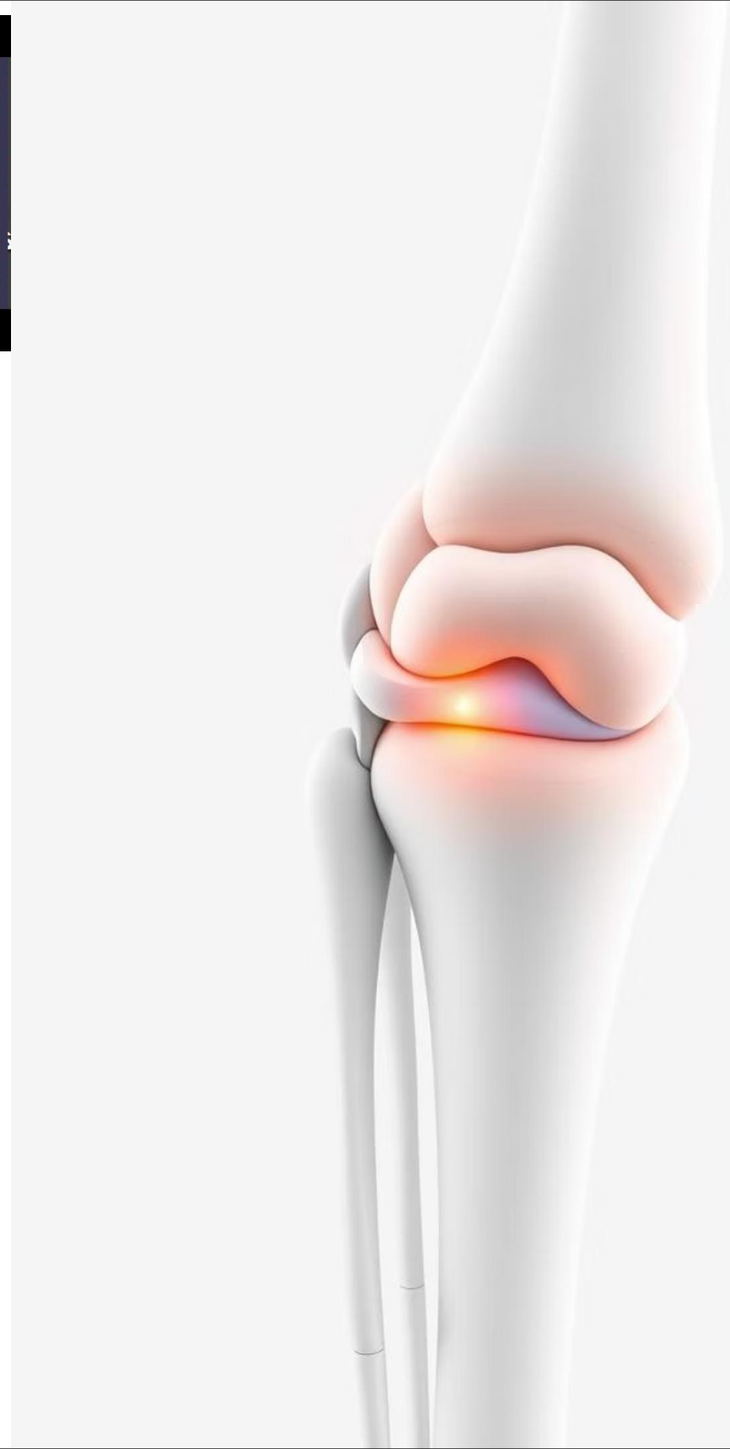
Distal Humerus Fractures: Presentation & Management

Distal humerus fractures are challenging intra-articular elbow injuries, requiring meticulous surgical planning and execution for optimal outcomes.



KEY ANATOMY AND EPIDEMIOLOGY

1

Elbow Anatomy

Composed of the medial/lateral epicondyles, capitellum, trochlea, and olecranon/coronoid fossae.

2

Fracture Types

Primarily supracondylar, intercondylar (T, Y, H-type), and condylar fractures.

3

Bimodal Distribution

Affects young males due to high-energy trauma and elderly females from low-energy falls and osteoporosis.

4

Incidence

Accounts for 30% of all elbow fractures in adults.

Classification Systems

AO/OTA Classification

The most widely used system for classifying these fractures.

Type A: Extra-articular fractures (e.g., supracondylar).

Type B: Partial articular fractures (e.g., capitellum, trochlea).

Type C: Complete articular fractures with intra-articular extension and articular surface disruption.

Jupiter Classification

A more detailed sub-classification specifically for C-type fractures, including H-type, T-type, and Y-type configurations.

These classifications are crucial for guiding surgical approach and fixation strategy.

Clinical Presentation & Diagnostic Imaging

1

Symptoms

Severe pain, swelling, visible deformity, and inability to move the elbow.

2

Neurovascular Assessment

Critical check for radial, ulnar, median nerve function, and brachial artery pulse.

3

Imaging Essentials

X-rays: Standard AP, lateral, and oblique views. **CT Scan:** Essential with 3D reconstruction for surgical planning, assessing comminution, and articular involvement. **MRI:** Rarely needed, considered only for significant soft tissue or ligamentous injury.

Treatment Principles & Options

1

Treatment Goals

Achieve anatomic articular reduction, stable fixation, and enable early range of motion (ROM) to optimize recovery.

2

Non-Operative Care

Rarely used, only for non-displaced fractures, stable fragments, or medically unfit patients. Involves 3-4 weeks in a short-arm cast/splint followed by progressive ROM.

3

Operative Management

ORIF (Open Reduction Internal Fixation): The standard for displaced intra-articular fractures, promoting early motion and better functional outcomes. **TEA (Total Elbow Arthroplasty):** For severely comminuted fractures in elderly, low-demand patients (e.g., >70 years old).

Surgical Approaches & Fixation Strategies

Surgical Approaches

Posterior Approach with Olecranon Osteotomy: Most common, offering excellent exposure of the distal humerus.

Triceps-Sparing/Splitting Approaches: Less extensive, avoids the need for an osteotomy.

Fixation Methods

Dual Plating: Standard technique, using orthogonal or parallel plate configurations.

Plate Application: Two precontoured locking plates applied to medial and lateral columns for stability.

Interfragmentary Screws: Used for precise articular reduction.

A strong construct is essential to withstand early mobilization.

Post-operative Management & Rehabilitation

Brief Immobilization

5-7 days in a posterior splint for initial comfort and swelling control.

Early Protected ROM

Initiated within 1 week post-op. Focus on active-assisted motion; CPM machine may be used. Avoid aggressive passive stretching.

Progressive Strengthening

Starts at 6-8 weeks, once signs of bony healing are evident, gradually increasing intensity.

Weight-Bearing Restrictions

Typically 8-12 weeks, depending on fracture stability and healing progress.

Full Recovery

Can extend from 6 to 12 months, requiring patience and dedication.

Potential Complications & Prognosis

Common Complications

Stiffness/Loss of ROM: Affects 30-50% of patients.

Ulnar Nerve Neuropathy: Occurs in 10-25% of cases.

Non-union or Malunion: Seen in 5-10%, often requiring revision.

Heterotopic Ossification: Abnormal bone formation (5-10%).

Infection: Less than 5% incidence.

Hardware Prominence/Pain: May necessitate removal in 15-20%.

Prognosis

With proper management, functional outcomes are generally good to excellent. However, the recovery process is demanding and requires consistent effort.