
Osteochondral Lesions of the Talus

w/ Dr. Kennedy



Epidemiology

- History of ankle sprains/ fracture
- Medial talar dome lesions- more posterior + deeper
- Lateral talar dome lesions- traumatic history, smaller, more central/ anterior



Etiology

- Inversion + dorsiflexion injury to lateral talus
- May also be due to repetitive microtraumatic events



History & Physical

- Ankle pain, catching/ locking
- Joint effusion, cavus hindfoot alignment, limited motion



Imaging

- Xrays- AP, lateral, mortise
- CT- helpful in locating cysts
- MRI



Non-op treatment

- Immobilization + NWB
- 50% fail w/ conservative treatment



Operative treatment

- BMS, retrograde drilling, osteochondral autografts, osteochondral allografts
- Adjuvants: Biologic agents (PRP), scaffold-based therapy, CMBA



Bone Marrow Stimulation

- Indications: lesions up to 150mm², or 15mm diameter)
- Steps: debride unstable cartilage + necrotic bone, debride calcified layer, penetrate subchondral bone plate w/ microfracture pick or small diameter drill
- Mesenchymal stem cell-proliferation
- Fibrous cartilage infill

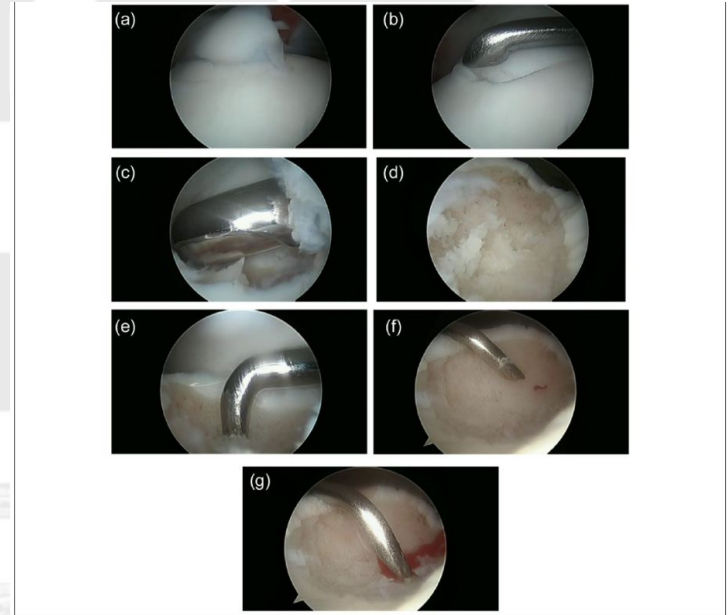


Figure 1. (a-d) Unstable cartilage, necrotic bone, and the calcified layer of cartilage are debrided using an angled curette and a motorized suction shaver until the stable rim of the remaining cartilage is exposed. (e) Bone marrow stimulation (BMS) is performed using a microfracture pic or drill to penetrate the subchondral bone plate. (f) Blood from the created holes is confirmed when inflow pressure of saline is decreased or stopped. (g) Biologics can be injected into the bed of the lesion, precisely at the site of the defect.

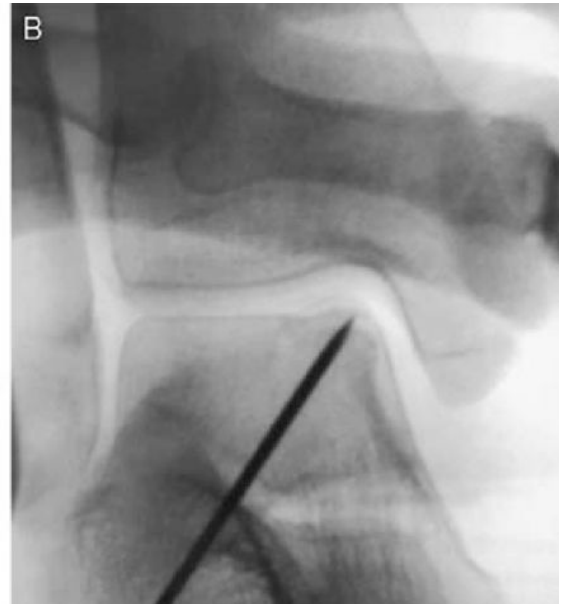
Bone Marrow Stimulation Outcomes

- 85% achieve good to excellent results
- Downfall: deterioration of fibrous cartilage infill
 - Fibrous cartilage mechanically inferior to hyaline cartilage
 - Type 1 cartilage is seen 1 year post op (starts out as fibrin clot + type II cartilage)



Arthroscopy w/ Retrograde drilling

- Cartilage cap should be intact
- K wire drilled from sinus tarsi into the defect
- Cannulated drill bit over wire +/- bone grafting



Autologous osteochondral transplantation

- Insertion of a cylindrical autologous osteochondral graft
- Use of a non-weight bearing portion of ipsilateral femoral condyle
- Steps: malleolar osteotomy, BMS to health bone, lesions removal + overdrilling, graft harvest, plug insertion

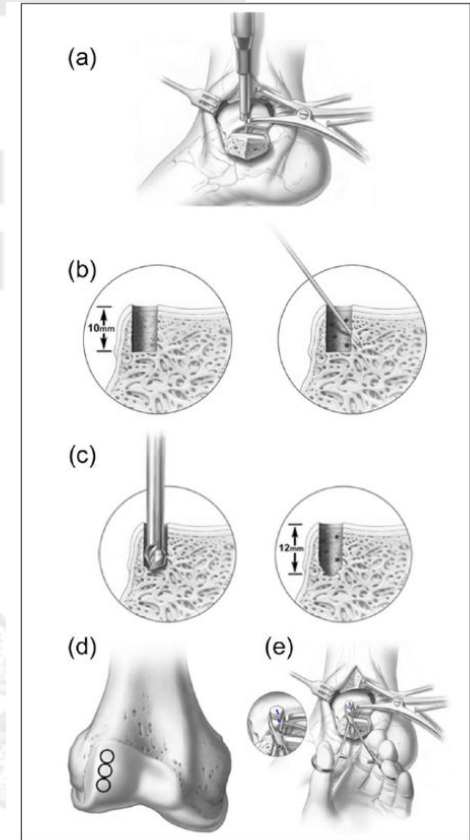
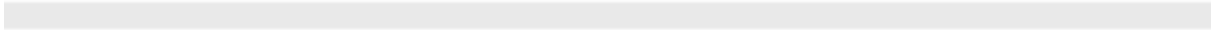


Figure 2. (a) Tibial chevron osteotomy is performed to provide direct visualization of the lesion. (b) Bone marrow stimulation (BMS) is performed in the surrounding healthy bone. (c) Overdrill is applied to make the created recipient site slightly longer than the harvested graft. (d) The osteochondral graft is harvested from a non-weightbearing portion of the

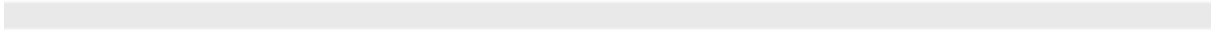
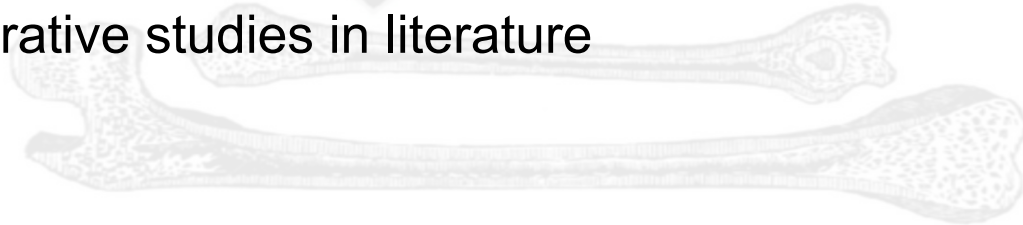
OCA (auto) outcomes

- Results: 87% good to excellent
- 63-95% athlete return to previous level of activity
- Disadvantage: poor integration, cyst formation around graft, cartilage deterioration, nonunion risk
 - Knee cartilage contains cytokines not always seen in ankle cartilage (MMP-8)



Augmentation- PRP

- Platelets contain growth factors + cytokines that participate in tissue healing,
- Blood is drawn > centrifuged
- Studies show: PRP used as adjuvant increased: MSC proliferation, proteoglycan deposition, type II collagen deposition, and inhibition of catabolic systems
- Few comparative studies in literature

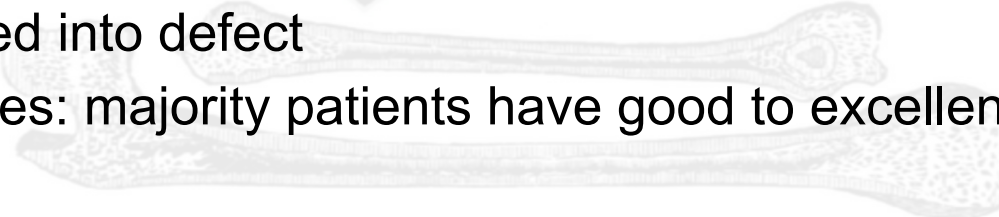


Concentrated Bone Marrow Aspirate

- Reservoir of MSCs, growth factors, and cytokines that improve quality of cartilage repair tissue

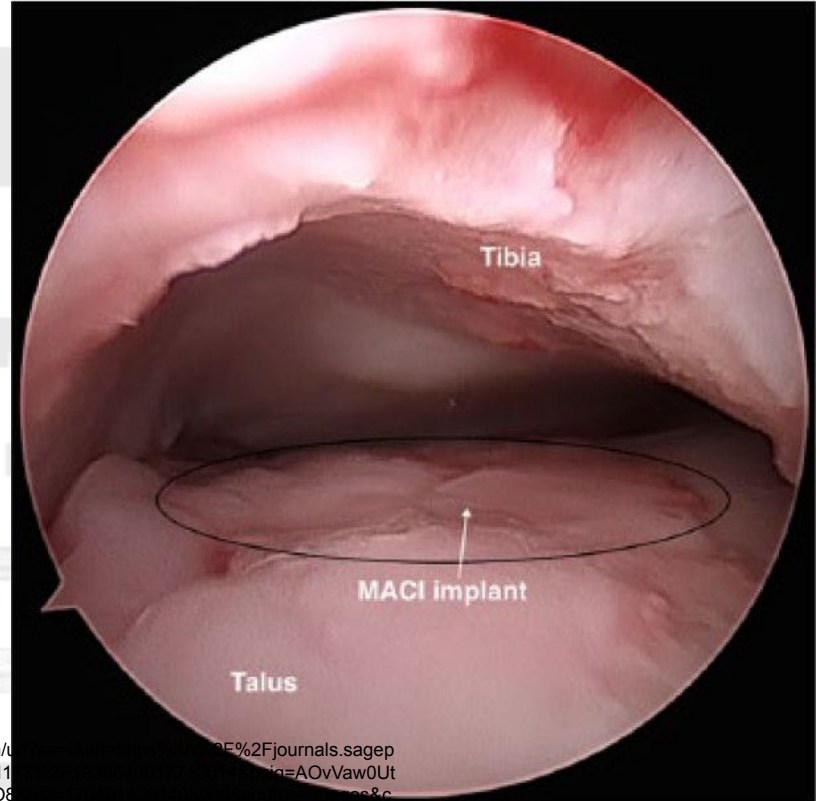


Scaffolds- MACI

- Matrix induced autologous chondrocyte implantation- 2 stage operative procedure
 - Stage 1, chondrocytes are biopsied and cultured over several weeks
 - Stage 2- chondrocytes are seeded in a scaffold containing type I/III collage, hyaluronan, and polyglycolic/ polylactic acid & implanted into defect
 - Outcomes: majority patients have good to excellent results
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Autologous matrix induced chondrogenesis

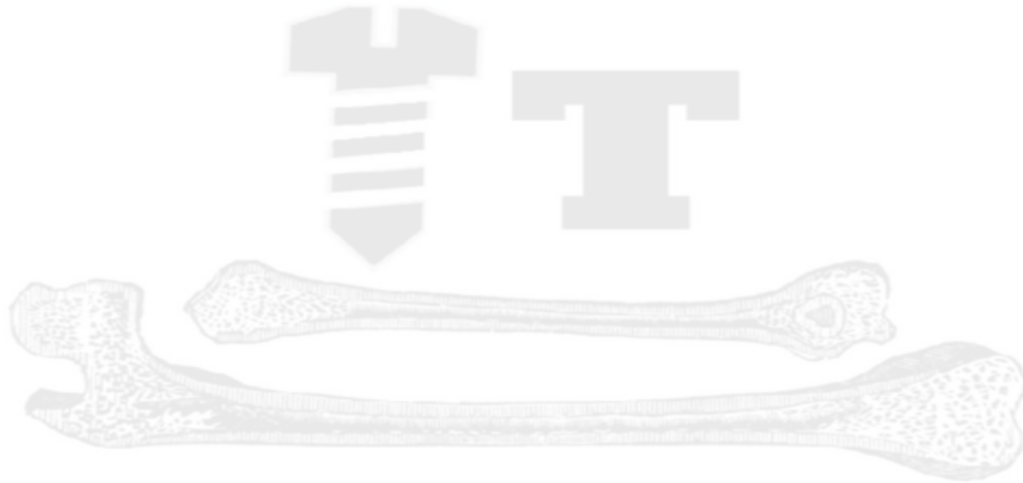
- 1 stage scaffold based therapy
- Acellular collagen I/II matrix is used to cover lesion following BMS



<https://www.google.com/ub.com%2Fdoi%2F10.11aS2SsW5afkYES6xBcO8d=vfe&opi=89978449&ved=0CBIQJRxqFwoTCLi9qOic0YMDFQAAAAA dAAAAABA1>

Bone marrow derived cells transplantation

- combination of CBMA & scaffold material used to fill defect



Sources, Thank you Dr. Kennedy!

- Yasui, Y., Wollstein, A., Murawski, C. D., & Kennedy, J. G. (2017). Operative treatment for osteochondral lesions of the talus: biologics and scaffold-based therapy. *Cartilage*, 8(1), 42-49.

