

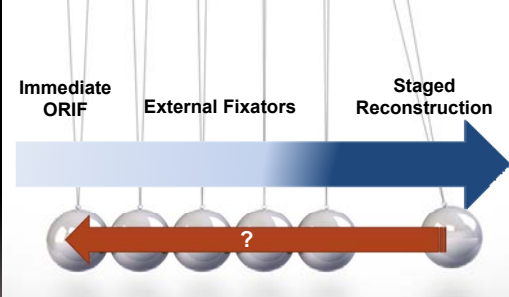
Pilon Fractures



John Ketz, M.D.
CSFS Tampa 2016



History of Treatment



Immediate ORIF External Fixators Staged Reconstruction

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Poor Timing

Wagner, Unfallchir, 1986
Mast, CORR 1988
Trumble, JOT 1992
Wyrsh, JBJS 1996
Helfet, CORR 1994

Guarantees

Soft tissue must be ready for surgical insult

Poor Outcome

Staged Protocols

JOT JOURNAL OF ORTHOPAEDIC TRAUMA

| | |
|---|---|
| <p>Sirkin, 1999</p> <ul style="list-style-type: none">• 56 Pylons• Immediate fibular ORIF with ankle spanning external fixation• Average 12.7 - 14 days to ORIF<ul style="list-style-type: none">• 1.8% wound dehiscence• 3.6% infection | <p>Patterson, 1999</p> <ul style="list-style-type: none">• 22 C3 Pylons• Average 24 days to ORIF• 73% Anatomical reductions• No Infections |
|---|---|

Staged Protocol

| | |
|---|---|
| <p>Early</p> <ul style="list-style-type: none">• Trans-articular external fixation• Fix fibula?• Allow soft tissue stabilization | <p>Late</p> <ul style="list-style-type: none">• Definitive Articular reconstruction• Remove fixator |
|---|---|

External Fixation

- A WELL PLACED EXTERNAL FIXATOR LEAVES YOU OPTIONS

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- DO NOT FIX THE FIBULA **UNLESS YOU ARE THE TREATING SURGEON**

TREATED ELSEWHERE AND TRANSFERRED
DRAINING WOUND: COULD NOT ADJUST INCISIONS

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9

Stage 1

- Allows you time to evaluate the **PATIENT**
- Allows you time to evaluate the **FRACTURE**
- Allows the **SOFT TISSUES** healing time

- **GOAL IS TO NOT BURN BRIDGES**

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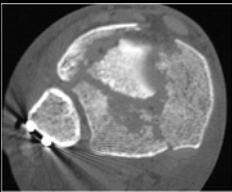
Options for Definitive Treatment

- ORIF
- External Fixation/Ring Fixator
- Primary Fusion
- Percutaneous

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Stage 2 Goals -Strategy

- Multiple Incision Options
 - Based on soft tissues
 - Articular Involvement
 - Multiple small (percutaneous)



Tornetta et al. CORR 1996

Stage 2 Goals -Strategy

- Anteromedial



The image shows two views of an anteromedial approach. On the left is an intraoperative photograph of a knee with a vertical incision. On the right is an axial CT scan of the knee with an orange arrow pointing to the anteromedial region.

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Stage 2 Goals -Strategy

- Anterolateral



The image shows two views of an anterolateral approach. On the left is an intraoperative photograph of a knee with a diagonal incision. On the right is an axial CT scan of the knee with an orange arrow pointing to the anterolateral region.

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Stage 2 Goals -Strategy

- Anterior



The image shows three views of an anterior approach. On the left is an intraoperative photograph of a knee with a horizontal incision. In the middle is a coronal CT scan of the knee. On the right is an axial CT scan of the knee with an orange arrow pointing to the anterior region.

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Stage 2 Goals -Strategy

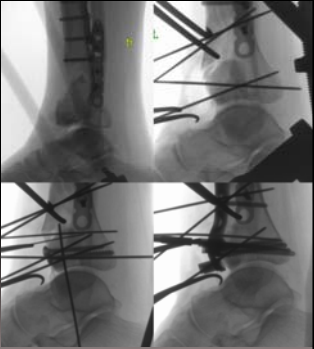
- Anterior "workhorse incision"



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Stage 2 Goals -Strategy

- Begin with Posterolateral Fragment
- Fix posteromedial to posterolateral
- Reduce central impaction
- Reduce Medial and Anterolateral fragments
- Provisional wire fixation
- Lag Screw Fixation
- Fix articular block to diaphysis



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Pilon Fractures

- Staged Fixation


Initial ex-fix +/- ORIF fibula

What Happens? ↓ Soft Tissue Improves Partial Healing

Definitive Fixation

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Complex Articular Injury



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Pilon Fractures

Good Reduction  Good Results
Bad Reduction  Bad Results

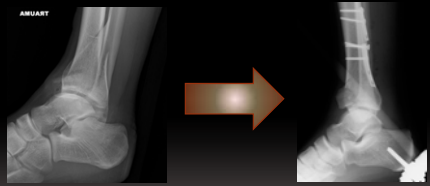


How do we improve reductions?

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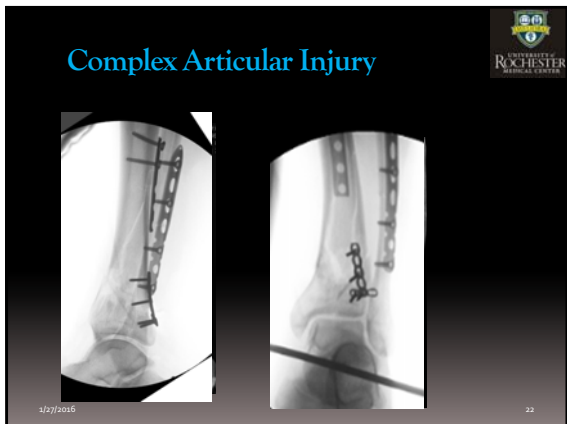
Complex Articular Injuries

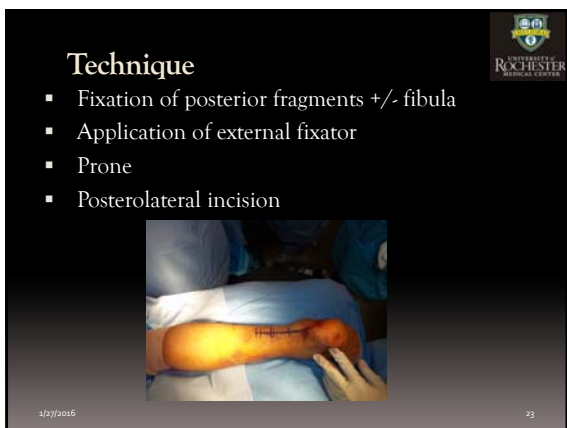
- More staged soft tissue friendly incisions
- Initial Ex-fix with limited ORIF

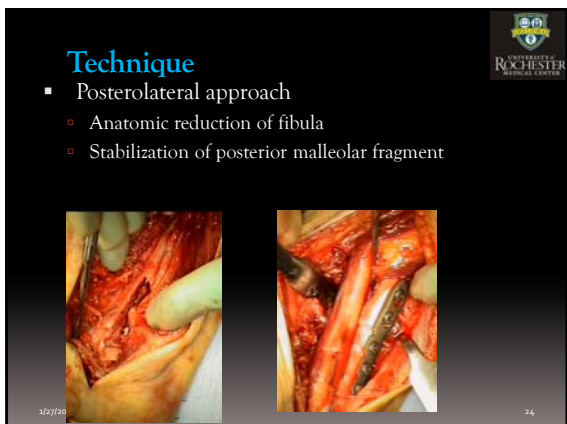


43 C → 43 B

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Technique


- Posterior Tibial fixation
 - 3.5 mm buttress plate
 - 2.4 mm/2.0 mm plates



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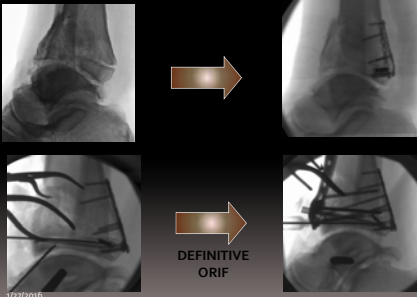
Technique

- Postoperative CT
 - Assess reduction
 - Revision?
 - Posterior fragment impaction
 - Incisions for definitive fixation



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Technique

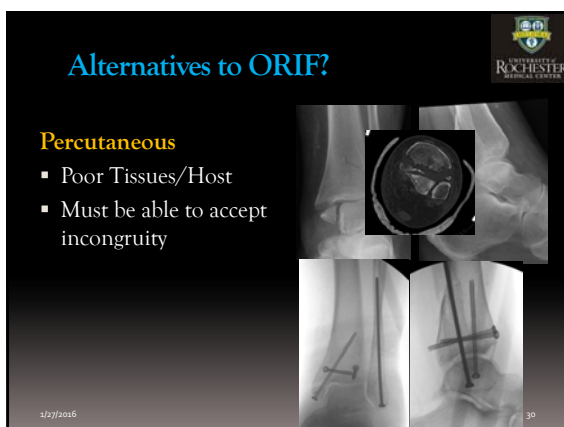


DEFINITIVE ORIF

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Alternatives to ORIF?

IM Nailing + Limited ORIF

- Shaft Nonunion
- Limited Joint Comminution




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Alternatives to ORIF?

Primary Fusion

- Not Good Host
 - Comorbidities
 - Noncompliance
- Soft Tissue Issues



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Post-op Protocol

- Immobilization until sutures out (2-4 wks)
- Cam walker until able to keep foot at neutral
- NWB for 10-12 weeks

Outcomes

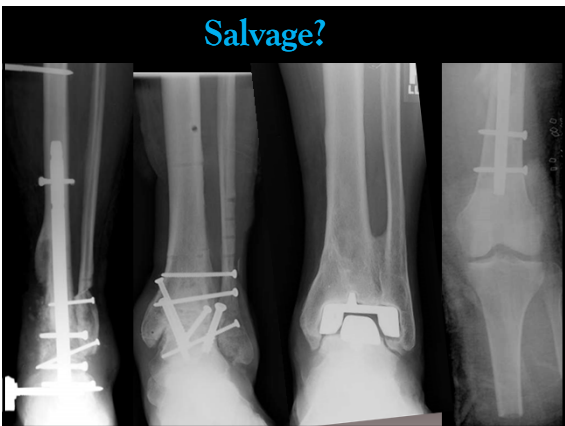
- Patients get better for up to 2.4 years (perception)
 - Ankle scores improve with time
- Increase arthritis with time
 - Radiographic

Marsh, JBJS 2003

Outcomes

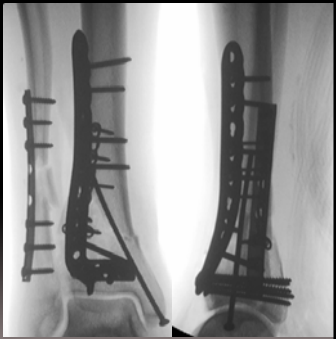
- Negative long term impact on function
- Limitation in recreation
 - Running (27/31)
- Half change jobs

Marsh, JBJS 2003




Summary

- Difficult fractures
- No single treatment method
- Staged protocol
- Patience



Summary

- Biological exposure & fixation
- Anatomic restoration of the articular surface
- Rigid fixation to allow early motion



Thank You

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