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# Current Concepts in Treatment of Talar Dome Lesions

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# Definition of Osteochondral Lesion

- Injury to cartilage and subchondral bone
- Often traumatic
- Can be idiopathic
- Usually are symptomatic
- May also be incidental findings- asymptomatic


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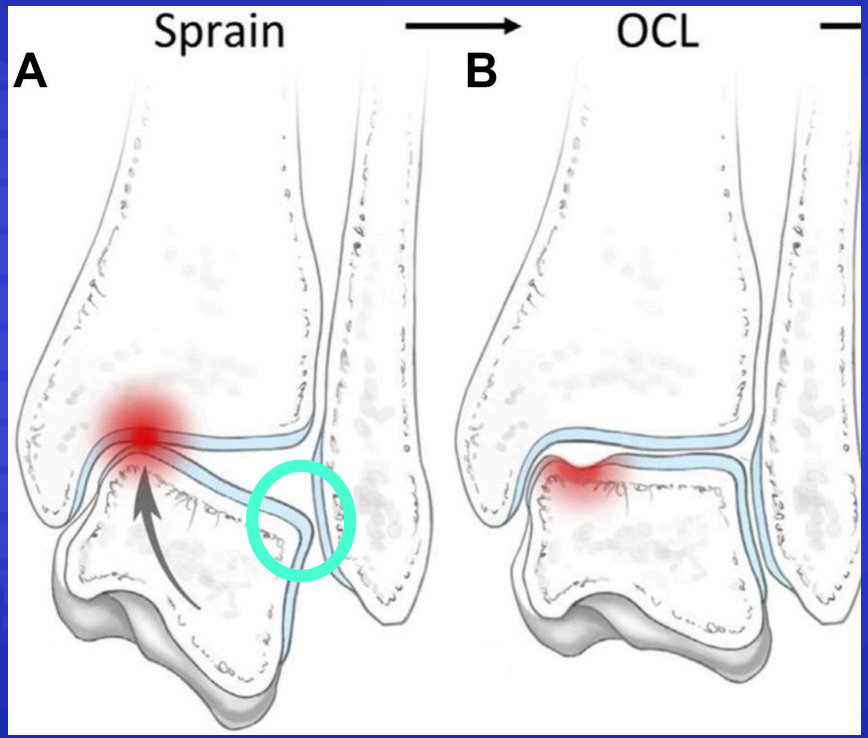
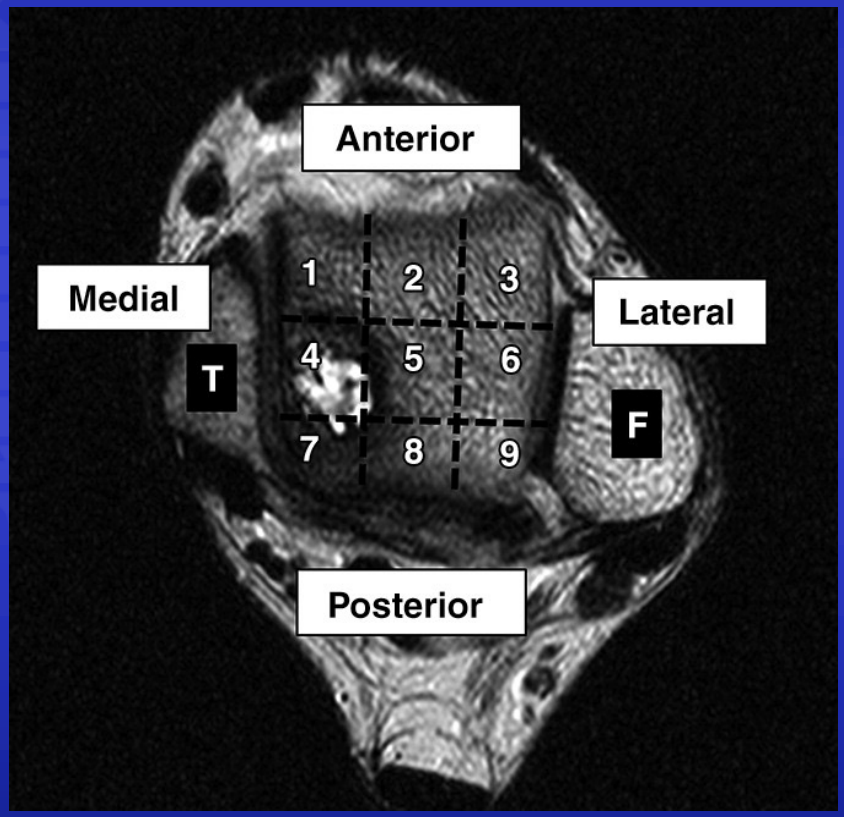
# Mechanism of Injury

- Most commonly occur from inversion injury
- Compression medial
- Shear lateral
- Repetitive microtrauma
- Idiopathic/ congenital?



# Medial vs Lateral Lesions

- Medial
  - Can be idiopathic or traumatic (68%)
  - Harder to access
- Lateral
  - Almost always traumatic
  - Easier to access with plantar flexion

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# Clinical Presentation

- Ankle sprain with persistent pain
- Can also be no history of trauma
- Chronic ankle pain
- Swelling, catching, locking

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# Physical examination

- Ankle appears normal
- Good range of motion
- Stable/unstable
- Tenderness in the medial or lateral gutters
- Check achilles, lisfranc, peroneals



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# Differential Diagnosis- ankle sprain not improving

- Persistent synovitis, soft tissue impingement
- Talar dome lesion
- Peroneal tendon tears
- Anterior process calcaneus/lateral talar process fractures
- Persistent instability
- Talar bruising/microfracture
- All of the above can be missed by x-rays/ultrasound
- Not missed by MRI, is MRI becoming the new x-ray?

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# Investigations- X-rays

- Overall alignment is important
- Helps understand EXTENT of instability
- Standing Ankle/Foot AP, L, Oblique x-rays
- Rule in/out gross fractures
- Rule in/out arthritis


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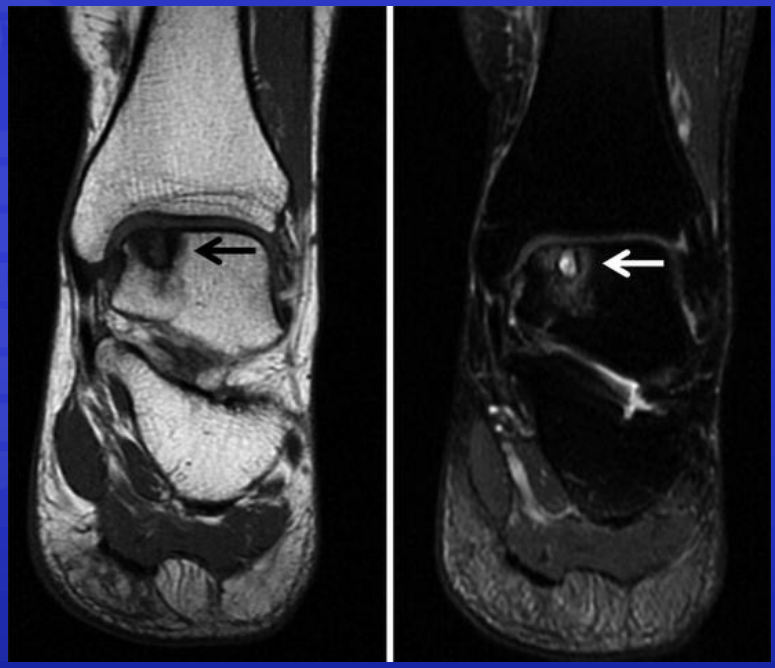
# Investigations- MRI

- It is good but NOT definitive
- Sensitive 90% (ability to identify)
- Specific 90% (lesion is actually an OLT)
- Can also miss a talar dome lesion, often cartilagenous



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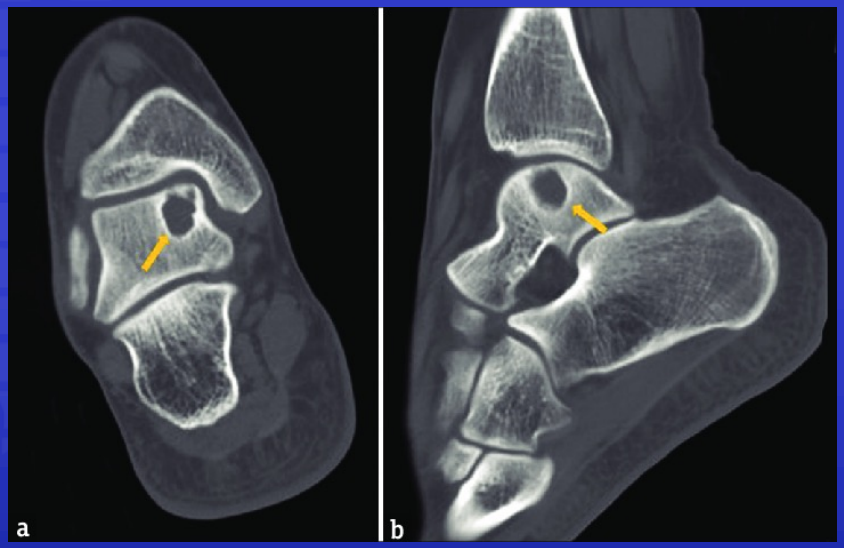
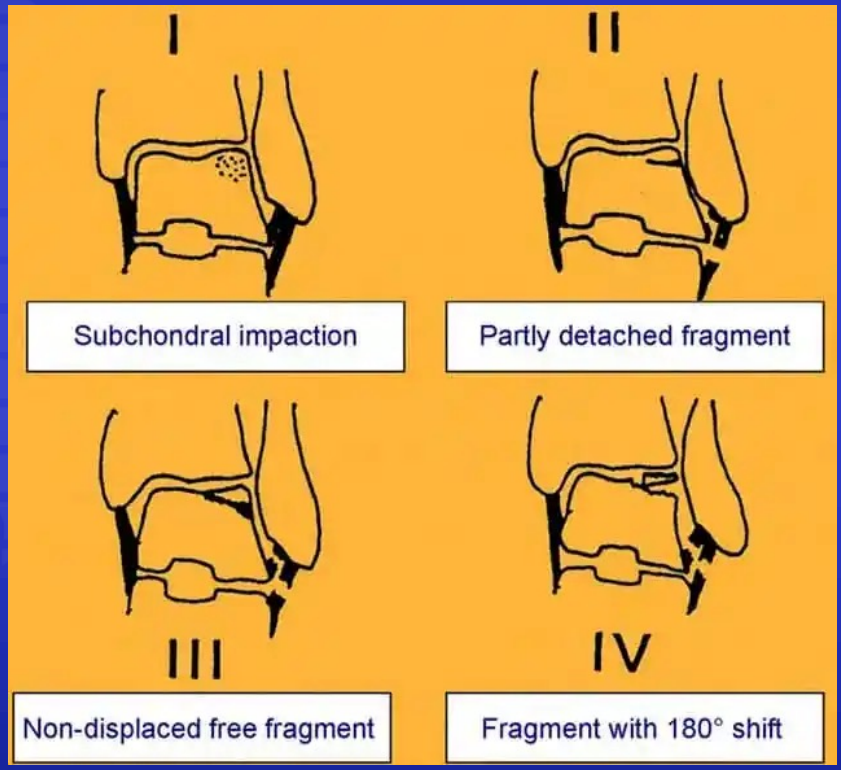
# Investigations- CT Scan

- Advantages
  - Great for bony detail
  - Location/depth side (for grafting procedures)
  - Integrity of subchondral bone
- Disadvantages
  - Can miss cartilage lesions
  - No information about viability of bone
  - Radiation exposure



# Classification- Berndt & Harty

- 1959- Stages based on x-rays
  - I: Subchondral compression
  - II: Partial detachment
  - III: Complete detachment, nondisplaced
  - IV: Displaced Fragment

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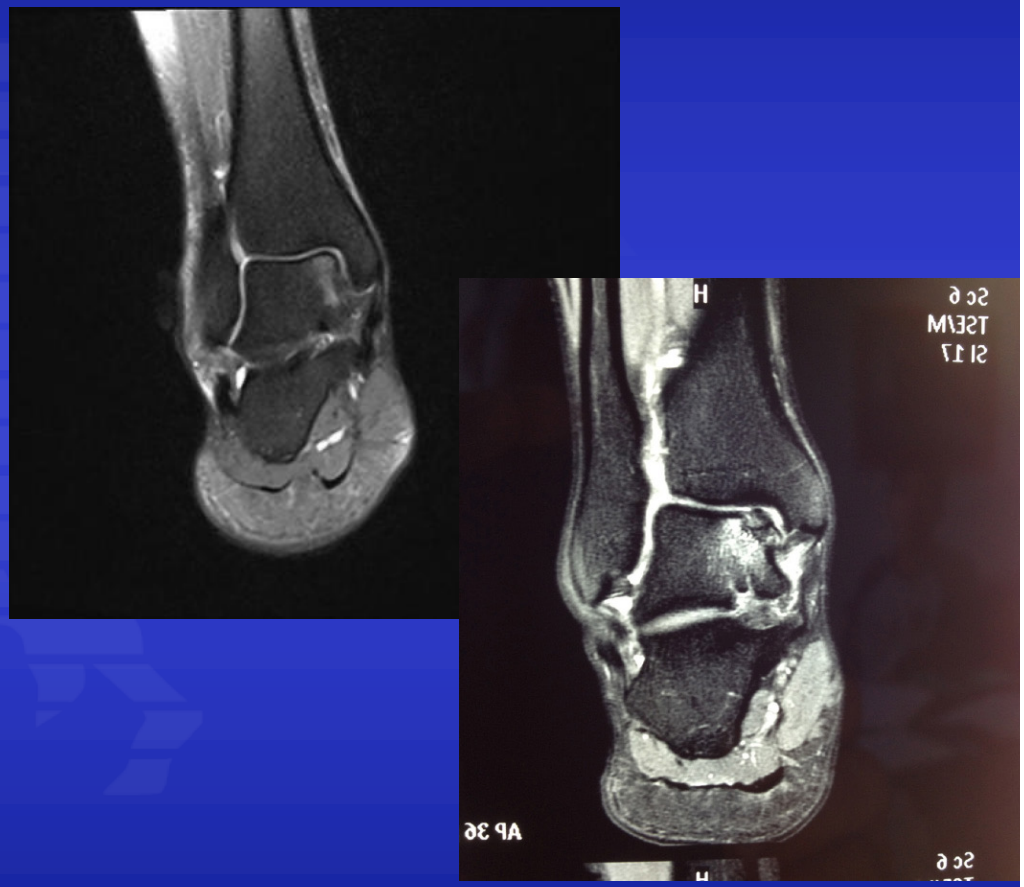
# MRI-Based Classification

- Anderson, Hepple (1999)
  - I: Cartilage intact, bone marrow oedema
  - IIa: Cartilage breached, non-cystic lesion
  - IIb: Cartilage breached, cystic lesion
  - III: detached but nondisplaced
  - IV: Displaced fragment
  - V: Subchondral cyst with articular defect.



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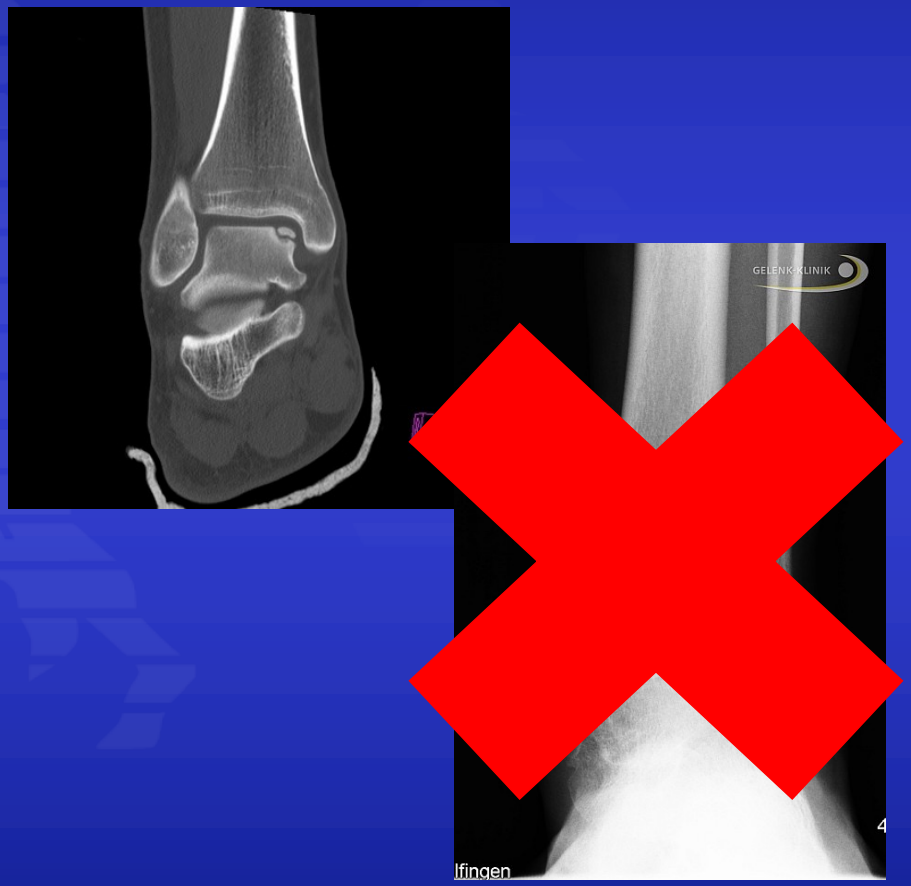
# Natural History: Myth Buster

- Focal articular cartilage damage: YES
- Do untreated lesions lead to arthritis? NO
- All OLTs do not require surgical treatment to prevent arthritis
- Treatment should be based upon symptoms

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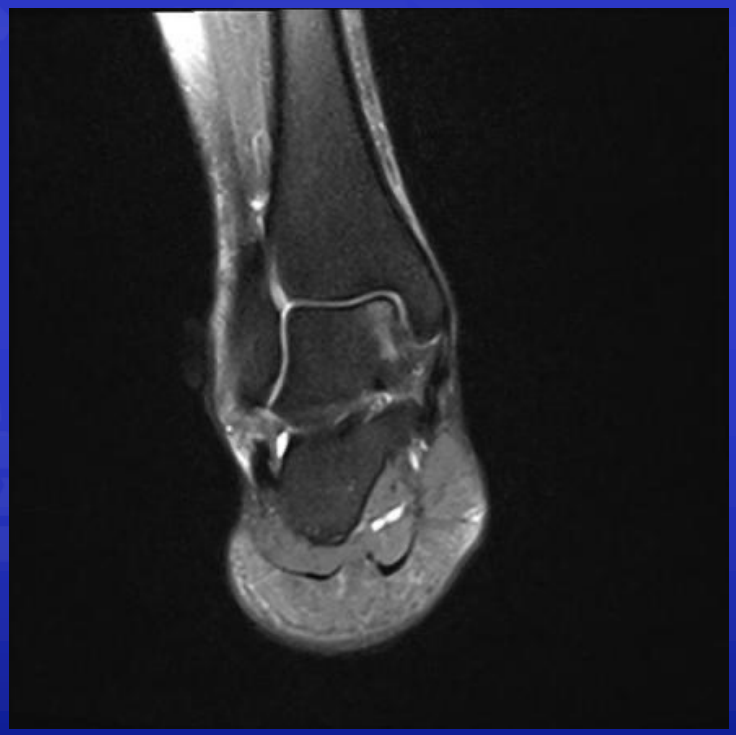
# Natural History

- Non-operative treatment of asymptomatic or minimally symptomatic OLTs resulted in no substantial progression in staging or lesion size
- 86% of all ankles had improved symptoms at 2 year follow up.
- Higher grade lesions less likely to heal

- Klammer et al, FAI 2015.

# Non-Operative Management Indications

- Asymptomatic
- Minimal symptoms with stage I or II lesions with no loose fragments
- Early MRI for ankle sprain- early lesions
- Skeletally immature more conservative.
- Small lesions (<1.5 $cm^{2)}$



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# Non-Operative Management:

- Rest/Restriction of sport
- NSAIDs
- Immobilisation 3 weeks to 4 months (depending on pain)
- Reported 50% success in stage I, II, early III

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# Non-Operative- Injections

- Cortisone injections
- Platelet Rich Plasma (PRP)
- Hyaluronic Acid (HA)
- Nondisplaced lesions
- May improve symptoms, not likely to change pathology

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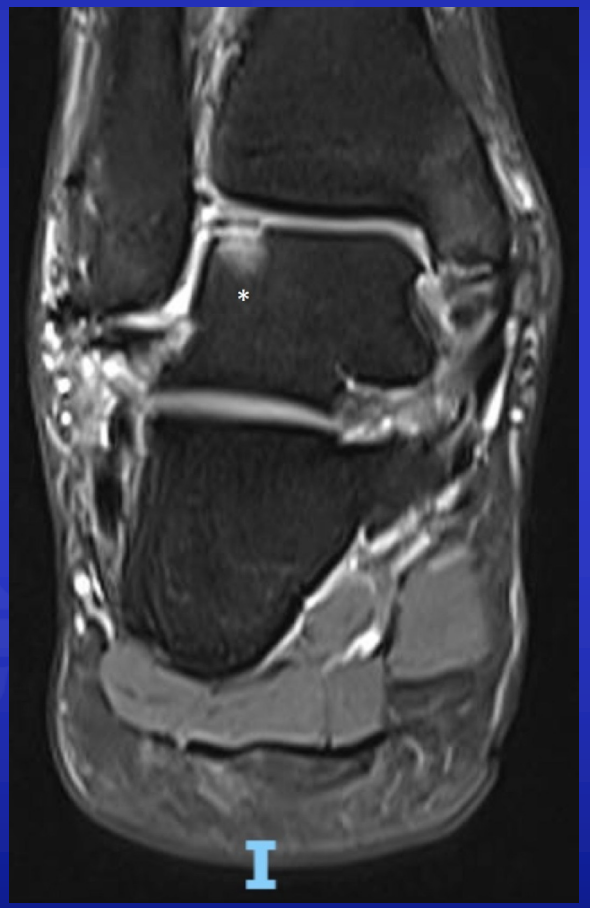
# Surgical Indications

- Unstable lesions
- Loose bodies
- Failed non-operative management for stable lesions



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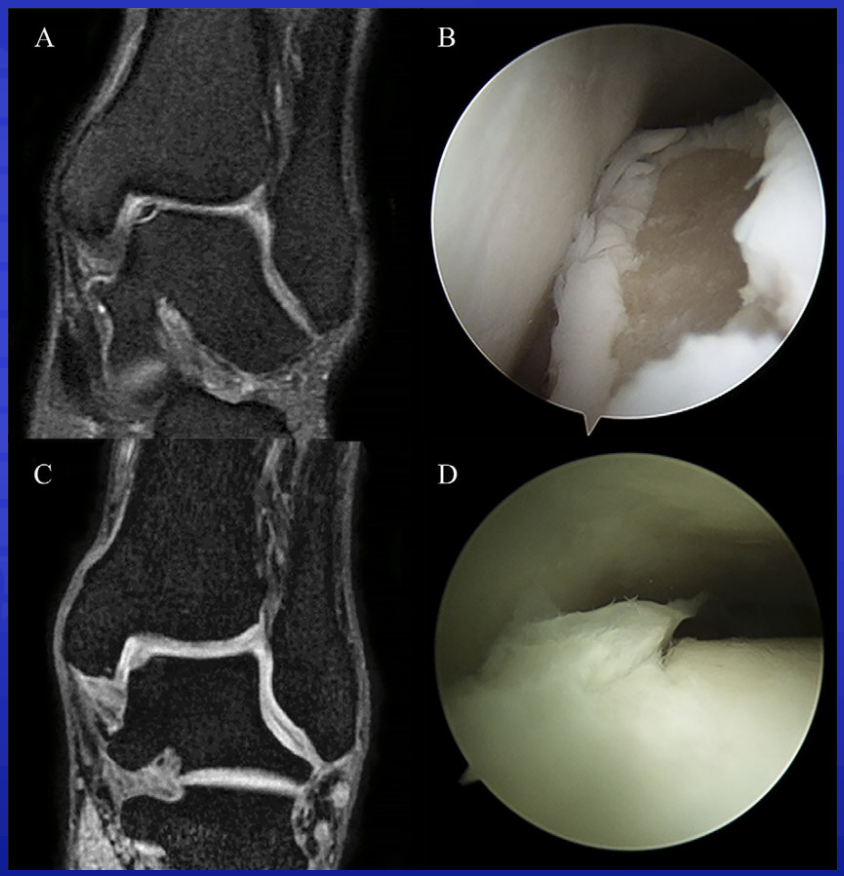
# Surgical Options

- Microfracture
- Retrograde Drilling
- OATS/Mosaicplasty
- Osteochondral Allograft
- ACI/MACI

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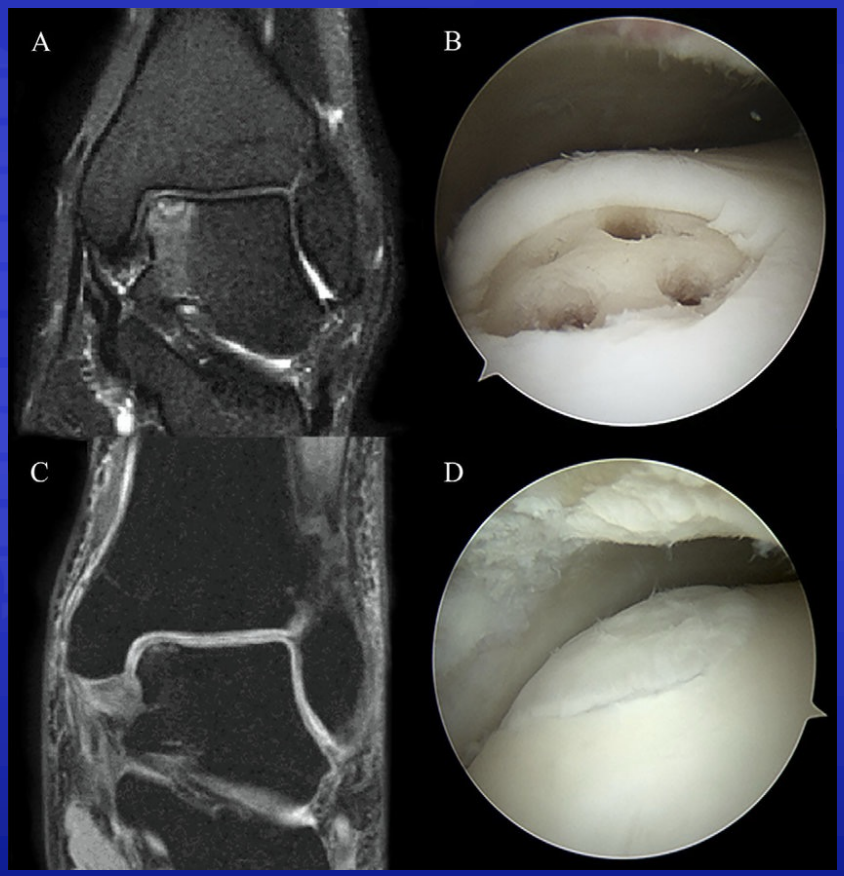
# Microfracture

- Arthroscopically
- Loose fragments cartilage and bone removed
- Vertical stable walls of cartilage
- Perforation of subchondral plate
  - Blood clot with growth factors, progenitor cells stimulates healing
  - Fibrocartilage

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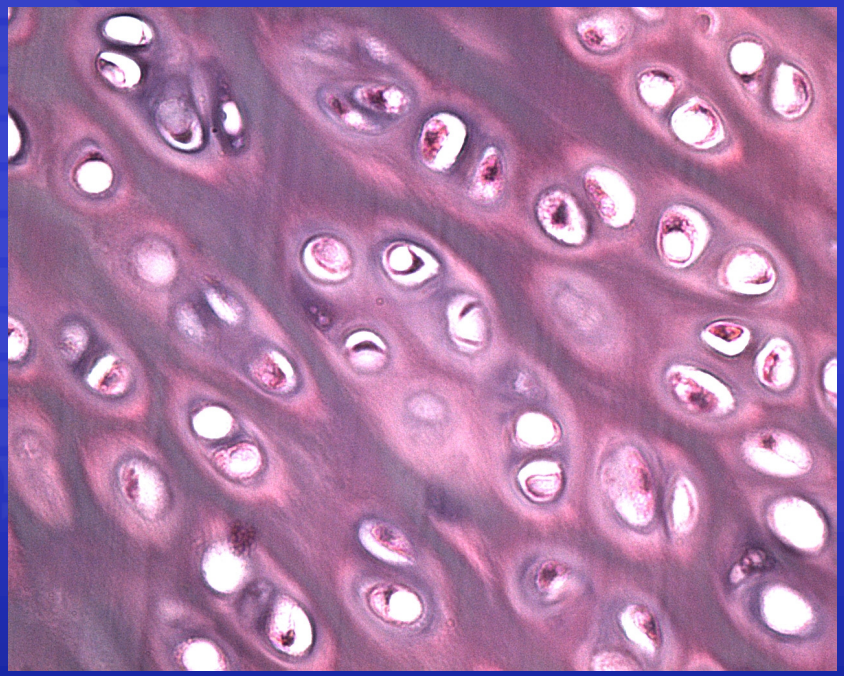
# Hyaline Cartilage

- Native articular cartilage
- Type II collagen
- Organised columnar architecture
- Excellent compressive resilience and elasticity
- Low friction coefficient
- Poor Healing



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# Fibrocartilage

- Type I collagen
  - Fewer proteoglycans
  - Disorganised fibres
- Produced by bone marrow-derived mesenchymal stem cells – microfracture
- Less compressible, less elastic
- Higher friction and stiffness
- Fills rapidly (months) and provides pain relief
- Can degenerate over time

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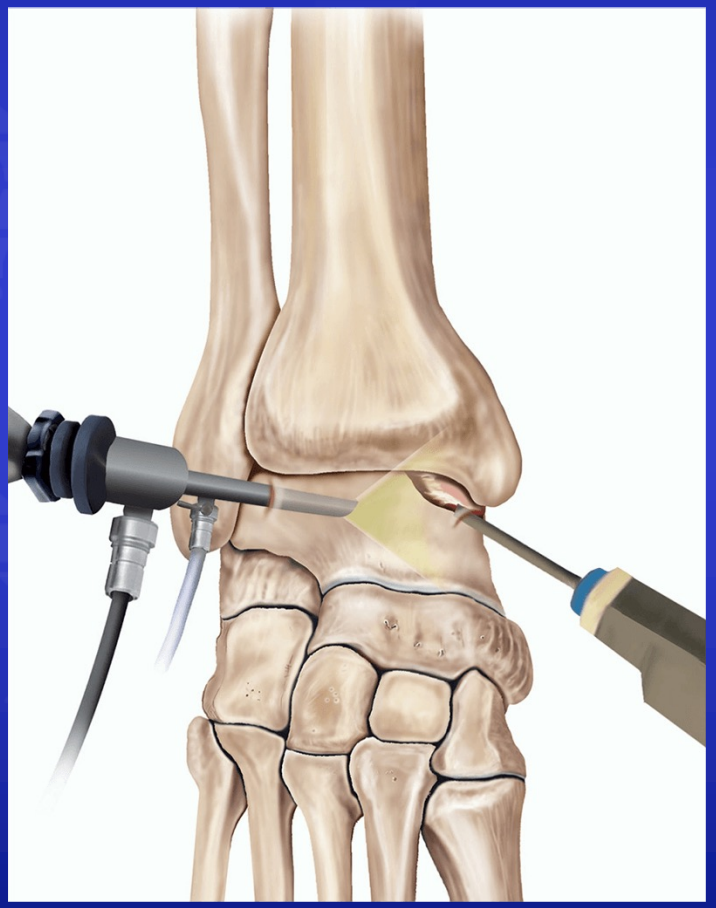
# Microfracture Recovery

- Day procedure
- Initial non weight bearing three days
- Progress partial to full weight bearing within 1-2 weeks
- Physiotherapy- ROM strength
- No sports 3 months
- Generally 80% success.



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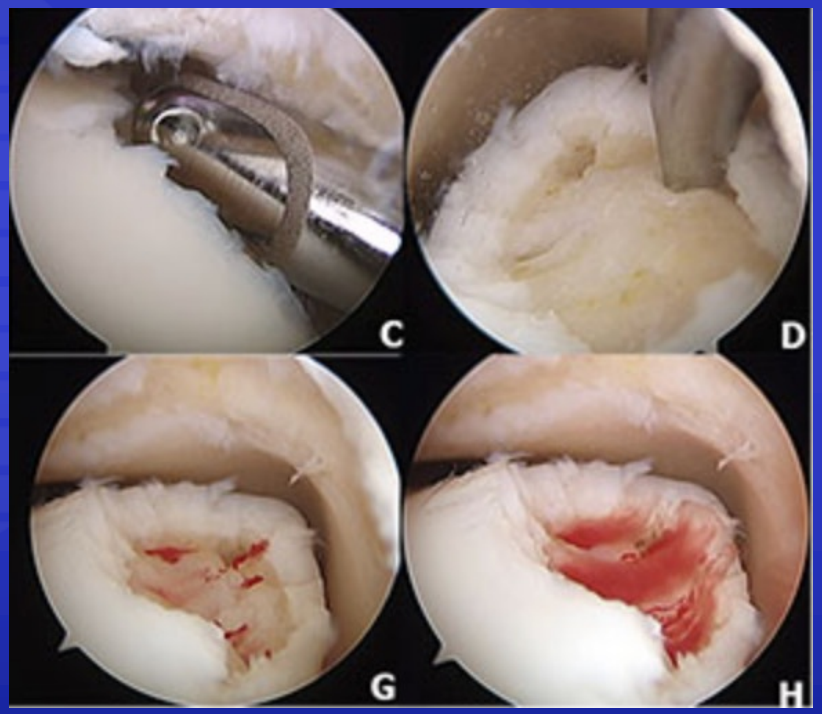
# Microfracture

- Most common initial procedure
  - Arthroscopic
  - Low cost
  - Easy recovery
  - Presence of cysts does not affect outcome
- More successful with
  - small (<1.5 $cm^2$)
  - contained lesions
- Common second procedure
  - 80% success rate of re-debridement (Saxby, FAI 2007)

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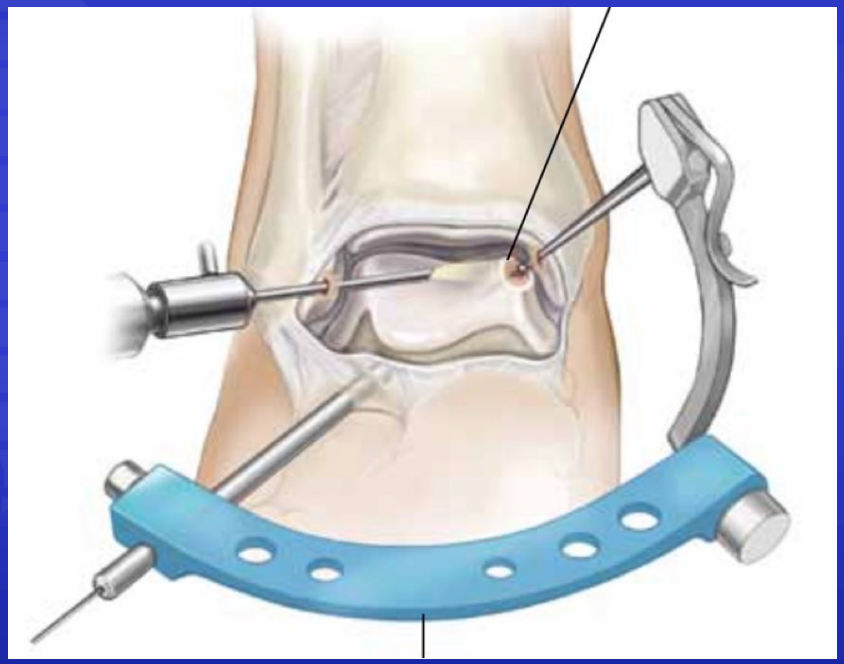
# Retrograde Drilling

- Bone is drilled from below the cartilage defect
- Reserved where cartilage is intact.
- Fluoroscopy or drill guides
- No difference between drilling and microfracture
- Preferred in pediatric population, preserves hyaline cartilage.



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# Osteochondral Autograft Transplantation (OATS)

- Matching plug of cartilage/bone taken from knee to ankle
- Usually used as a secondary procedure
- For larger lesions
- Must be contained, surrounding cartilage

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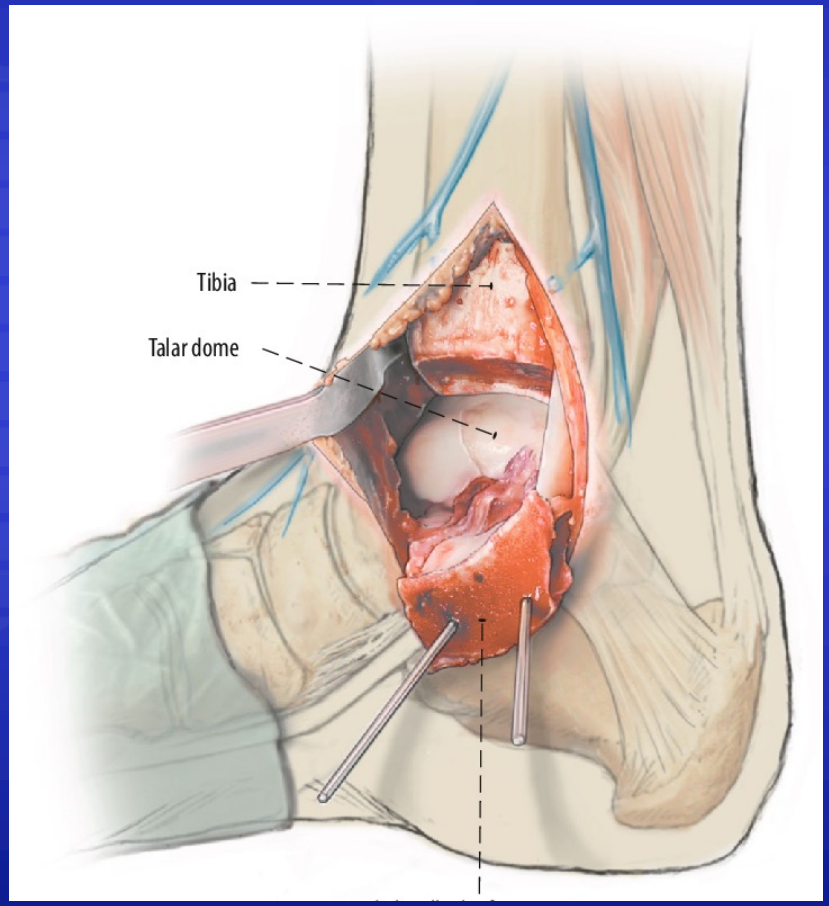
# OATS

- Benefits
  - Restore hyaline cartilage
  - Can fill large defects and cystic lesions
- Drawbacks
  - Morbidity of the knee
  - Often need medial malleolar osteotomy for access

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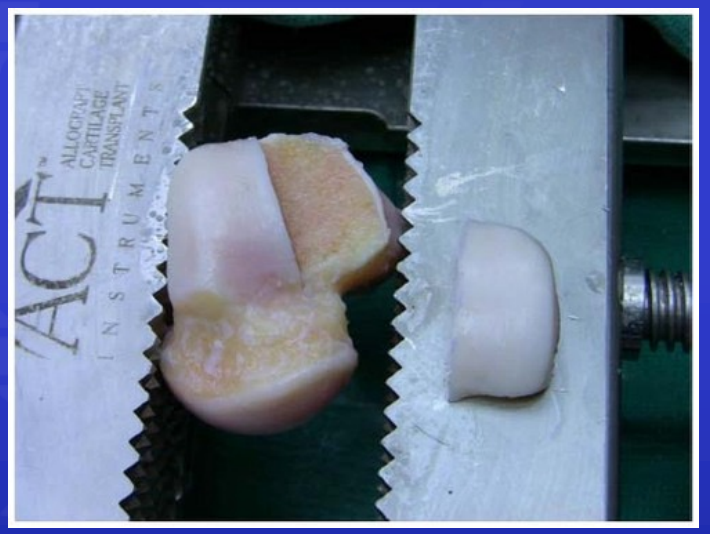
# Fresh Osteochondral Allograft Transplantation

- Used from a cadaveric donor
- Failed procedures
- Especially Larger lesions>1.5cm involving shoulder region
- Large cysts
- Avoids donor morbidity

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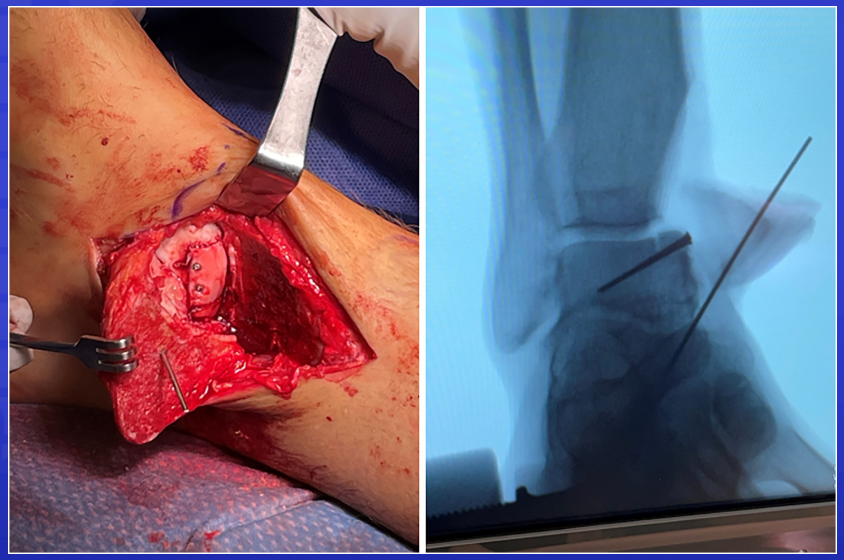
# Fresh Osteochondral Allograft Transplantation

- CT matching with donor graft
- Disease transmission- store for 14 days frozen for testing
- Viability of chondrocytes decreases after 28 days post mortem
- Best performed 15 to 28 days post mortem
- Fixed with screws
- Success rates low, failures lead to ankle fusion or replacement



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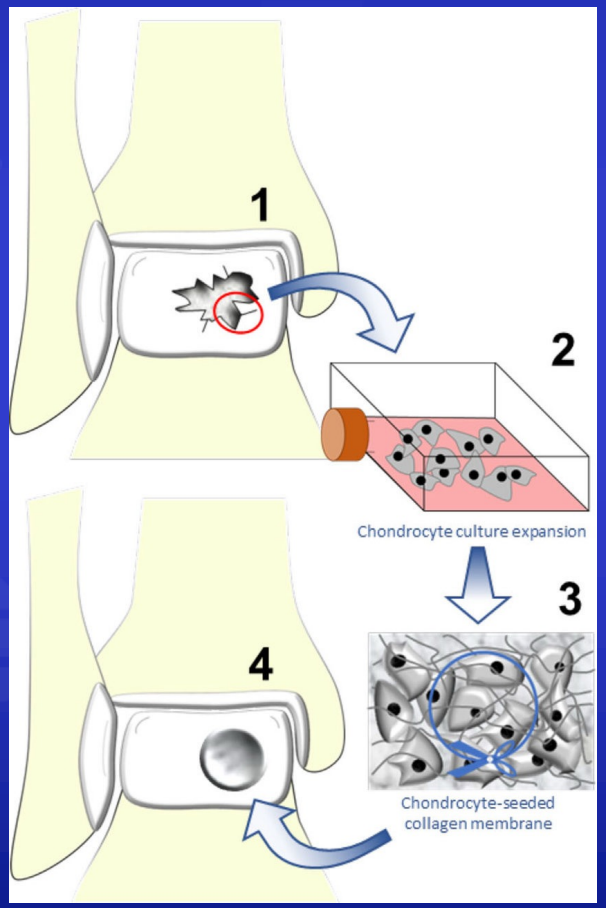
# Autologous Chondrocyte Implantation

- Two staged procedure
  - Biopsy (from ankle lesion during microfracture)
  - Viable chondrocytes Cultured 2-6 weeks
  - 2nd arthroscopy for implantation.
  - Uses a collagen scaffold
- For larger lesions (>1cm$^2$)
- Generally good results, but costly and similar to microfracture.
- Lack of controlled trials
- Increased cost, not funded in Australia.

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# Post-operative Care

- Those with OATS, osteotomy, or MACI need period of non-weight bearing 4-6 weeks and camboot
- Can progress with range of motion
- Return to sports three to six months.

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# Summary

- Nonoperative
  - Early stage lesions without loose fragments
  - Non-displaced
  - Asymptomatic
  - Small with acute ankle sprain
  - Many heal
- Surgery
  - Grade III to IV lesions, loose bodies
  - Failed non-operative treatment
  - Microfracture <1.5cm$^2$ or for most lesions
  - Repeat Microfracture, OATS, ACI for failed initial procedure, or for larger lesions.


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# Thank You

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