, bone grafting should be employed.<sup>15,16</sup>
- Its definitive location can then be found by probing for cartilage that is slightly softer than the
- surrounding healthy cartilage. The target arm of the Micro Vector guide is then positioned over the defect, and the K-wire is passed through the sinus tarsi and anterolateral talar
- body. Arthroscopic visualization ensures that the articular cartilage is approached but not violated.
- The addition of fluoroscopic guidance will provide the surgeon greater confidence
- When bone grafting is desired, a cannulated drill can be used over the K-wire to establish a larger diameter; a small-diameter curet may be introduced to remove cystic material.
- Finally, bone graft from the distal tibia or calcaneus can be used to fill the defect using the
- bone biopsy instrumentation. Alternatively, a biologic viscous paste of calcium sulfate can be used



# Open reconstructive procedures (eg, OAT, ACI, structural osteochondral)

- Cartilage reconstruction procedures for OLTs are contraindicated in patients with diffuse ankle arthritis, bipolar lesions (ie, “kissing” lesions or osteonecrosis of the talar dome).
- Approach: With the exception of OLTs at the anterior or posterior margins of the talar dome (which can be accessed with anterior or posterior arthrotomy with plantar flexion or dorsiflexion, medial OLTs are accessed via medial malleolar osteotomy, and lateral OLTs are accessed via anterior talofibular ligament/calcaneofibular ligament (ATFL/CFL) release or lateral malleolar osteotomy.

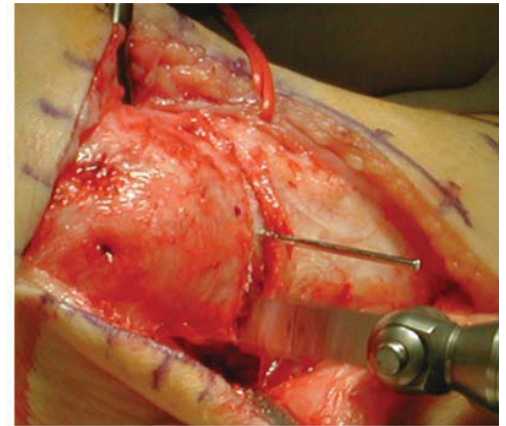
# Approaches for Medial Lesions

- A longitudinal incision is made centered over the medial malleolus. An anterior arthrotomy permits identification of the ankle joint line and may allow visualization of the anterior aspect of the OLT. Posteriorly, the flexor retinaculum is opened, and the posterior tibial tendon (PTT) is identified directly on the posterior tibia.
- The PTT rests in a groove in the posterior aspect of the medial tibia in its own sheath. The flexor digitorum longus tendon lies directly behind the PTT and must not be mistaken for it because the PTT may be injured if it is not retracted before performing the medial malleolar osteotomy.
- The medial malleolar osteotomy is planned to enter the tibial plafond at the lateral extent of the OLT . Under fluoroscopic guidance, a K-wire is placed obliquely in line with, but slightly proximal and medial to, the desired osteotomy so as not to interfere with the passage of the saw or osteotome.
- Prior to creation of the osteotomy, two parallel screw holes for later fixation

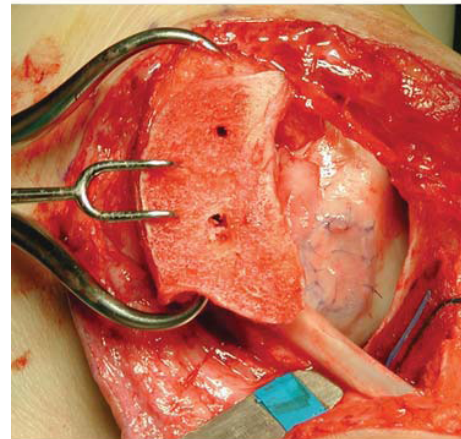
- A microsagittal saw is used to perform the oblique osteotomy to the level of the subchondral bone
- The penetration into the joint is performed with an osteotome
- The medial malleolus is then reflected, suspended by the deltoid ligament.
- To fully displace the medial malleolar fragment, the PTT sheath must be released from the medial malleolus



A



B



C

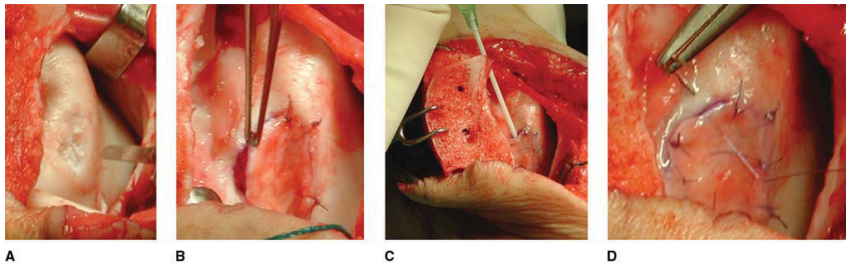


D

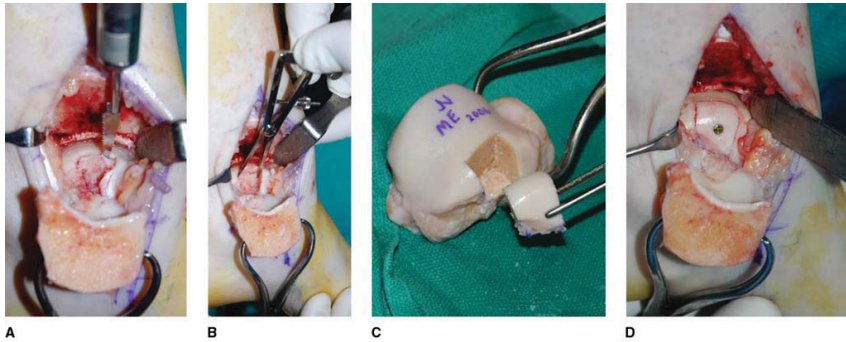
# Approaches for Lateral Lesions

- Often lateral OLTs are associated with lateral ankle instability.
- The modified Broström procedure can be used both to approach the lesion and to stabilize
- A longitudinal incision is made over the distal fibula. The inferior extensor retinaculum is isolated, while the sural nerve and the lateral branch of the superficial peroneal nerve are protected.
- The joint capsule, along with its condensations, the ATFL and CFL, is released while leaving a 1-mm cuff on the distal fibula.
- Plantar flexion and inversion then allow the talus to subluxate anteriorly out of the ankle mortise to expose the OLT.
- The capsule is repaired. We prefer to use suture anchors in the distal fibula
- During tensioning of the repair, the talus must be maintained posteriorly under the plafond, with the ankle in neutral flexion and the hindfoot in slight eversion. Finally, the inferior extensor retinaculum is advanced to the distal fibula to lend greater stability to the repair.<sup>46</sup>
- An alternative to ligament release is fibular osteotomy

- Osteochondral autografting is performed
- as a single-stage operation
- consisting of three steps: recipient
- site preparation, graft harvest, and
- transfer of the osteochondral graft
- into the recipient site.<sup>8,9</sup> Options for
- graft sizes range from 6 to 10 mm,
- and multiple grafts may be harvested
- to resurface and physiologically contour
- defects >10 mm (mosaicplasty).
- The osteochondral graft can be taken
- from a non–weight-bearing portion
- of the ipsilateral knee or from an allograft
- talus.



- Autologous chondrocyte implantation. **A, Exposure of medial talus osteochondral lesion of the talus (OLT) with a**
- medial malleolar osteotomy is followed by débridement of the lesion. **B, The periosteal flap, with the cambium layer**
- directed toward the defect, has been secured circumferentially to the stable walls of the OLT. **C, An opening is left**
- through which to inject the chondrocyte suspension. **D, The last suture is placed in the periosteal flap to contain the**
- chondrocytes. Fibrin glue is used to seal the periosteal flap.



- Fresh osteochondral allograft reconstruction.  
**A, Preparation of the lesion with reciprocating saw. B, Sizing of the defect. C, The allograft talus and harvested osteochondral graft sized to match the defect. D, The final appearance,**
- following screw fixation.

# Results

- In a meta-analysis of management of OLTs, Tol found that good to-excellent results are achieved in 45% of those treated nonsurgically, in 38% of those treated with excision alone, in 78% of those treated with excision and curettage, and in 85% of those treated with excision and drilling.
- Second-look arthroscopy has shown that normal or near normal cartilage is restored by microfracture in only 60% of patients
- The results of Kumai et al<sup>27</sup> for drilling OLTs were most favorable in younger patients with traumatic lesions and a short interval between injury and drilling. Becher and Thermann<sup>20</sup>
- reported on the outcome of microfracture and found no correlation with patient age or grade or location of the defect; however, degenerative posttraumatic lesions with arthrosis had less satisfactory results.
- Choi found that only defect size and not patient age, duration of symptoms, trauma, associated lesions, or the location of lesions correlated with successful outcome.



# Ankle sprain and OLT.

Foot Ankle Clin N Am 14  
(2009) 215–227

- One of the common diagnoses associated with ankle injury is osteochondral lesions of the talus (OLT).

Lippert and colleagues<sup>4</sup> described a 7% incidence of osteochondral lesion after chronic ankle sprains in 962 patients.

- In other study The results of acute ankle arthroscopy in a series of acute ankle sprains revealed a medial talar chondral lesion in 66% of cases

**Table 1**  
**Results of arthroscopic debridement based on diagnosis**

Diagnosis	Procedure	2-Year Follow-up	<i>P</i> value
OLT	3.2 ± 3.1	7.8 ± 3.2	0.0002
Soft tissue impingement	4.3 ± 3.7	8.8 ± 3.4	0.02
Anterior bony impingement	3.1 ± 3.7	7.7 ± 3	0.008
Lateral plica	4.1 ± 2.1	8.7 ± 3.7	0.20
Postfracture scar	3.1 ± 3.3	5.3 ± 3.2	0.14
OA/chondromalacia	2.8 ± 3.3	4.3 ± 3.1	0.31
PVNS	3.7	3.6	NS
WCB	4.1 ± 3.7	4.3 ± 4.1	0.90

A retrospective study on 108 ankle sprains, Labovitz looked at the

- incidence, location, pattern, and age of occult osseous injuries after ankle sprains.
- The MRI findings showed bone bruises in 39%.

The investigation

- Posteromedial or anterolateral locations are most common. The sensitivity of routine radiography is 50% to 75%,
- Bone scan is 99% sensitive.
- CT scan may be useful for bony anatomy and location of the lesion.
- MRI is indicated if radiographic results are normal;
- it may give information regarding vascularity, healing, and cartilage integrity.

# Loomer classification

- cystic lesions (Fig. 1):
- Stage 1: subchondral compression (edema)
- Stage 2: incomplete fracture, undisplaced
- Stage 3: complete fracture, undisplaced
- Stage 4: displaced fragment
- Stage 5: radiolucent (fibrous) defect, roof intact

# Pritsch: arthroscopic

- Stage 1: intact, shiny cartilage
- Stage 2: intact but soft
- Stage 3: frayed cartilage
- The overall indications for repair can be restricted to the cases of a large lesion ( $> 35\%$  talar dome surface area) with a cartilage surface intact

# CONTROVERSIES

- An asymptomatic finding on radiography/CT/MRI or bone scan remains controversial but at this point is generally left untreated.
- Posterior lesions—whether posteromedial or lateral—that are difficult to access arthroscopically from a supine and anterior approach need a posterior approach or malleolar osteotomy or prone posterior arthroscopy
- Combined mechanical instability and OLT occur often. In general if the symptoms are predominantly pain from the lesion, treatment of the lesion alone is satisfactory; however, if instability is symptomatic, treatment of OLT and instability is necessary.
- If debridement fails and chronic pain continues after excision, it is necessary to rule out and treat other contributing causes (associated lesions, impingement), treat instability, assess the joint overload at area of lesion

# Articular Resurfacing

- In general, indication for surgical treatment of these lesions is failure of nonoperative management
- In athletes with acute ankle sprains and displaced osteochondral lesions, one may elect early arthroscopic excision
- Indication for articular resurfacing is failure of excision with curettage or drilling. In circumstances in which there is a large bony defect or lesions larger than 15 mm, one may elect a primary resurfacing technique versus excision and debridement.

# MOSAICPLASTY

- Hangody popularized this technique by taking osteochondral plugs from the ipsilateral knee to the ankle. Treated for detached lesions larger than 10 mm.
- Malleolar osteotomy was performed in some cases. Postoperatively, patients were managed with 2 weeks of casting (4 weeks with osteotomy).
- The results were 28 excellent, 6 good, 2 fair. 100% full range of motion was reached by 8 weeks in all cases, and no knee complaints were reported.
- Generally they are most commonly indicated for medial lesions.
- Athletes who have failed conservative treatment or excision and curettage need further treatment.
- My preference is not to take plugs larger than 6 mm from the lateral anterior femoral condyle trochlear ridge .



# AUTOLOGOUS CHONDROCYTE IMPLANTATION

- The technique of autologous chondrocyte implantation **has not had a large experience** in ankles of athletes.
- The results increased from 10 poor and 1 fair (preoperative) to 3 excellent, 6 good, and 2 fair (postoperative).

# OSTEOCHONDRAL ALLOGRAFT

- Osteochondral allograft transplantation provides mature hyaline cartilage with living chondrocytes with structural support to the osteochondral defect. In contrast to

# SUMMARY

- OLT are a common cause of disability after an ankle sprain. Strategies in management are evolving.
- Excision and debridement (curettage or drilling) continue to be the mainstay of initial surgical treatment. Articular resurfacing options continue to be popular and continue to improve.
- The role of autologous or allograft osteochondral resurfacing needs further investigation.
- For athletes with these difficult lesions, careful evaluation and appropriate operative or nonoperative treatment can allow return to play after 3 to 6 months.

## OCT. *Am J Sports Med* 2009 37: 1974

- Conclusion: Initial defect size is an important and easily obtainable prognostic factor in osteochondral lesions of the talus and so may serve as a basis for preoperative surgical decisions.
- A cut off point exists regarding the risk of clinical failure at a defect area of approximately 150 mm<sup>2</sup> as calculated from magnetic resonance imaging.