Comparison between external fixation and plate fixation for intraarticular distal radial fractures

Essay

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Abstract

The final outcome in distal radius fracture management is dependent on many factors and can be influenced by accurate restoration of the anatomy, minimal disruption of the surrounding tissues, and early active wrist rehabilitation

Key word: fixation, intraarticular, orthopedic

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AO	Arbeitsgemeinschaft fur Osteosynthesefragen
AP	Anteroposterior
BR	Brachioradialis
CRPS	Complex regional pain syndrome
DRF	Distal radial fractures
DRUJ	Distal radioulnar joint
EPL	Extensor Pollicis Longus
FCR	Flexor carpi radialis
FFH	Fall from a height
FPL	Flexor pollicis longus
IFZ	Intermediate fibrous zone
LCP	Locking compression plate
LHS	Locking head screw
ORIF	Open reduction and internal fixation
PMMA	Polymethyl methacrylate
PQ	Pronator quadratus
RSC	Radioscaphocapitate
SRL	Short radiolunate
TCL	Transverse carpal ligament
TFCC	Triangular fibrocarilage complex

INTRODUCTION

Distal radius fractures remain an injury that fosters considerable interest and debate.[1] Distal radial fractures account for 20%of fractures among medicare enrollees and are second only to hip fractures in terms of incidence in the elderly population. These fractures represent approximately one-sixth of all fractures that are treated in emergency departments.[2]

In the older population, the mechanism of injury usually involves a fall onto the outstretched hand in an elderly patient whose bone quality is diminished by osteoporosis. In younger patients, high-energy injury mechanisms lead to wide displacement and marked comminution in bone of normal quality.[3]

The goal of surgical fixation in the unstable distal radius fracture is to restore intra-articular and extraarticular anatomic alignment.[4] Persistent step or gap deformity of the articular surface after distal radius fracture may predispose to the development of posttraumatic arthritis of the radiocarpal joint. Although the clinical manifestations of post traumatic arthritis may not be disabling, yet the goal of surgical treatment of intra-articular distal radius fractures remains anatomic reduction. [5]

Many methods are available to treat distal radius fractures, each with its own benefits and potential complications, which must be weighed when choosing which procedure to use. [6]

Many fixation techniques have been described including pin and plaster fixation, percutaneous pinning, intramedullary pinning, external fixation (bridging or nonbridging, static or dynamic), injectable bone cement, and various forms of internal fixation with customized implants.[7]

Aim of the work

This essay aims at evaluating the outcome of external fixation versus plating through volar approach in treating Intraarticular Distal Radial Fractures .

ANATOMY

THE DISTAL RADIUS

A) Osseous anatomy

The lower end of the radius is large, quadrilateral, and provided with two articular surfaces; one below, for the carpus, and another at the medial side, for the ulna. The carpal articular surface is triangular, concave, smooth, and divided by a slight antero-posterior ridge into two parts. The lateral, triangular, articulating with the scaphoid bone and called the scaphoid fossa; the medial, quadrilateral, with the lunate bone and called the lunate fossa. The articular surface for the head of the ulna is called the ulnar notch (sigmoid cavity) of the radius. These two articular surfaces are separated by a prominent ridge, to which the base of the triangular articular disk is attached; this disk separates the wrist-joint from the distal radioulnar articulation (**Figure1**).

The distal radius has three non-articular surfaces: volar, dorsal, and lateral. The dorsal surface is convex, affords attachment to the dorsal radiocarpal ligaments, and is marked by three grooves and a prominent ridge ”Lister’s tubercle”. The lateral surface is prolonged obliquely downward into the styloid process, which gives attachment by its base to the tendon of the

Brachioradialis, and by its apex to the radial collateral ligament of the wrist-joint. The lateral surface of this process is marked by a flat groove, for the tendons of the Abductor pollicis longus and Extensor pollicis brevis.[8]

The volar surface, is broad, flat, affords attachment to the volar radiocarpal ligaments and the pronator quadratus. The volar lunate facet projects an average of approximately 3mm anterior to the relatively flat volar surface **(Figure 2)**.[9] Plates placed over this prominence can risk tendon irritation and can be more palpable to the patient.[10]

The concave surface of the volar radius is limited distally by a transverse ridge or the **watershed line**. Distal to the watershed line, the radius slopes in a dorso-distal direction and receives the proximal attachments of the volar wrist capsule and the volar capsular ligaments. This ridge lies close (2 mm) to the joint line on its ulnar aspect and well proximal (10–15 mm) from the joint line on its radial aspect. Fixation implants must be placed proximal to and their profile must not project above the watershed line to avoid impingement on flexor tendons.[10]

Volar Radial Tuberosity is a prominence on the radial margin of the pronator quadratus (PQ) fossa. Plates that are placed too radial will overlie this tuberosity, will be pronated, and will not lie flat on the radius and may become palpable to the patient, requiring subsequent removal. **Volar Radial Ridge** a ridge of varying prominence extends proximally from the volar radial tuberosity and marks the radial limit of the pronator quadratus fossa **(Figure 3)**.[10]

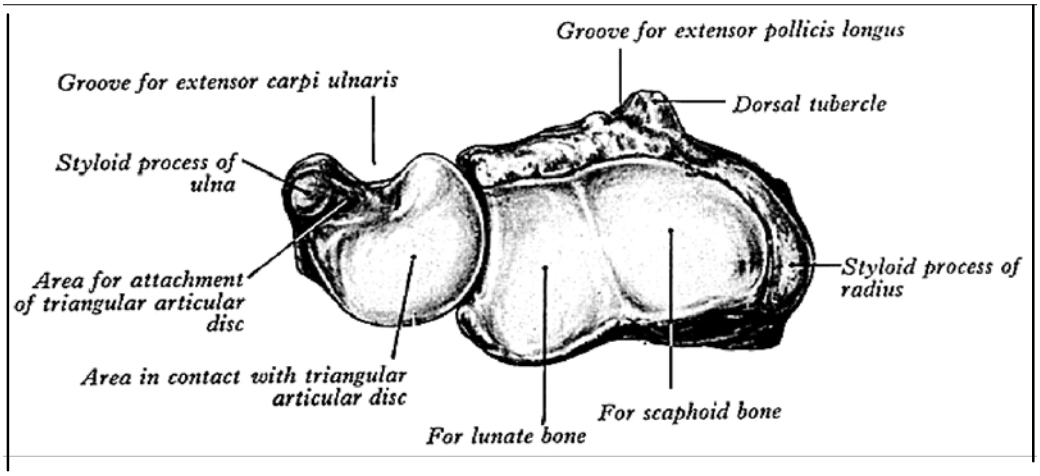

Figure 1: View of the articular surfaces of the distal radius and ulna.[11]