PLEASE CLICK ON THE FOLLOWING LINK TO WATCH THE LECTURE ONLINE:-

https://www.youtube.com/watch?v= qoT0jEu 800



DISTAL RADIUS FRACTURES

MOHAMMAD ALSAAIDEH

30 yrs old male





30 yrs old male



CT

DORSAL



VOLAR



70 YRS FEMALE NON DOMINANT HAND





70 YRS FEMALE NON DOMINANT HAND



Epidemiology



Most common orthopedic fracture seen in the A &E

 The second most common fracture in the elderly

• More common in females (especially after 50)

RISK FACTORS

• OSTEOPOROSIS

can be the first fracture or sentinel fracture indicating the presence of osteoporosis.



RISK FACTORS

•Impaired Postural stability

These patients are fitter and have intact reflexes compared to those with proximal humerus or NOF #s



Mechanism of injury

• Mostly a fall on outstretched hand from standing height...

dosrally angulated #s occur when the wrist is dorsiflexed 40-90 degrees , volar shear #s occur with wrist flexion .

• Fall from height , RTAs , industrial injuries are other mechanisms.

• INTEROSSEOUS LIGAMENT INJURIES 15-30%

- ✓ scapholunate & lunotriquetral ligs.
- \checkmark difficult to diagnose in the settting of DR #s.
- ✓ The management of these injuries remains controversial and is left to surgeon discretion

• Triangular Fibrocartilage Complex Injury

- ✓ 40-80% of cases
- ✓ most are peripheral avulsions associated with ulnar styloid fractures
- ✓ usually treated conservatively

- Chondral injuries (32%)
- ✓ likely to contribute to posttraumatic arthritis

- Scaphoid and other carpal fractures
- ✓ should be managed in the same manner as if they occurred separately

- Acute carpal tunnel syndrome
- The most urgent injury & must be addressed urgently
- ✓ median nerve contusions are also frequent and can be monitored for resolution
- ✓ PTs are higher risk to develop chronic carpal tunnel syndrome after DR #s

ANATOMY



ANATOMY



ANATOMY









WHEN TO ACCEPT AS A TRUE PA ??





WHEN TO ACCEPT AS A TRUE PA ??



xrays

- ✓ radial inclination
- ✓ NL 23 degrees
- ✓ accept <5 deg loss





✓ radial height

✓ NL 13mm

✓ accept
 <5mm
 shortening



xrays

✓ volar tilt

✓ NL 11 degrees

✓ accept up to 5deg dorsal tilt



xrays

- ✓ulnar variance
- ✓ a measure of radial shortening and should not be confused with radial height

✓ NL is zero



XRAYS

TEAR DROP ANGLE (NL 70)





ORTHOFIXAR.COM

XRAYS TDA

TEAR DROP ANGLE NL 70

CT

✓ TO ASSESS....

- ✓ INTRARTICULA EXTENSION
- ✓ STEP OFF
- ✓ COMMINUTION



CT

TO ASSESS THE DIE PUNCH #S



3D CT



CLASSIFICATIONS

- many classification systems developed to describe DR#s over the years
- Most are based on radiographic evaluation

• None have yet been developed to add significant practical value for treatment.

AO



2R3 Distal end segment



2R3AExtraarticular2R3A1Radial styloid avulsion2R3A2Simple2R3A3Wedge or multifragmentary



2R3B Partial articular
2R3B1 Sagittal
2R3B2 Dorsal rim (Barton's)
2R3B3 Volar rim (reverse Barton's, Goyrand-Smith's II)



2R3C3

2R3C Complete articular

2R3C1 Simple articular and metaphyseal
2R3C2 Multifragmentary metaphyseal
2R3C3 Multifragmentary articular, simple or multifragmentary metaphyseal

• COLLE'S #



Source: Usatine RP, Smith MA, Mayeaux EJ, Chumley HS: The Color Atlas of Family Medicine, Second Edition: www.accessmedicine.com Copyright © The McGraw-Hill Companies, Inc. All rights reserved.

SMITH



volar barton



DORSAL BARTON


Signs & Symptoms

✓ PAIN
 ✓ SWELLING
 ✓ GROSS DEFORMITY
 ✓ OPEN WOUNDS
 ✓ NUMBNESS
 ✓ ECCHYMOSIS

DINNER FORK DEFORMITY







 The goal to maintain a patient's functional status and therefore depends greatly on the individual demands

- ✓ factors to consider ..
- FRACTURE PATTERN
- AGE
- FUNCTIONAL STATUS
- HAND DOMINANACE
- COMORBIDITIES
- PATIENT EXPECTATIONS





 PATEINTS WITH DISPLACED FRACTURES SHOULD UNDERGO CLOSED REDUCTION IN ER

 local hematoma block (MOST COMMONLY USED), intravenous (IV) conscious sedation, regional anesthesia, or general anesthesia

- Nonoperative management
- external fixation
- Internal fixation:
- ✓ CRPP
- ✓ ORIF volar plate DVR
- ✓ ORIF dorsal plate
- ✓ fragment-specific fixation
- ✓ dorsal spanning plate.
- ✓ COMBINATIONS OF ANY

- NON OPERATIVE .
- remains the most common mean of treating distal radius fractures
- Recent studies have shown that older physicians are more likely to choose nonoperative management than those under age 40

CLOSED REDUCTION



NON OPERATIVE

• BELOW ELBOW CAST .

• NO BENIFIT FOR ABOVE ELBOW CAST.

• ALWAYS KEEP THE MCP JOINTS FREE

NON OPERATIVE

• NON DISPLACEDCAST 4-6 WEEKS WITH A SINGLE FOLLOW UP

• IF STABLE AFTER REDUCTION..WEEKLY FOLLOW UP TO 3 WEEKS THEN AT 6 WEEKS.

PREDICTING INSTABILITY

- ✓ Dorsal angulation more than 20 degrees (INITIAL DISPLACEMENT)
- ✓ metaphyseal comminution
- ✓ Intra-articular radiocarpal fracture
- ✓ Associated ulna fracture
- ✓ Age over 60

NON OPERATIVE

 Low-demand patients in whom surgery is not a reasonable option maybe splinted or casted for 3 to 4 weeks.

OPERATIVE Rx

 AAOS does not recommend for or against any one specific method of operative fixation of distal radius fractures



• little equipment and is minimally invasive

 unstable extra articular or minimally articular distal radius fractures

• A large intra-articular radial styloid fracture can be managed well with percutaneous wires

• No difference has been shown between techniques or number of pins (at least 2)

 at least 1.6-mm (0.062-inch) K-wires should be used.

• WIRES ARE LEFT FOR 6 WEEKS WITH A CAST

- COMPLICATIONS :
- ✓ PIN TRACT INFECTION

✓ SUPERFASCIAL RADIAL NERVE INJURY (15%)

ORIF / VOLAR PLATE (DVR)

 unstable extra-articular fracture



• volar shear patterns (BARTON)

• complete articular fractures

ORIF / VOLAR PLATE (DVR)

• There must be sufficient bone in the distal fragment for placement of screws

 specialized plates designed to fit the volar rim of the distal radius are becoming more available

RIM PLATES



В

FCR APPROACH



FCR APPROACH



ORIF / VOLAR PLATE (DVR)

 A sigmoid notch view of the distal radius should be obtained to confirm that a true AP view is used to judge fracture reduction and plate positioning

sigmoid notch view



dorsal tangentional view



VOLAR LUANTE FRAGMENT

 Care should be taken to identify fractures of the volar lunate facet and confirm that these fragments are captured to avoid later loss of fixation

VOLAR LUANTE FRAGMENT



В

ORIF / VOLAR PLATE (DVR)

• COMPLICATIONS :

*****SOFT TISSUES IRRITATION**

✓ VOLARLY BY THE PALTE ITSELF ---FPL RUPTURE

✓ DORSALLY BY PROMINENT SCREWS--EPL RUPTURE

ORIF/ DORSAL PLATE

• LESS COMMON THAN BEFORE , AFTER THE WIDESPREAD OF VOLR PLATES.

• FOR DORSAL SHEAR FRACTURES & DIE PUNCH COMPONENTS

ORIF/ DORSAL PLATE



ORIF/ DORSAL PLATE

 SOFT TISSUES IRRITAION AND EXTENSOR TENDON RUPTURES ARE THE COMMON COMPLICATIONS

FRAGEMENT SPECIFIC FIXATION



FRAGEMENT SPECIFIC FIXATION





EXTERNAL FIXATOR

• Used for distal radius fractures with soft-tissue compromise or those not amenable to ORIF

*COMPICATIONS -PIN SITE INFECTION -SRN INJURY -STIFFNESS & CRPS



EXTERNAL FIXATOR



А

DORSAL SPANNING PLATE

• Another option for treating severely comminuted distal radius fractures.

- ALLOWS IMMEDIATE WEIGHT BEARING
- removed after 3 months
- ******complications:
- tendon irritation & stiffness

DORSAL SPANNING PLATE


Percutaneous Pinning Versus External Fixation

• two studies

• no significant difference in radiologic outcome, complications, or function

Percutaneous Pinning Versus Volar Locked Plating

SCIENTIFIC ARTICLES

Functional Outcomes for Unstable Distal Radial Fractures Treated with Open Reduction and Internal Fixation or Closed Reduction and Percutaneous Fixation

A Prospective Randomized Trial

Rozental, Tamara D. MD¹; Blazar, Philip E. MD²; Franko, Orrin I. BS³; Chacko, Aron T. BS¹; Earp, Brandon E. MD²; Day, Charles S. MD¹

found better scores in the volar plating group at 6, 9, and 12 weeks, but no significant difference at 1 year.

External Fixation Versus Volar Locked Plating

Bridging external fixation and supplementary Kirschner-wire fixation versus volar locked plating for unstable fractures of the distal radius: a randomised, prospective trial

K Egol ¹, M Walsh, N Tejwani, T McLaurin, C Wynn, N Paksima

At 1 year, each group had similar function and the overall complication rates were similar

Volar Locked Plating Versus Fragment-Specific Fixation

 Randomized Controlled Trial
 > J Hand Surg Am. 2017 Mar;42(3):156-165.e1.

 doi: 10.1016/j.jhsa.2016.12.001. Epub 2017 Jan 11.

Fragment-Specific Fixation Versus Volar Locking Plates in Primarily Nonreducible or Secondarily Redisplaced Distal Radius Fractures: A Randomized Controlled Study

Marcus Landgren¹, Antonio Abramo², Mats Geijer³, Philippe Kopylov², Magnus Tägil²

Affiliations + expand PMID: 28089163 DOI: 10.1016/j.jhsa.2016.12.001

no difference in outcomes, but they found a higher complication rate in fragment-specific fixation

#s in the elderly

 Meta-analyses and systematic reviews demonstrate no difference in functional outcomes between closed treatment versus operative methods in elderly patients (>65 years old)



TENDON INJURIES

• The EPL tendon is the most commonly ruptured tendon.

Transfer of the (EIP) tendon is the treatment method

 Flexor tendon ruptures that occur from plate irritation can be managed with hardware removal and primary repair, tendon grafts, or transfers

MALUNION

• Occurs commonly in elderly patients managed nonoperatively.

• Treatment should focus on the symptomatic patient and not on radiographic appearance.

• Rx by DR OSTEOTOMY +- ULNA OSTEOTOMY

COMPLEX REGIONAL PAIN SYNDROME

• The 2009 AAOS CPG made a moderate recommendation for the use of vitamin C .

Review > J Orthop Trauma. 2015 Aug;29(8):e235-41. doi: 10.1097/BOT.000000000000305.

Vitamin C to Prevent Complex Regional Pain Syndrome in Patients With Distal Radius Fractures: A Meta-Analysis of Randomized Controlled Trials

Nathan Evaniew ¹, Colm McCarthy, Ydo V Kleinlugtenbelt, Michelle Ghert, Mohit Bhandari

Affiliations + expand PMID: 26197022 DOI: 10.1097/BOT.000000000000305

vitamin C fails to demonstrate a significant benefit

Back to the first case.....



