PILON FRACTURES: HOW TO PLAN INCISIONS

John Ketz, MD

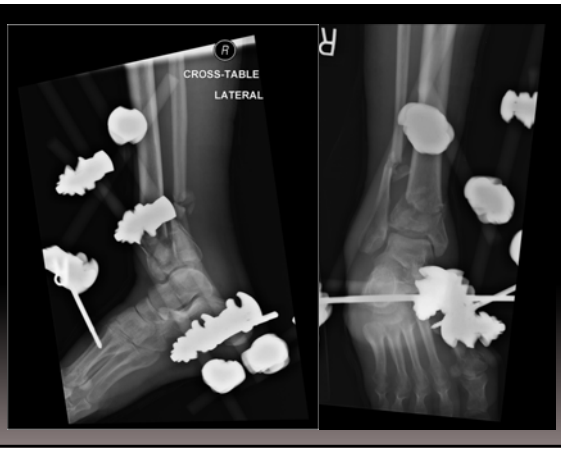
Introduction

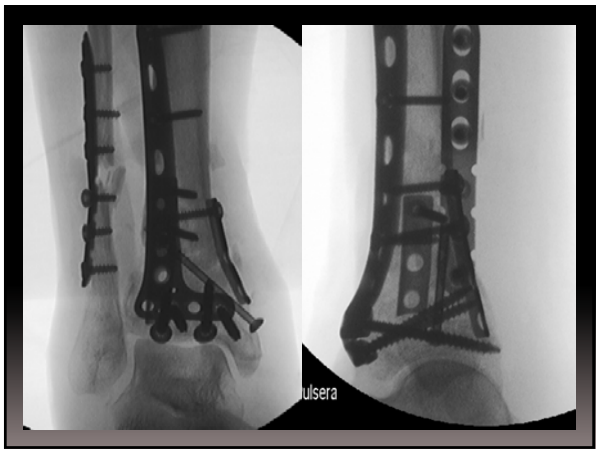
- Pilon fractures are complex injuries
- Soft tissue injury
- Anatomical reduction is key for good outcomes

DON'T BURN BRIDGES

Pilon Fractures

A WELL PLACED EXTERNAL FIXATOR LEAVES YOU OPTIONS



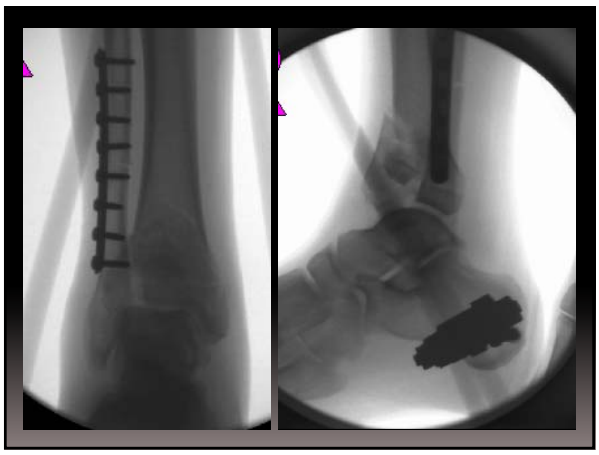


Pilon Fractures

DO NOT FIX FIBULA

UNLESS

YOU ARE THE TREATING SURGEON



Axial Computed Tomography of Pilon Fractures

Paul Tornetta III, MD; and John Gorup, MD

Better understanding of #fragments/impaction

The operative plan was changed in 14 (64%) patients

Additional information was gained in 18 (82%) patients.

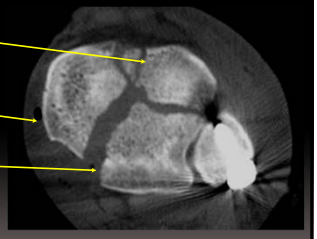
Articular Injury

- 3 Major Fragments

Anterolateral Articular (Chaput)

Medial Malleolus

Posterior Articular (Volkmann's)



Pilon Fractures

- Staged Fixation

Initial ex-fix +/- ORIF fibula

What Happens?

Soft Tissue Improves

Partial Healing

Definitive Fixation

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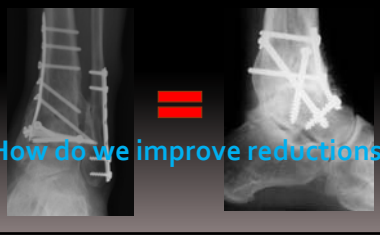
Pilon Fractures

Good Reduction ? Good Results

Bad Reduction = Bad Results



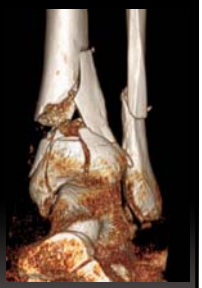
How do we improve reductions?

Incisions

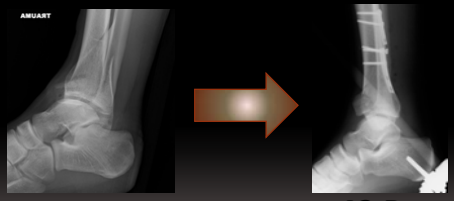
- Posteromedial
- Posterolateral
- Anterior
- Anterolateral
- Anteromedial
- Percutaneous

Pilon Fractures

- Type C fractures
  - Bad soft tissues
  - Bad joint injury
  - Often have posterior malleolar fragment(s)



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



43 C

43 B

TECHNICAL TRICK

Early Limited Internal Fixation of Diaphyseal Extensions in Select Pilon Fractures: Upgrading AO/OTA Type C Fractures to AO/OTA Type B

Robert P. Dunbar, MD, David P. Barei, MD, FRCS(C),* Erik N. Kubiak, MD,† Sean E. Nork, MD,* and M. Bradford Henley, MD, MBA**

J. Orthop. Trauma
2008: V.22, pp. 426 - 9

ORIGINAL ARTICLE

Staged Posterior Tibial Plating for the Treatment of Orthopaedic Trauma Association 43C2 and 43C3 Tibial Pilon Fractures

John Ketz, MD and Roy Sanders, MD†*

J. Orthop. Trauma
2012: V.26, pp. 341-6

Pilon Fractures

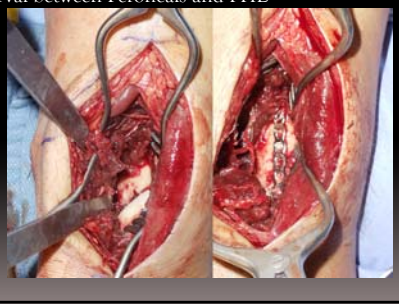
- Posterolateral approach
  - Displaced posterior fragments
  - Prone
  - ORIF fibula through same approach

Technique

- Fixation of posterior fragments +/- fibula
- Application of external fixator
- Prone
- Posterolateral incision

Ankle Fractures

- **Posterolateral approach**
  - Interval between Peroneals and FHL

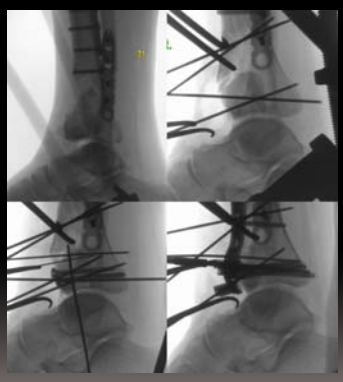


Technique

- Posterolateral approach
  - Anatomic reduction of fibula
  - Stabilization of posterior malleolar fragment

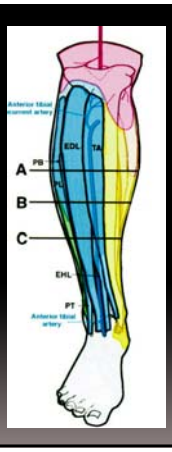
Advantages

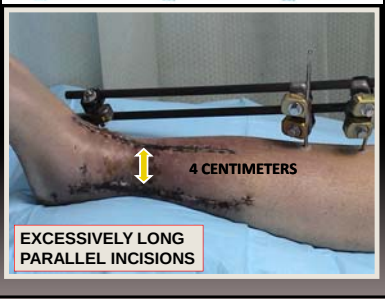
- Better visualization of fragments
- One incision at a time
- Limited tourniquet time
- Allows for revision



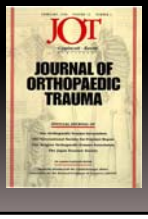
Disadvantages

- Increased nonunion risk
- Infection/Nonunion with posterior hardware





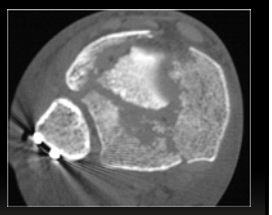
An understanding of the concept of angiosomes explains why surgical incisions can be safely placed within 7 cm of each other. Introduced by Taylor and Palmer[15] in 1987, an angiosome is defined as a composite block of tissue that is supplied anatomically by source vessels that span between the skin and bone.[16] The source vessels of these angiosomes produce branches that supply the deep tissues as well as the



Stage 2 Goals -Strategy

Multiple Incision Options

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

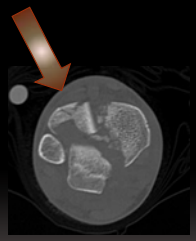


Stage 2 Goals -Strategy

Anteromedial

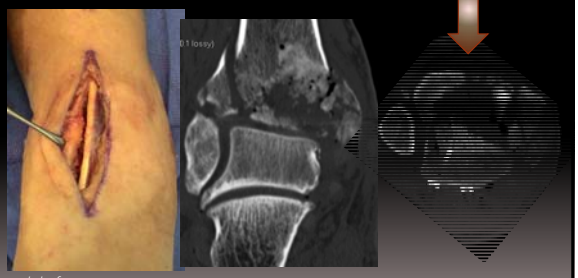
Stage 2 Goals -Strategy

Anterolateral



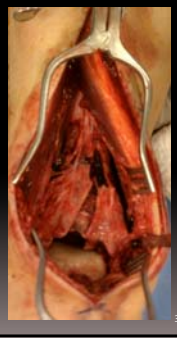
Stage 2 Goals -Strategy

Anterior



Stage 2 Goals -Strategy

- Anterior "workhorse incision"
- My preferred incision



What about the "7cm" Rule ?

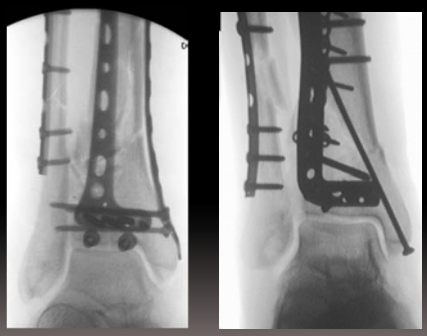
- Multiple smaller approaches
- Allows for fracture specific fixation

Incision Placement

- 42 patients, 46 plafond fractures
- Two surgical approaches in 32 fractures
- Three Surgical approaches in 14 fractures
- Skin bridges:
  - 5.0 to 5.9 cm (25)
  - 6.0 to 6.9 cm (16)
- Soft tissue complications in 4 fractures (9%)

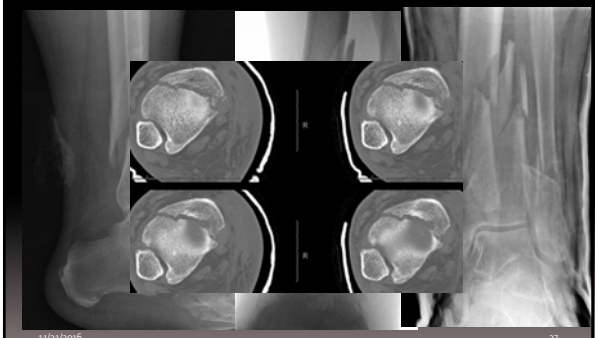
Howard et al. J Orthop Trauma. 22(5) 299-305.

Percutaneous Techniques



Percutaneous Techniques

Percutaneous Techniques



Percutaneous Techniques

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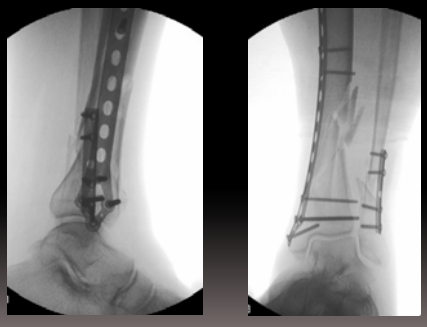
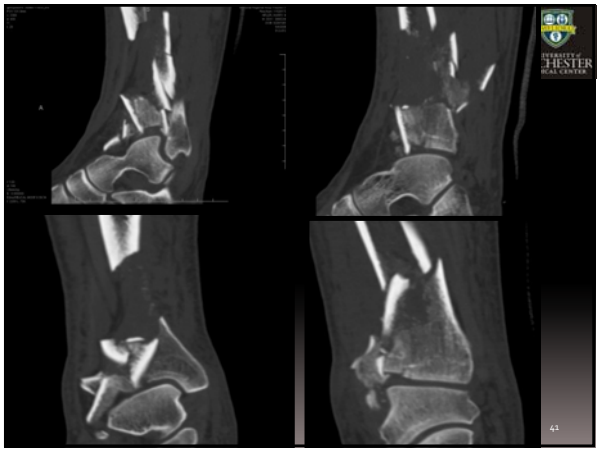
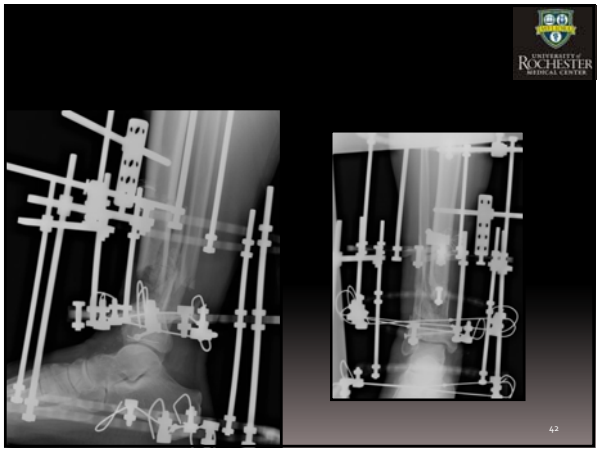
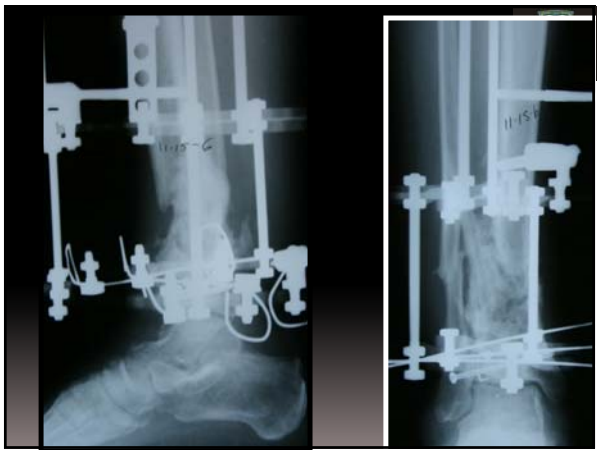


Percutaneous Techniques







Alternatives

LARGE WOUNDS MAY ALTER FUTURE SURGERY

Alternatives


A
A
R
F
C
A
A
11/21/2016
46


A
A
A
A
11/21/2016
47


11/21/2016
48

Summary

- Difficult injuries with multiple treatment options
- Poor planning can be devastating
- Plan according to the fracture
- Plan according to the patient