Access to the Talus for Treatment of Osteochondral Lesions

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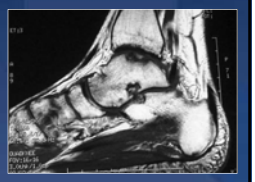
Epidemiology of OLT

- 2-7% of ankle sprains
  - Lesions in 17-63% of pts undergoing instability surgery
- 17-79% of all ankle fractures
- Posteromedial 57%
- Anterolateral 43%
- Most common in young adults (25 - 30 yo), males



Leontaritis et al, JBJS '09
Loren et al, Arthroscopy '02

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Treatment of OLT

- History, examination, radiographic studies must rule out other etiologies of ankle pain
  - malalignment
  - instability
  - posterior tibial, peroneal subluxation or tears
  - tarsal coalitions
  - degenerative joint disease
  - subtalar joint disease
  - soft-tissue impingement
  - infection

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Talus Osteochondral Injury: Operative Treatment

- Objectives:
  - Maintain joint congruity
  - Restore anatomic joint surface
  - Rigidly fix unstable fragments
  - Improve blood supply to the fragment
  - Repair osteochondral defects
- Address coexistent pathology:
  - Ligament instability
  - Hindfoot malalignment

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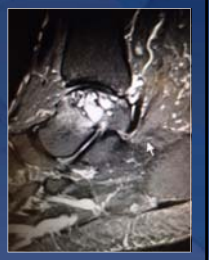
Imaging Helps To Plan The Approach

- High quality views of the ankle
  - AP, lateral, mortise
- Stress radiographs to r/o instability
- MRI, CT
  - Characterize OLT location, size
  - Quality of the subchondral bone
- Review prior surgical reports



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Arthroscopic Access

- Arthroscopy can access most lesions
  - AM, AL, PL portals
- Supine position
- Bolster under ipsilateral buttock
  - Bolster to flex hip
- Noninvasive distraction

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Arthroscopic Access

- Should be able to access anterior 50% of talar dome
- More posterior access
  - Straight posterior portal (*Voto et al*)
  - 1, 2 posteromedial portals (*Maffulli et al*)
  - Coaxial portals medial or lateral
  - Prone position, posterior arthroscopy with PM, PL portals

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Limits of Arthroscopic Access

- Access may be possible for debridement, but not for the perpendicular access required for treatment of certain OLT
- Autologous osteochondral transplantation requires perpendicular access for proper graft placement

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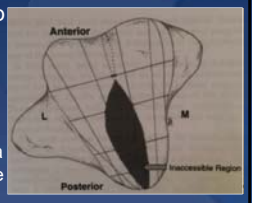
Need for Perpendicular Access to Talar Dome

- Soft tissue approaches and/or osteotomies can help improve talar access
- *Muir et al., AJSM 2006*
  - 20% of M/L talar dome not accessible w/o osteotomy
  - Malleolar osteotomies leave a residual central 15-24% of the talar dome inaccessible perpendicularly



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Osteotomies Improve Access to Talus

- Medial
  - Medial malleolar osteotomy
- Lateral
  - Arthrotomy
  - Plafondplasty
  - Fibular osteotomy
- Anterior
  - For large lesions
- Posterior

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Medial Malleolar Osteotomy

- 10 cm medial incision
- 3cm above joint line to tip of malleolus then curve anterior talar neck
- Retract saphenous vein anteriorly
- Anteromedial arthrotomy
- Protect PTT with small Homan

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Medial Malleolar Osteotomy

- Pre-drill holes for later fixation screws
- 2 x 4.0 titanium cancellous compression screws perpendicular to planned osteotomy

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Medial Malleolar Osteotomy

- Oblique, step cut, chevron
- Measure optimal level for cut
  - 45° toward junction of tibial plafond and medial colliculus
  - Smooth wire to template
  - Aim lateral enough to access lesion

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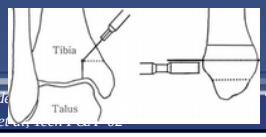
Medial Malleolar Osteotomy

- Incise periosteum to mark line of osteotomy and facilitate correct reduction
- Small thin microsag saw
- Complete with osteotome
- Make sure complete all the way posterior



Alexande *'07*
Cohen et al,

Medial Malleolar Osteotomy

- Retract posteriorly and inferiorly
  - Sharp Senn retractor
  - Release most posterior capsule attachment with scissors
  - Anterior capsule has to be released from axilla to the tip of MM
  - Release superficial and deep PTT sheath along the posterior edge of the malleolus
  - Take care of the deltoid ligament!!

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Medial Malleolar Osteotomy

- Maximize exposure
  - Apply valgus stress
  - +/- Laminar spreader

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Medial Malleolar Osteotomy

- Osteotomy site is reduced
  - Pointed reduction forceps
- Internal fixation performed with the guidance of the predrilled screw holes
- Fixated w/3 x 4.0 cannulated screws (titanium preferable for MRI compatibility)

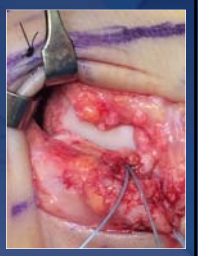
Anterolateral Access

- With plantar flexion most lateral lesions can be addressed w/o osteotomy
- Lateral extensile incision
- 4-6 cm incision medial to fibula, centered at ankle joint
  - Vertical anterolateral arthrotomy
  - Protect SPN, EDL

Scranton et al., JBJS Br 2006

Anterolateral Access

- Bump under heel
  - Plantar flexion
  - Anterior talar subluxation
- Anterior fibular periosteal flap including ATFL release +/- CFL release
- Draw talus forward with K-wire or Schantz pin "joy stick" placed in talar body



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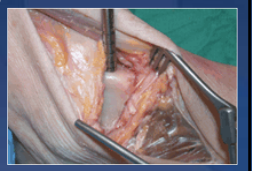
Posterolateral Access w/o Osteotomy

Kreuz et al.

- PL approach b/w peroneals and achilles
- Protect sural n laterally
- Retract FHL tendon medially for best access to PL dome
- DF ankle for most dome exposure



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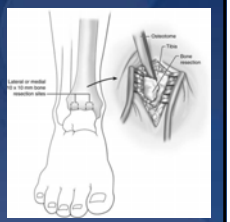
Anterior Tibial Plafondplasty

Peters et al., FAI 2012

- Anterior margin of tibia corresponding to the OLT in the coronal plane is removed w/o damaging native tibial cartilage
- Medial to tibialis anterior
- Lateral to peroneus tertius
- 20mm prox and distal to ankle
- AITFL intact



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Anterior Tibial Plafondplasty

Peters et al., FAI 2012

- 1/4" osteotome, 10mm prox/M/L
- 45° angle with ankle in PF
- Removal 10x10x8 mm window grants perpendicular access to 81% of talus in sagittal plane
  - Additional 20% be accessed with posterior approach

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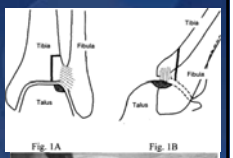
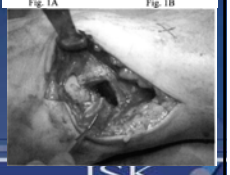
Centro-lateral Access w/Chaput Osteotomy

Tochigi et al., FAI 2002

- Anterolateral approach
- Predrill for 4-0 screw
- Maintain AITFL attachment
- Osteotomy in 2 planes
  - 1-1.5 cm AL fragment
- Complete with osteotome to protect talus
- ER fragment on ligament
- 66% lateral exposure





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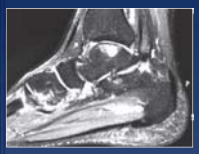
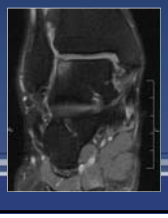
Anterolateral Tibial Osteotomy





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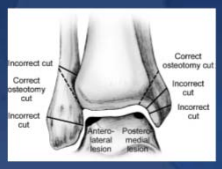
Lateral Access with Osteotomy

- Transverse osteotomy
  - 1 cm proximal to joint line
  - Incise distal syndesmotic ligaments, retract inferiorly
  - Reduce with lateral plate with syndesmotic screw through plate



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Oblique Fibula Osteotomy

- *Garras et al, FAI 2008*
  - Provides greatest access to lateral talar dome
  - No significant difference w/added ligament release
- Supine
- Bump under ipsilateral buttock
- 7cm proximally to tip of fibula
- Minimize periosteal stripping on fibula

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Oblique Fibular Osteotomy

- Oblique cut proximal lateral@45°
  - Create Weber B pattern
- Division inteross ligs, syndesmosis not disrupted, +/- ATFL/CFL
- Translate LM inferior, posterior
- Invert/varus/translate talus
- Pre-drill fibula
  - Provisionally place plate
  - Antiglide fibula fixation

Garras et al, FAI 2008

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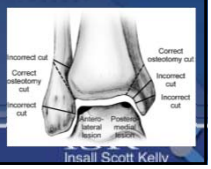
Distal Fibular Window Osteotomy

Allen & DiGiovanni, Tech Ft Ankl 2003

- Rollback fibular window osteotomy
  - Elevate periosteum medial
  - Cuts 5 cm proximal to plafond and 3 cm proximal to this
    - Long enough and proximal enough for access!!
  - Anterolateral arthrotomy, identify inferior portion of AITFL



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Distal Fibular Window Osteotomy

Allen & DiGiovanni, Tech Ft Ankl 2003

- Rollback intercalary fragment laterally
- +/- Schantz pin/K wire in talar body
- Pre-drill fibula for post-reduction fixation
- Stabilize with 1/3 tubular plate with fixation in proximal, intercalary, distal fibula segments

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Combined Fibula,Tibia Chaput Osteotomy

- Best combined access to central and lateral lesions
- Lateral extensile approach
- Tibial osteotomy 45° to plafond in coronal plane, aim PL
- Fibular parallel to tibial
  - 10cm proximal to plafond

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Combined Fibula,Tibia Chaput Osteotomy

- Fixation plate, screws
  - One perpendicular to osteotomy
  - One parallel to plafond

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Osteotomy Post-operative Care

- Non weightbearing splint x 2 wks
- Stitches removed at 2 wks
- Transition to non weightbearing boot x 4 weeks
  - Work on ROM DF/PF
- Progress to full weight bearing beginning after 6 weeks

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Conclusions

- Osteochondral autologous transplantation is a recommended treatment for larger refractory OLT and those with subchondral cysts
- Perpendicular access required for proper graft placement
- Approach used is dictated by size and location of lesion as directed by preop MRI or CT scan

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Conclusions

- The correct osteotomy will improve access more than soft tissue approaches alone
  - Even so, the central 15-24% of the talar dome is still inaccessible perpendicularly
- Fix osteotomies with titanium hardware to allow future MRI examination

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THANK YOU!!!

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