

Osteochondral lesions of Talus

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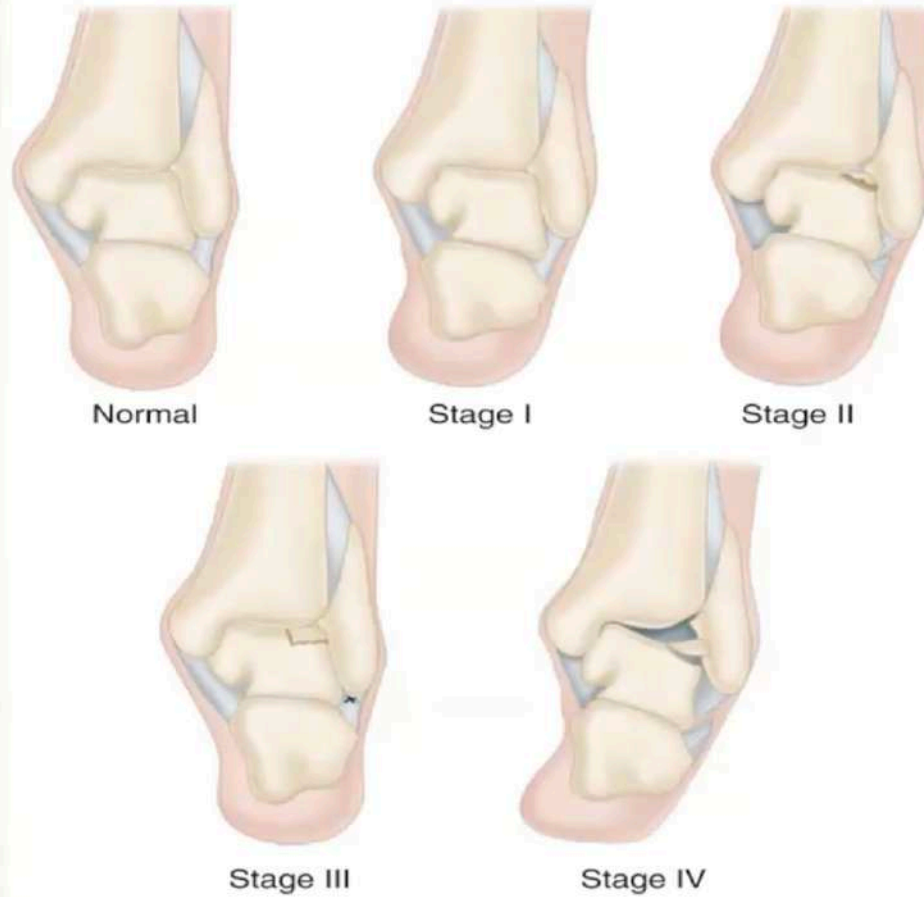



KONIG (1888) – Osteochondritis Dissecans

KAPPIS (1922) – Osteochondritis Dissecans of Ankle

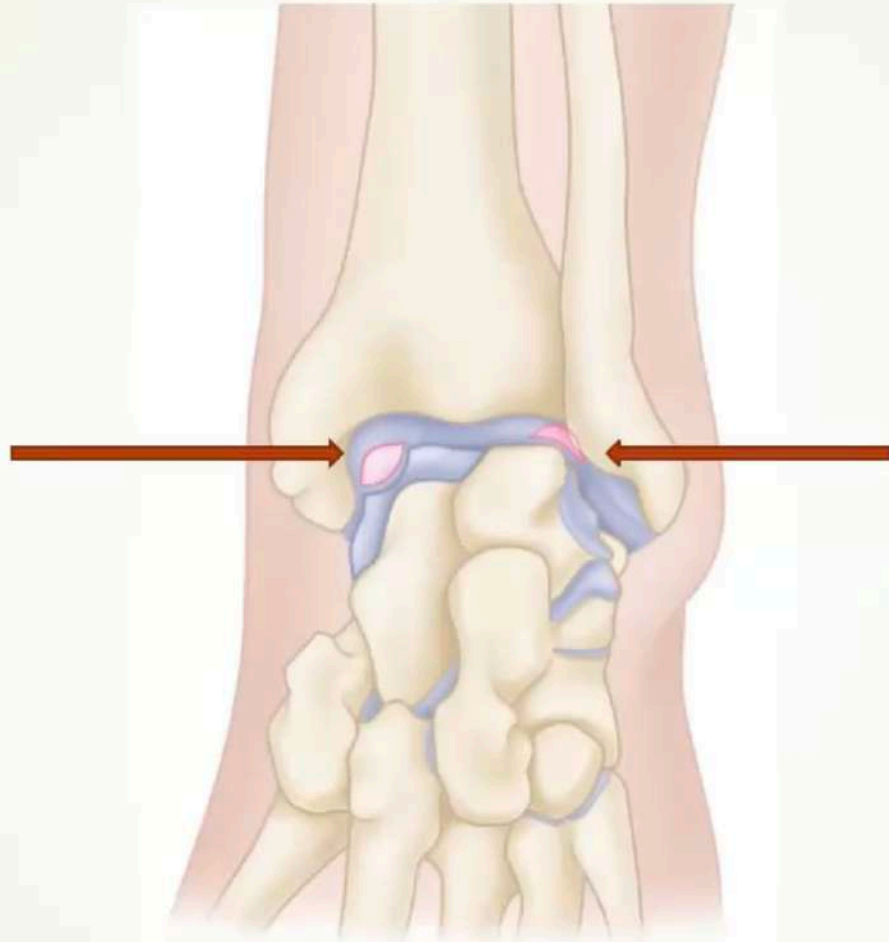
BERNDT & HARTY (1959) – Transchondral Fracture and Classification

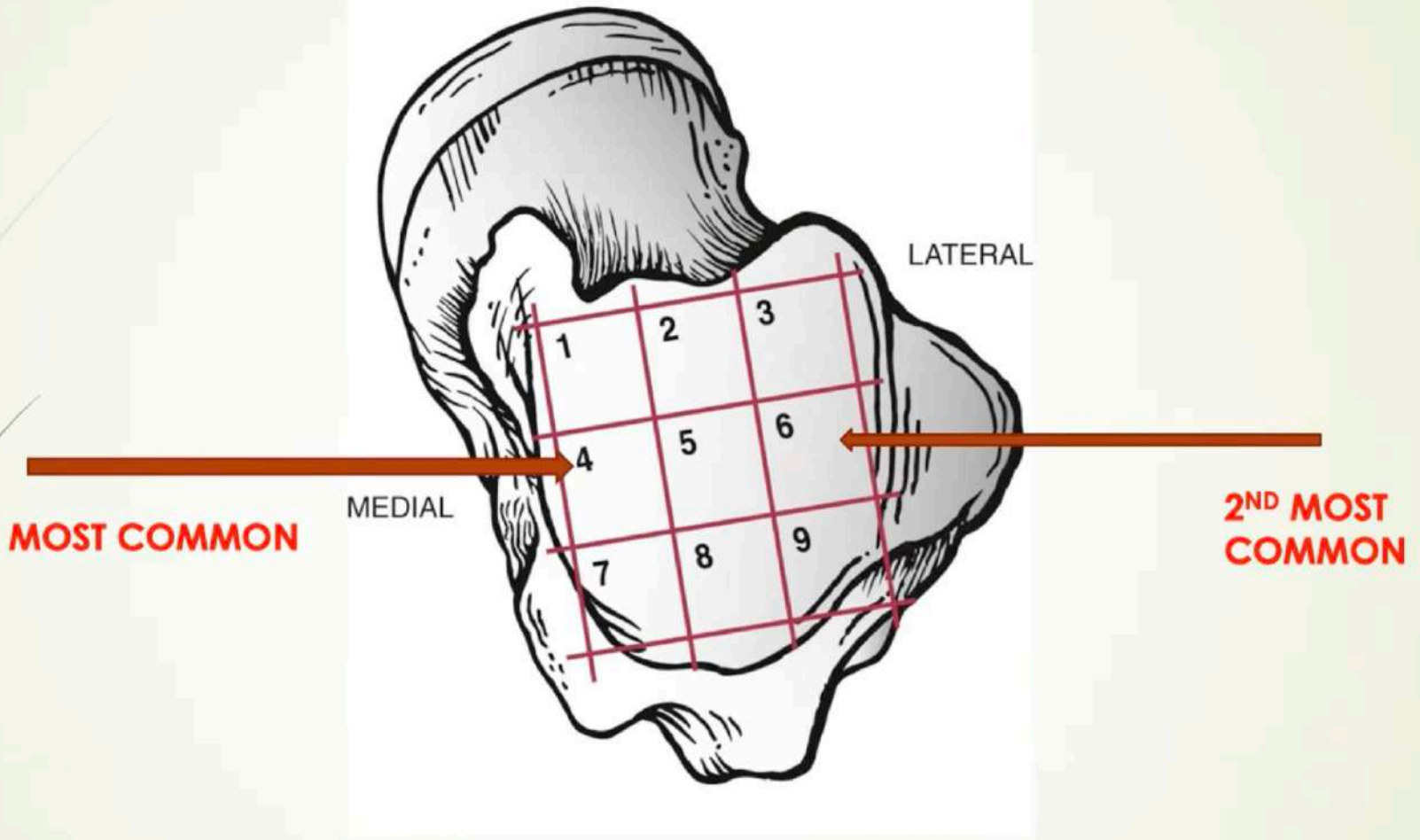
CLASSIFICATION- TYPE BASED





MEDIAL LESION	LATERAL LESION
MORE COMMON	LESS COMMON
INVERSION, PF , LATERAL ROTATION OF TIBIA ON TALUS	INVERSION , STRONG DF
MORE POSTERIOR	MORE ANTERIOR
DEEPER AND CUP SHAPED	SHALLOW AND WAFER SHAPED
MOSTLY NON DISPLACED	MOSTLY DISPLACED







CAUSES

- ▶ **OSTEONECROSIS**
- ▶ **SYSTEMIC VASCULOPATHIES**
- ▶ **ACUTE TRAUMA**
- ▶ **CHRONIC MICROTRAUMA**
- ▶ **ENDOCRINE/ METABOLIC FACTORS**
- ▶ **MALALIGNMENT**
- ▶ **GENETIC PREDISPOSITION**

HIGH SUSPICION

4 % OF ALL OCD

IN UPTO 50% OF ACUTE ANKLE SPRAIN AND FRACTURES

>50% ARE MISSED AND MARKED "SPRAIN"



DIAGNOSIS

OBLIQUE & PLANTAR VIEWS

- ▶ HIGH INDEX OF SUSPICION (MODE OF INJURY)
- ▶ SPORTS INJURY – EARS UP!!
- ▶ CHRONIC ANKLE PAIN AND INSTABILITY
- ▶ PERSISTENT EFFUSION
- ▶ DELAYED SYNOVITIS
- ▶ LOCKING OR GIVING WAY OF JOINT
- ▶ RADIOGRAPHS

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- ▶ RADIOGRAPHS
- ▶ TECHNETIUM BONE SCAN
- ▶ CT



OBLIQUE & PLANTAR VIEWS

HIGH SUSCPICIO

2 MMCUTS – AXIAL/CORONAL
WITH CONTRAST







CLASSIFICATION SYSTEM- RADIOLOGICAL

PLAIN RADIOGRAPHS

BRENDT & HARTY (1959)

- I:** Compressed
- II:** Chip avulsed but attached
- III:** Chip detached but undisplaced
- IV:** Chip detached and displaced

LOOMER ET AL. (1993)

- V:** Radiolucent cystic lesion seen on CT



CT

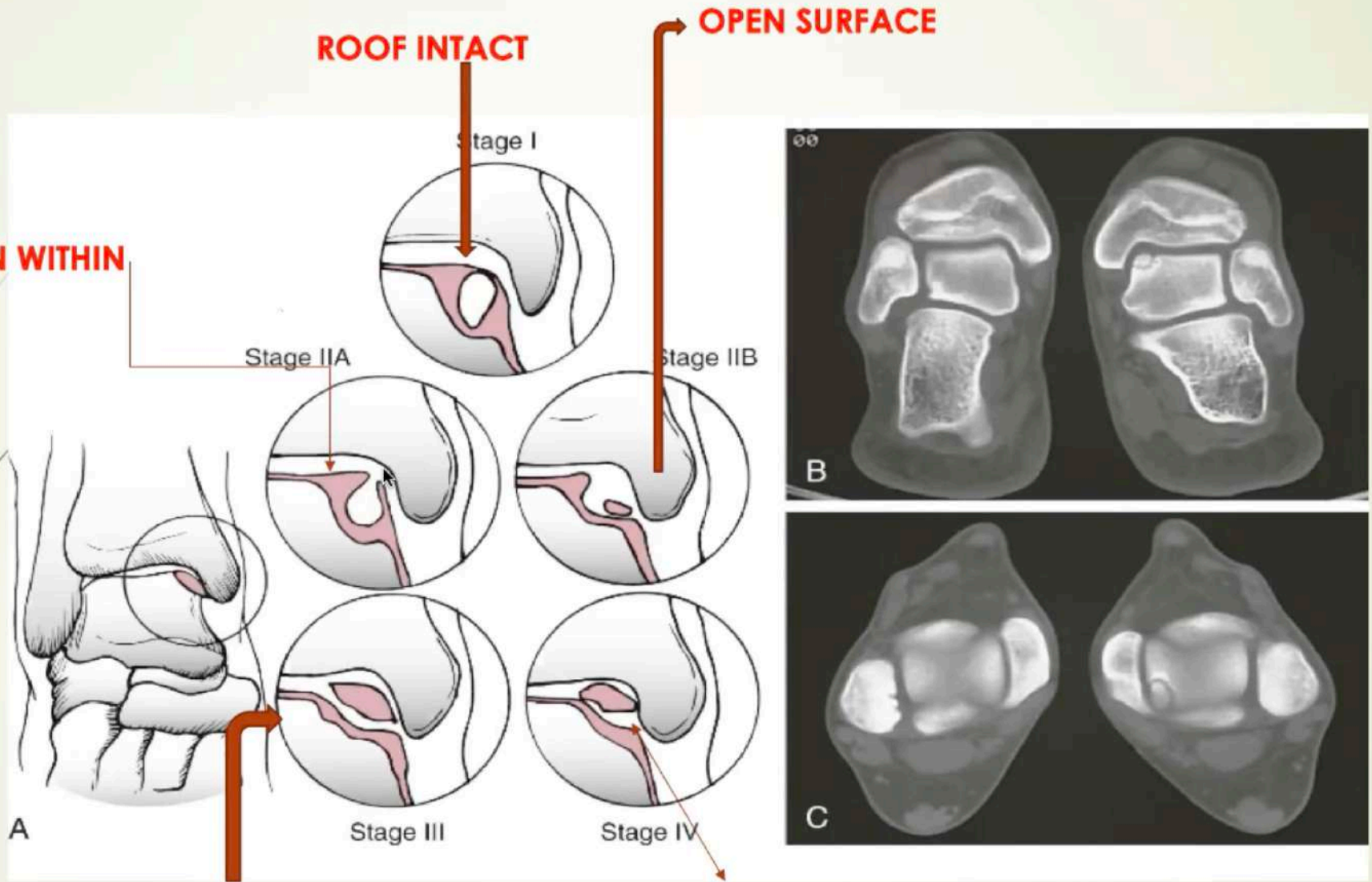
FERKEL & SGAGLIONE (1994)

- I: Cystic lesion within dome of talus, intact roof on all views
- IIA: Cystic lesion with communication to talar dome surface
- IIB: Open articular surface lesion with overlying nondisplaced fragment
- III: Undisplaced lesion with lucency
- IV: Displaced fragment

LESION WITHIN

ROOF INTACT

OPEN SURFACE



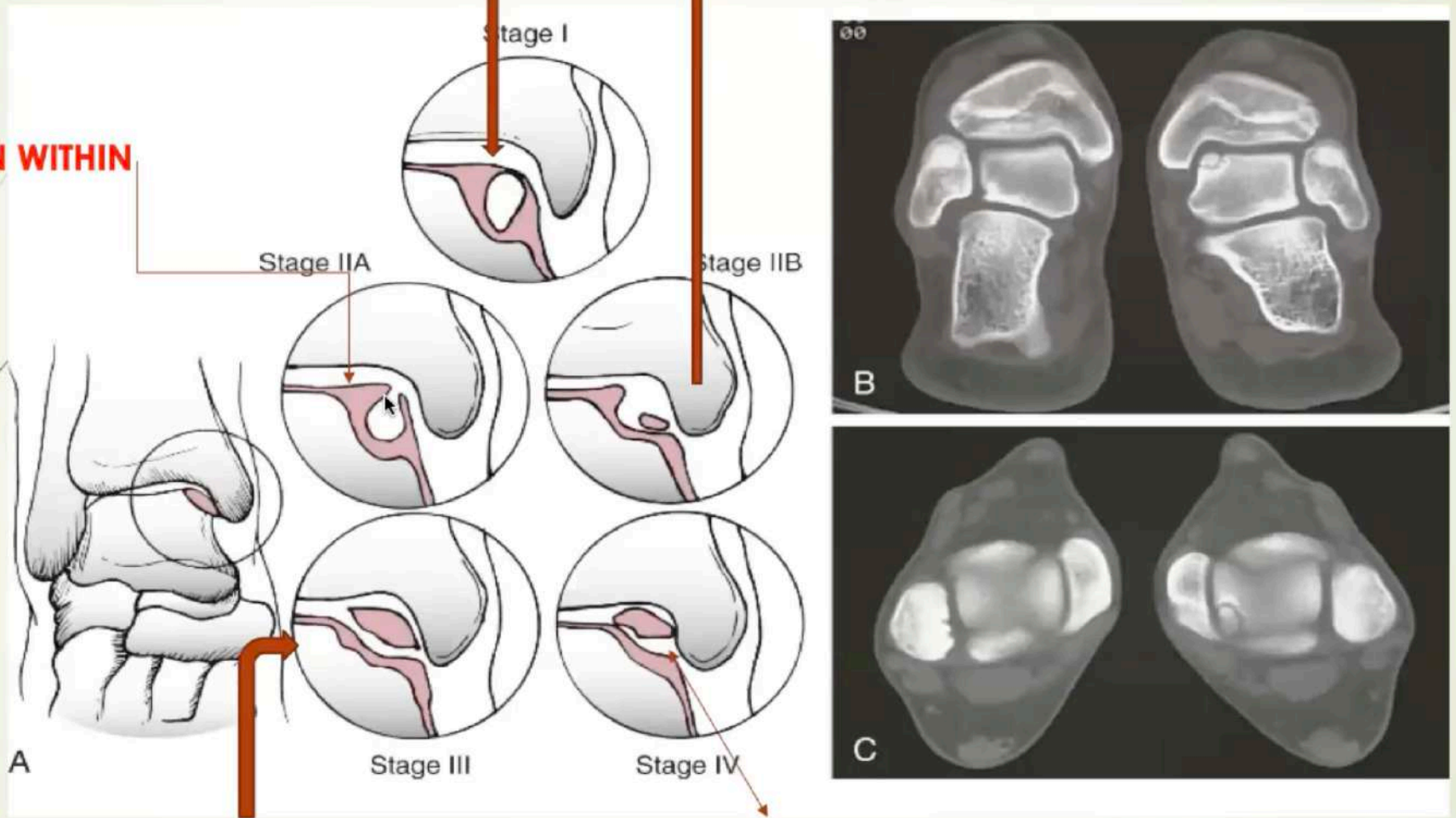
NON DISPLACED

DISPLACED

LESION WITHIN

ROOF INTACT

OPEN SURFACE



NON DISPLACED

DISPLACED



ARTHROSCOPY

PRITSCH ET AL (1986)

- I: Intact overlying cartilage
- II: Soft overlying cartilage
- III: Frayed overlying cartilage

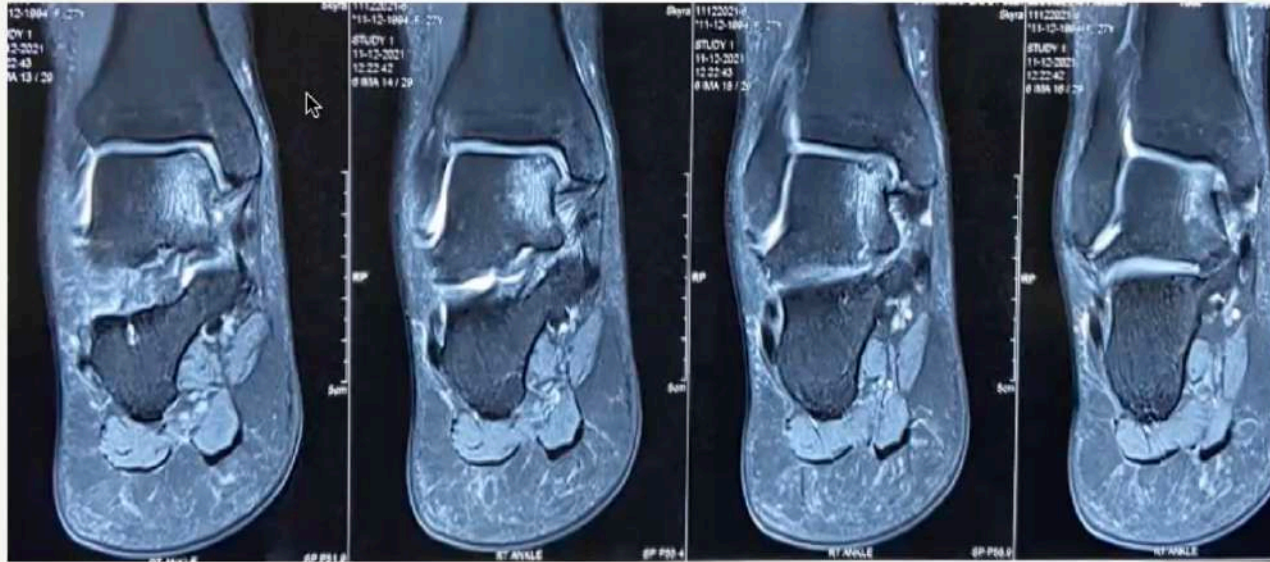
CHENG ET AL (1995)

- A: Smooth, intact but soft or ballottable
- B: Rough surface
- C: Fibrillation/fissuring
- D: Flap present or bone exposed
- E: Loose, undisplaced fragment
- F: Displaced fragment



MRI BASED

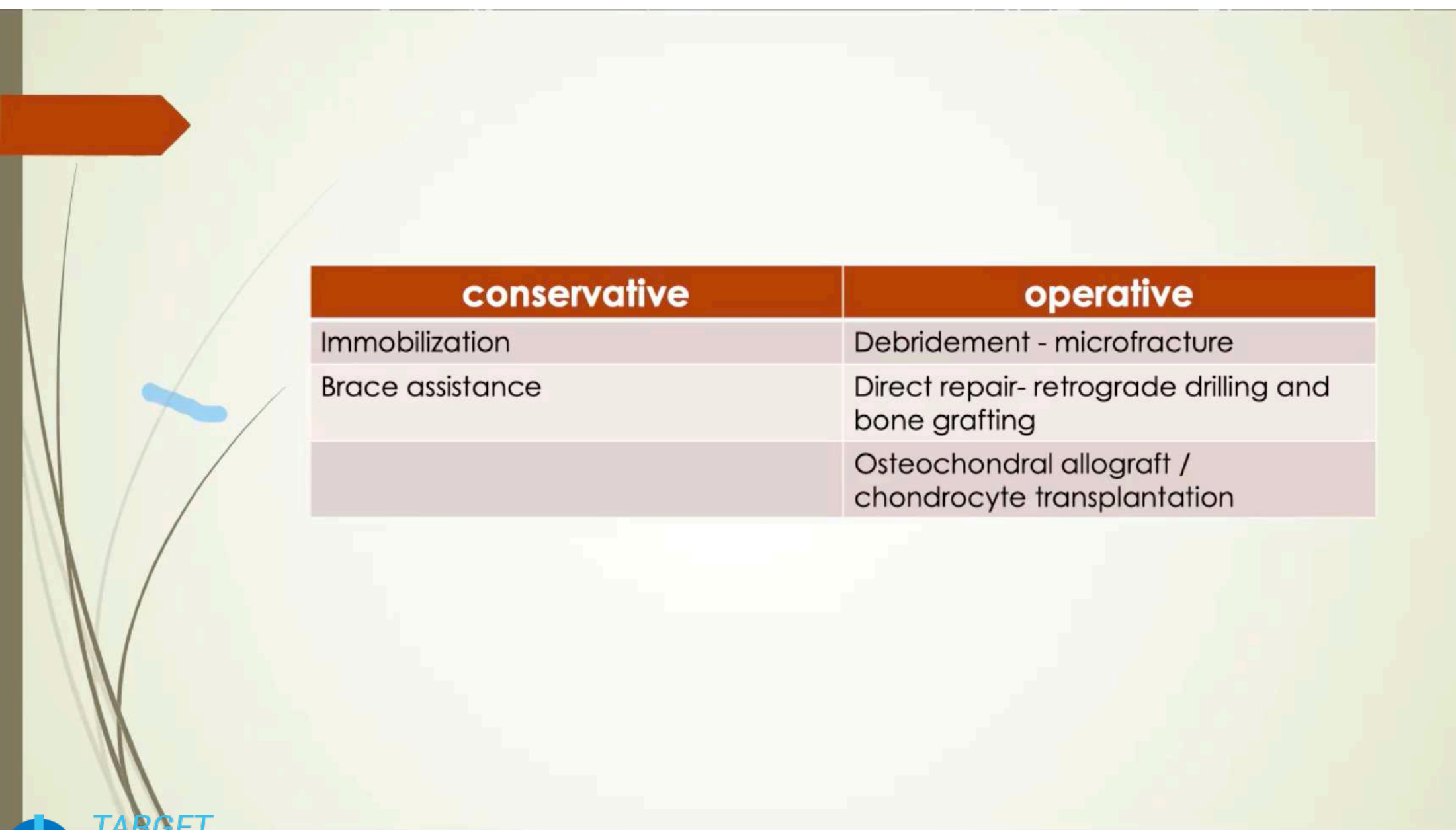
TARANOW ET AL. (1999)	HEPPLE ET AL. (1999)	MINTZ ET AL. (2003)
<ul style="list-style-type: none"> 1: Subchondral compression/bone bruise appearing as high signal on T2-weighted images 2: Subchondral cysts that are not seen acutely (arise from stage 1) 3: Partially separated or detached fragments in situ 4: Displaced fragments 	<ul style="list-style-type: none"> 1: Articular cartilage damage only 2a: Cartilage injury with underlying fracture and surrounding bony edema 2b: Stage 2a without surrounding bony edema 3: Detached but undisplaced fragment 4: Detached and displaced fragment 5: Subchondral cyst formation 	<ul style="list-style-type: none"> 0: Normal 1: Hypointense but morphologically intact cartilage surface 2: Fibrillation or fissures not extending to bone 3: Flap present or bone exposed 4: Loose undisplaced fragment 5: Displaced fragment





Treatment

- ▶ **Patient characteristics** (activity level, age, general condition)
- ▶ **Lesion** – size, location, degenerative changes if any



conservative	operative
Immobilization	Debridement - microfracture
Brace assistance	Direct repair- retrograde drilling and bone grafting
	Osteochondral allograft / chondrocyte transplantation

Review of literature

- 54% chronic cystic Talar lesions managed conservatively have good outcome (35 ankle series)
- 45% good outcome- systemic review
- All **displaced lesion with symptoms- operative indication**
- **Stage 3 lateral lesions- Early surgery**
- **Stage 3, 4 acute lesions- ORIF is indicated**
- **Incomplete medial and lateral lesions (stage 2)**
- **Completely detached but undisplaced (stage 3)**
- **Lesions in children**

**Immobilization with PTB
brace**

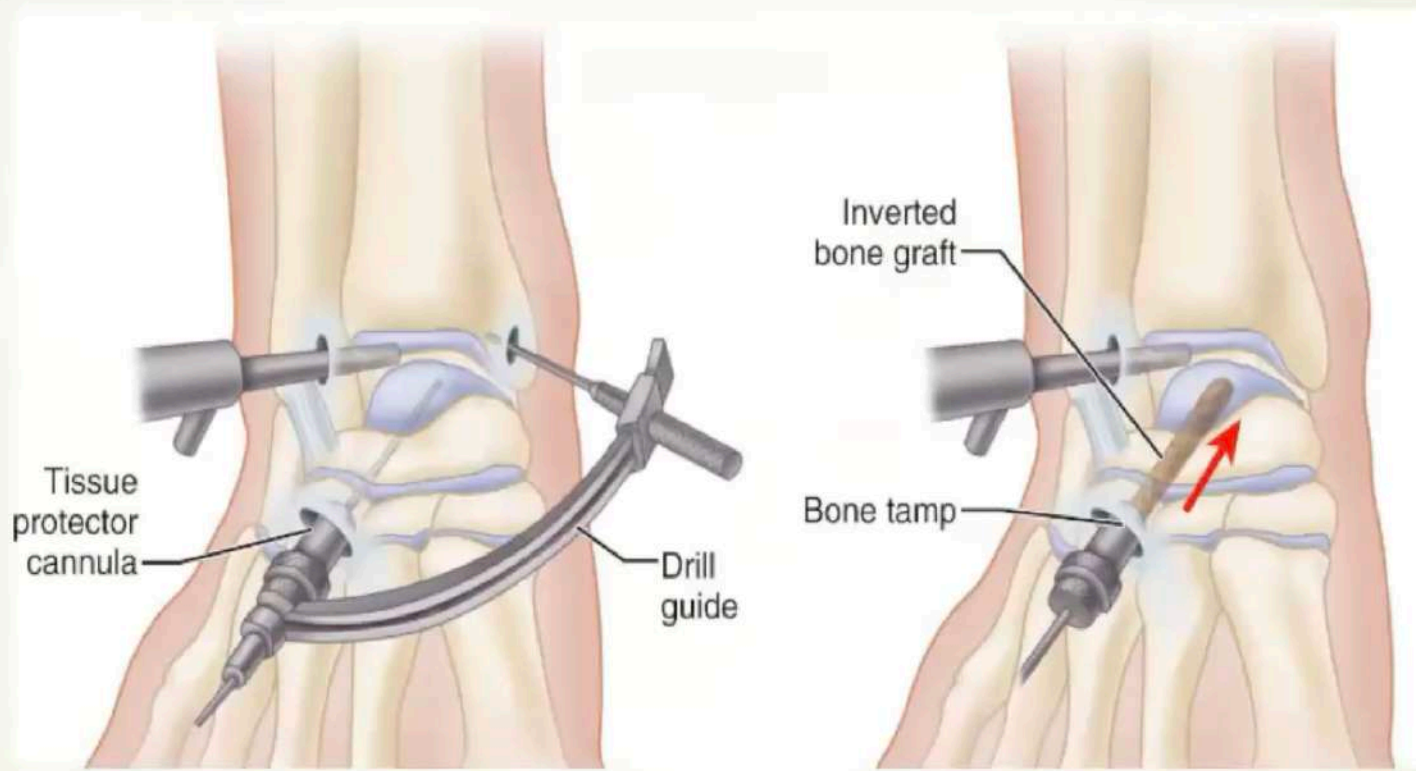
1. Early lesion with mild osteosclerosis of surrounding Talar bone
2. Continuity of cartilage
3. Stability of osteochondral fragment

- Early stage lesion
- Medial lesions
- Lesions in children not healed

Percutaneous arthroscopic drilling

**Less invasive
Medial malleolus
osteotomy not needed**

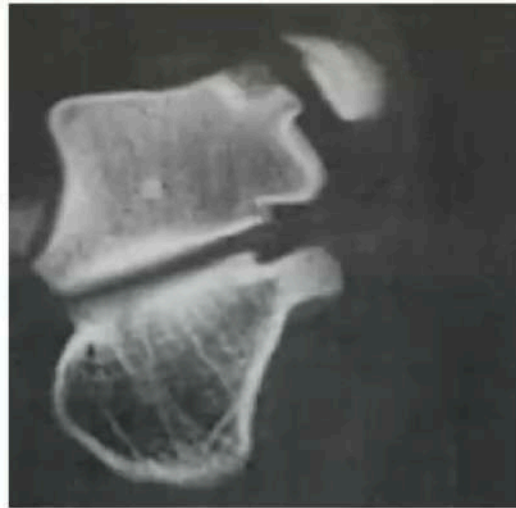
**Good alternative to excision
and curettage**



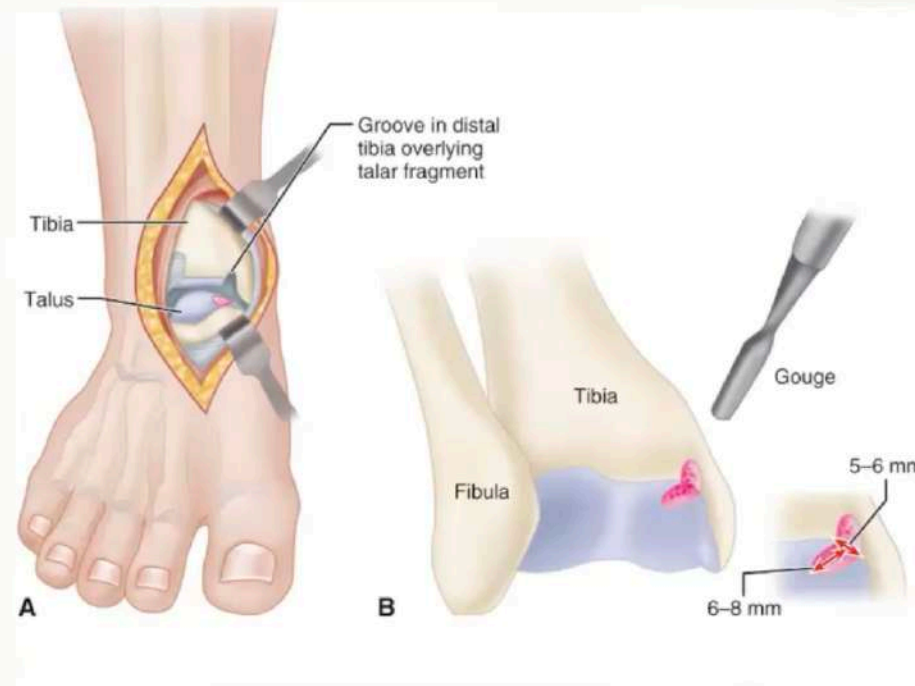


Surgical Planning

- ▶ CT with 2MM cuts in coronal and axial planes.
- ▶ Determine location of the lesion (Anterior, Middle, Posterior)
- ▶ Plan Medial Malleolus osteotomy if necessary
- ▶ Grooving of anteromedial tibia if can be done
- ▶ Lateral lesions usually do not need osteotomy



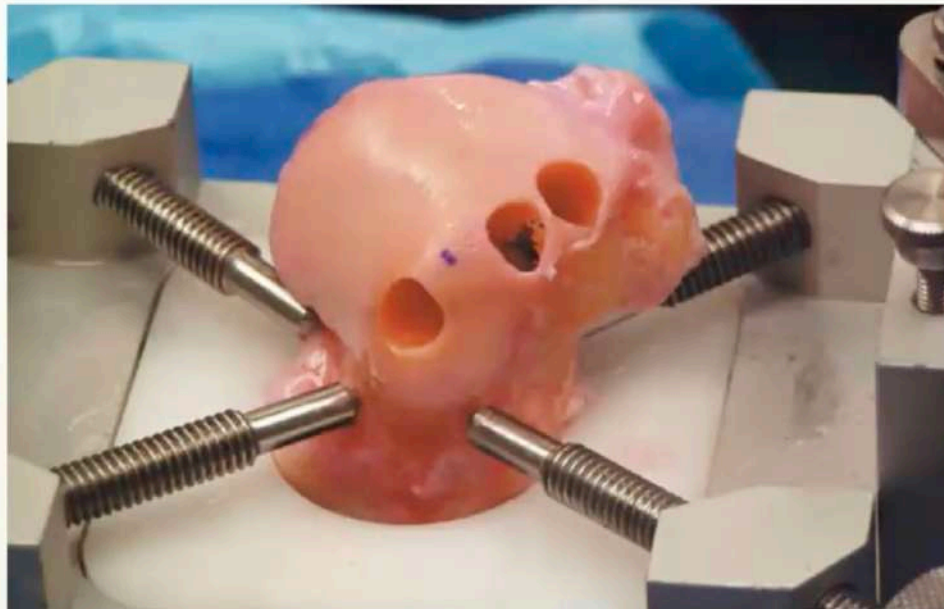
Antero-medial grooving of Tibia





LARGER DEFECTS

- ▶ **OATS-** > 5MM DEFECT, SINGLE BONE PLUG
- ▶ **MOSAICPLASTY** – MULTIPLE SMALL PLUGS
- ▶ **MEGA- OATS-** > 12 MM DEFECT- FRESH TALAR ALLOGRAFT IS NEEDED
- ▶ **ACI**



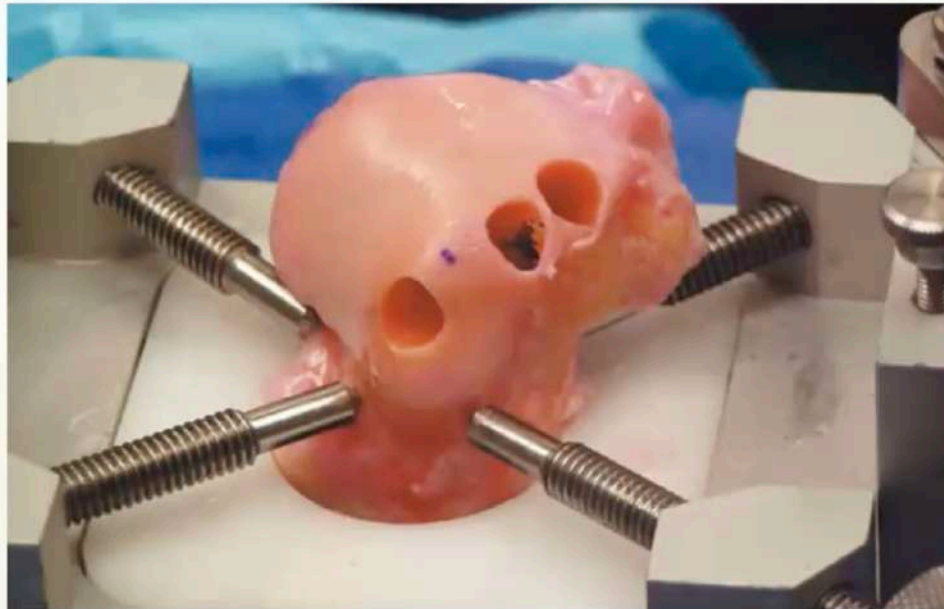


ACI

- 200-300MG AUTOLOGOUS CHONDROCYTES ARE NEEDED
- GROWN IN VITRO 2-5 WEEKS
- REIMPLANTED THROUGH ARTHROTOMY
- LARGE WELL CONTAINED STAGE 3, 4
- LARGE DEFETS WITH EXTENSIVE SUNCHONDRAL CYSTIC CHANGES
- FAILED PREVIOUS SURGERY
- 15- 55 YEARS OF AGE
- NO MALALIGNMENT
- NO DEGENERATIVE JOINT DISEASE
- NO INSTABILITY
- CONTRAINDICATED IN KISSING/BIPOLAR LESIONS

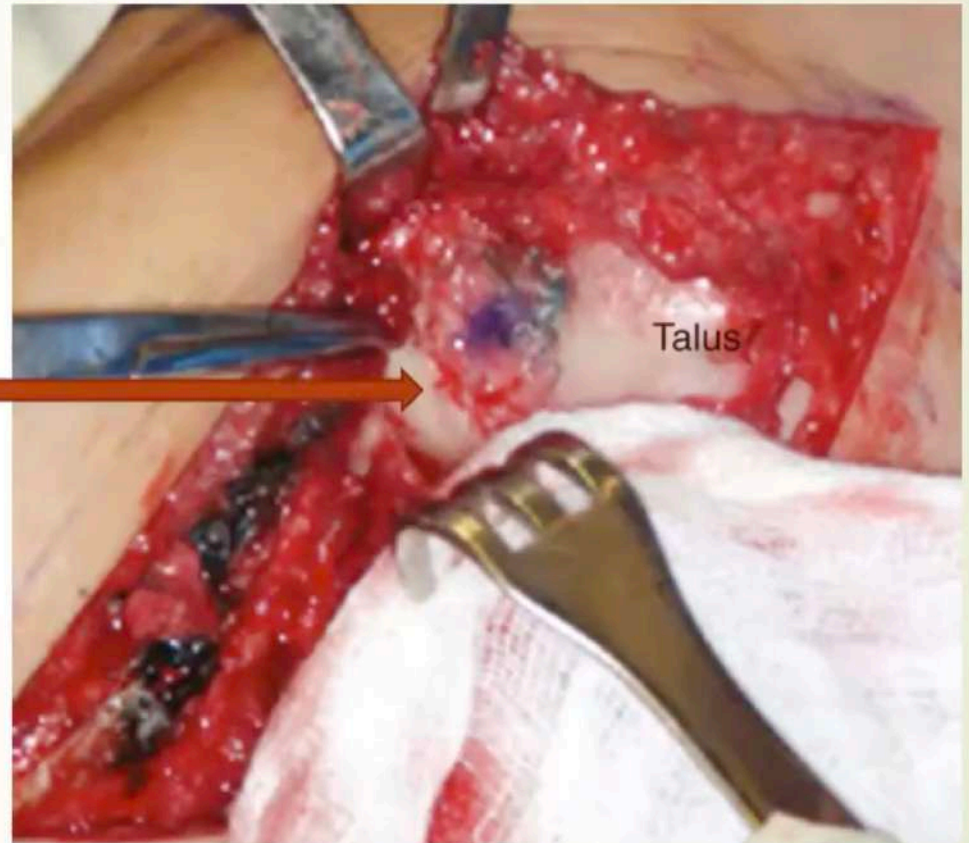
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- **NEGATIVES :**
- DONOR SIDE MORBIDITY
- NEED FOR SECOND SURGERY
- EXPENSIVE


IMPLANTATION WITH PERIOSTEAL FLAP





TREATMENT OF CHOICE

- ▶ ARTHROSCOPIC MANAGEMENT OF OCD IS PREFERRED NOW
- ▶ REDUCED MORBIDITY
- ▶ NO ARTHROTOMY OR OSTEOTOMY



Type of Lesion

Chondral (cartilage only)
Osteochondral (cartilage and underlying bone)
Subchondral (intact overlying cartilage)
Cystic (>5 mm deep osteochondral)

Stability of Lesion

Stable
Unstable

Displacement of Lesion

Displaced
Nondisplaced

Chronicity

Acute
Chronic

Size of Lesion

Small (area < 1.5 cm² or greatest diameter < 15 mm)
Large (area > 1.5 cm² or greatest diameter > 15 mm)

Location

Medial (anterior, central, or posterior)
Lateral (anterior, central, or posterior)
Central (anterior, central, or posterior)

Containment

Contained
Uncontained (shoulder lesion)

Previous Treatment(s)

Primary
Revision



FUTURE OPTIONS

- **MACI-** MATRIX/MEMBRANE AUTOLOGOUS CHONDROCYTE IMPLANTATION
- **CACI-** COVERED AUTOLOGOUS CHONDROCYTE IMPLANTATION
- **AAP/PRP-** ARTHROSCOPIC ALLOGRAFT WITH PRP
- **HYALOGRAFT**
- **NEOCARTILAGE**
- **PROGENITOR CELLS/ STEM CELLS**



MACI

- ▶ MEMBRANE MADE OF BOVINE COLLAGEN TYPE 1 AND 3 IS SIZED TO FIT THE DEFECT
- ▶ NO NEED OF PERIOSTEAL FLAP TO SEAL
- ▶ MEMBRANE IS LOADED 3-4 DAYS BEFORE REIMPLANTATION WITH THE CELLS
- ▶ SUTURED OR SEALED WITH FIBRIN GLUE
- ▶ CELLS MAY BE HARVESTED FROM INFRAPATELLAR FAT PAD ALSO.



CACI

- ▶ ABSORBABLE PORCINE MEMBRANE COLLAGEN TYPE 1 AND 3 IS USED TO SEAL THE LESION
- ▶ LAB GROWN CHONDROCYTES THEN INJECTED UNDER THE SEAL