


Distal Femur Nonunion Help!


Trauma 101
Clearwater 2016

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Introduction

- Help prevent/treat the nonunion?
- Touch on both




Introduction

- Modern fixation techniques
 - Locking plates
 - SS, titanium, polyaxial, Far Cortex Locking
 - SC specific IMN
 - Minimally invasive
- Large cancellous bone surface
- Union rates 84-97%
 - Ricci et al JOT 2014
 - Vallier JOT 2012, LCP 16% v CBP 3.4%



Causes of Failure

- Metabolic
- DM
- Smoking



Causes of Failure

- Open fractures
- High energy




Causes of Failure

- Poor reduction
- Poor fixation/plate position




Causes of Failure

- Short plate length
 - 9 holes on prox frag
 - Ricci et al JOT 2014



Surgeon Controlled Factors

- Reduction
 - Simple = ORIF, lag screws, compression
 - Comminuted = bridge plate, minimally invasive, no medial dissection





Surgeon Controlled Factors





Surgeon Controlled Factors

- Longer plates
- At least 9 holes on prox frag



Surgeon Controlled Factors

- Staged bone graft
 - Open fx
 - Very high energy



DF Nonunion Workup General

- Labs
 - CBC, ESR, CRP
- Nutritional
 - Liver
 - Total protein, albumin




DF Nonunion Workup History

- Personality of the fx
- Mechanism
 - High vs low energy
- NV involvement
- Infection
- Hardware
- Social factors
 - Drugs, ETOH
- Smoking
- Occupation
- Goals





DF Nonunion Workup Physical Exam

- Deformity
- Stability
- Joint motion
- Limb length
- Gait
- Associated injuries
- Soft tissue
 - Scars, flaps, edema
- NV
 - ABI, TCO2



Workup Xrays

- Std AP, Lat
- Deformity, limb length
 - Long leg standing
 - Scanogram
 - Opposite limb
- CTs hard to interpret
 - Useful for evaluating joint and intercondylar healing



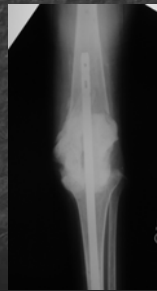
DF Nonunion Goals

- Most NUs multifactorial or unknown
- ID causes, clear infection
- Correct deformity
- Provide stability
- Respect the soft tissue
- Augment biology



Decision Making

- Is it infected?
 - ROH, ex fix
 - ATB spacer
 - IV ATBs
- Convert septic NU to aseptic NU



Decision Making

- Limb length discrepancy or defect
- Shorten
 - Advantage of vascularized bone on vascularized bone
 - What to do with LLD?
- Equalize LL
 - Bone graft, large
 - Need healthy soft tissue
 - Prolonged healing, fixation implications



Decision Making Ideal Goals

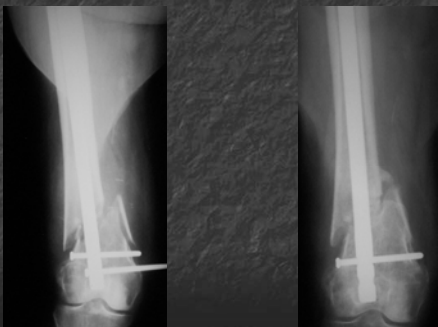
- Based on Ilizarov principles
- Stability
 - Compression
- Correct alignment
- Vascularity
 - Healthy bone to healthy bone
 - Distraction of corticotomy increases perfusion
- Function, early weight bearing

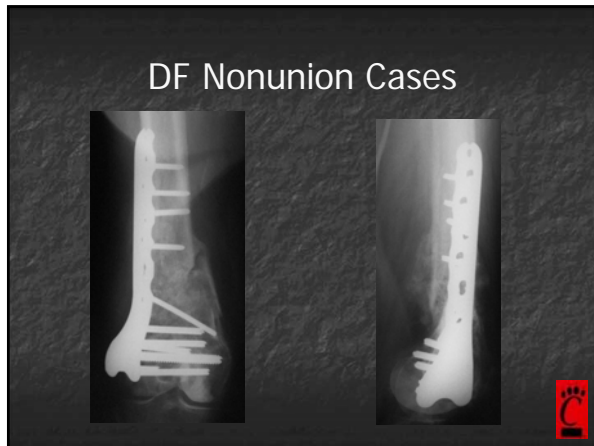


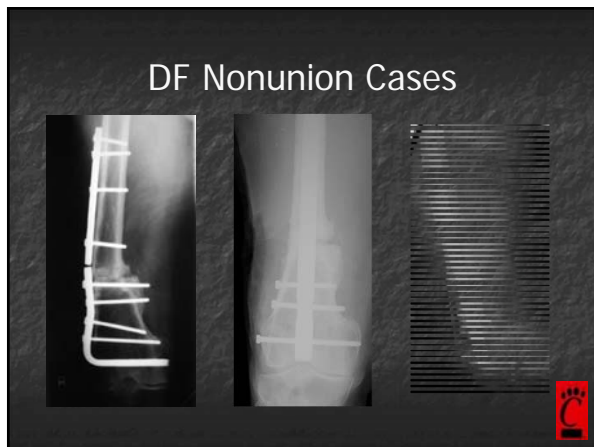
Alignment

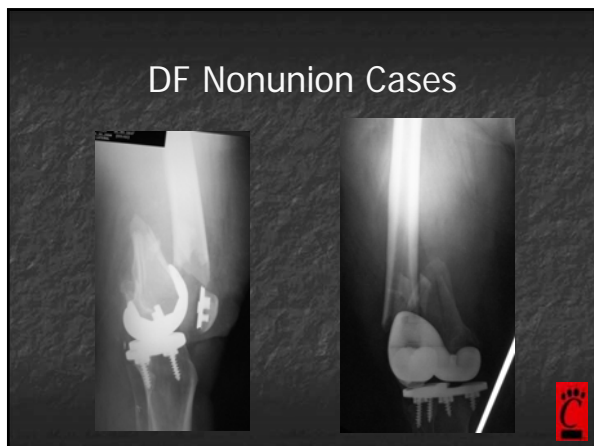


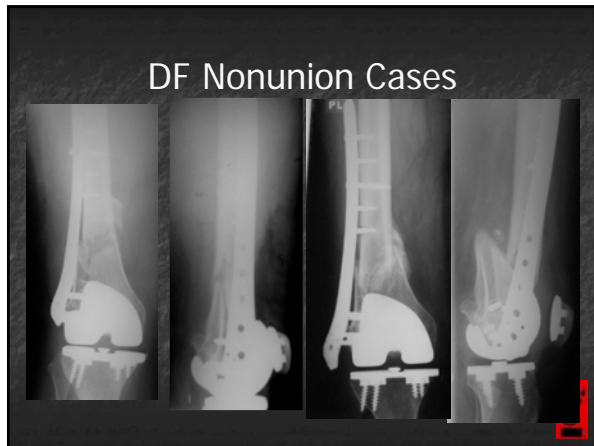
DF Nonunion Cases

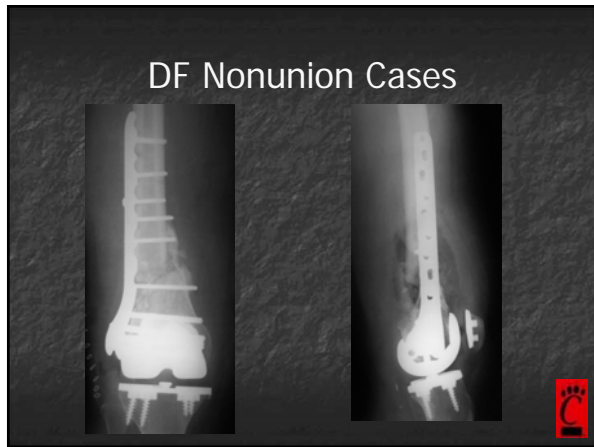




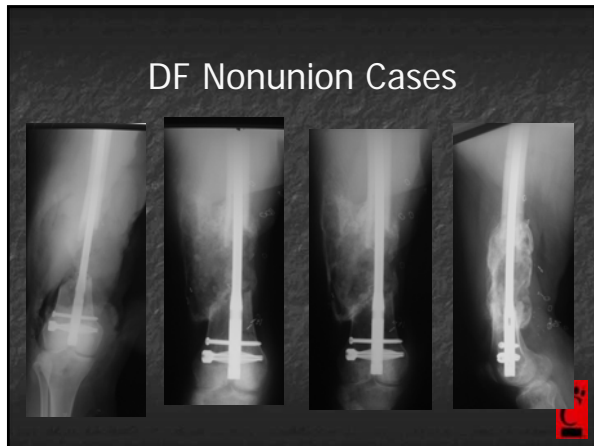


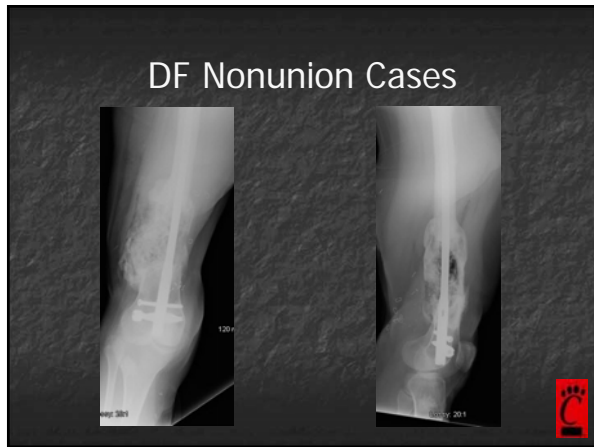
















- No sign of infection
- Still with L hum neck NU
- What's the plan?
 - Watch?
 - Stage?
 - Fixation strategy?




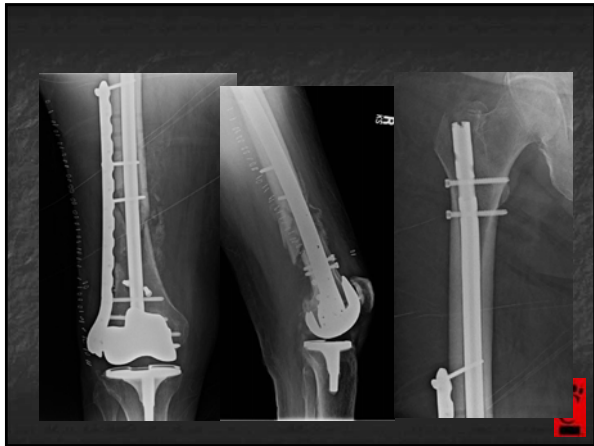
Returns 2 wks later increasing pain



My thinking

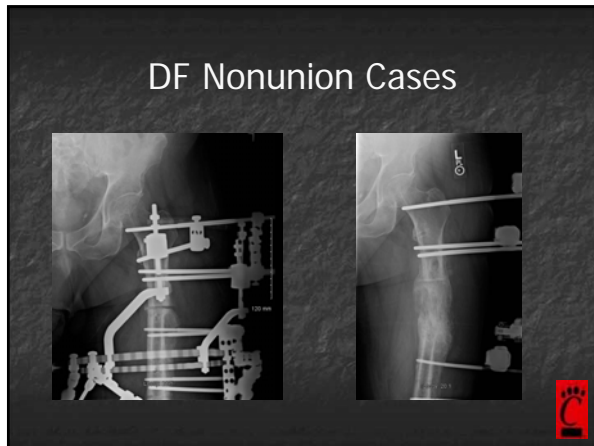
- Not infected
- He's an alcoholic without doubt
- He has humeral NU
- He is going to wt bear, no doubt
 - IMNs best load sharing devices
 - Bigger the better

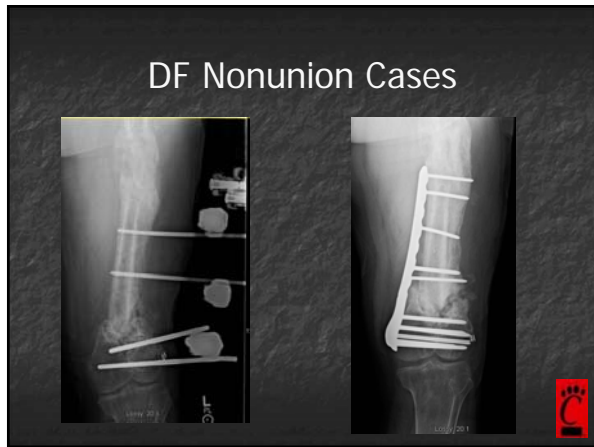


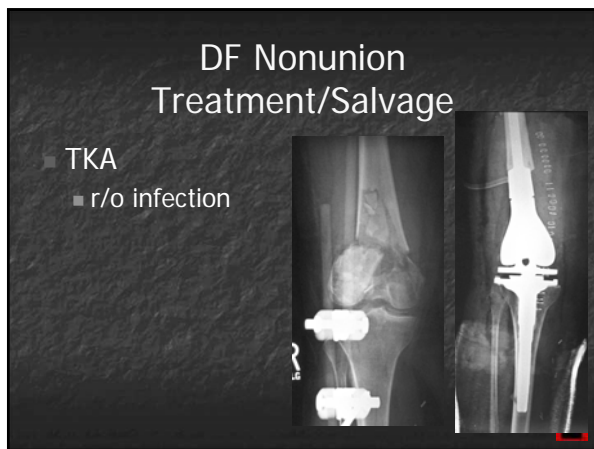














DF Nonunion Treatment/Salvage

- TKA
 - r/o infection
- AKA



Life is short, Have some fun



- 1. Haidukewych et al, JBJS 07, 89:614
- 2. Injury 05
- 3. Vallier et al, JOT 2012, 26:327