

## Original Research Article

# Role of volar plating in unstable distal radial fractures in elderly patients in tertiary teaching hospital

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### ABSTRACT

**Background:** Aim of the study was to investigate the efficacy of volar locking plate fixation for unstable distal radial fractures DRFs in the elderly population (60 years old and older).

**Methods:** An ethical committee approved the study protocol for research studies at NRI medical college. We included only unstable distal radial fractures in elderly patients between 60 to 70 years, and patients who consent to the study. We excluded patients with comorbid conditions and below 60 years and patients with vascular injuries. Results were evaluated by the DASH questionnaire and Gartland and Werley scores.

**Results:** According to Gartland and Werley score, 30 patients (85.7%) had excellent and good results. According to the DASH score, 31 patients (88.5%) had excellent and good results, and four patients (11.4%) had fair results. The most commonly noted complications in our study were arthritis (2 cases 5.7%), extensor pollicis longus tendon irritation (1 case 2.9%), and Reflex sympathetic dystrophy (1 case 2.9%).

**Conclusions:** Locked compression plate in unstable distal radius fractures provides excellent results with an effective correction of distal radius anatomy. Early range of movements of joints leads to a good outcome and return to regular activity.

**Keywords:** Radius fracture, Elderly patient, Volar locking plate

### INTRODUCTION

Distal radius fracture (DRF) is one of the most common fractures of the upper extremity, accounts for 15% of all fractures.<sup>1,2</sup> Most DRFs are stable and treated with closed reduction and cast immobilization, whereas some require additional fixation.<sup>3,4</sup> Closed reduction with cast immobilization in elderly patients is prone to displacement and poor results.<sup>5</sup>

The volar locking plate is a widely accepted treatment for unstable DRFs due to the advantages of direct reduction, stable fixation, and early mobilization of wrist fractures.<sup>9</sup>

With the rising incidence of unstable distal radius fracture in an elderly population, the volar locking plate's efficacy is not well known due to comorbidities and osteoporosis,

high-risk anesthesia risk.<sup>10-15</sup>

Humans' life expectancy increased to 74 years, causing more demand for activity in our study group.

This study aimed to investigate the efficacy of volar locking plate fixation to treat unstable DRFs in the elderly population (60 years old and older).

### METHODS

An ethical committee approved the study protocol for research studies at NRI medical college.

#### *Inclusion criteria*

Patients with unstable DRF in the elderly and having age

of more than 60 years and patients who give consent for the study were included in the study

**Exclusion criteria**

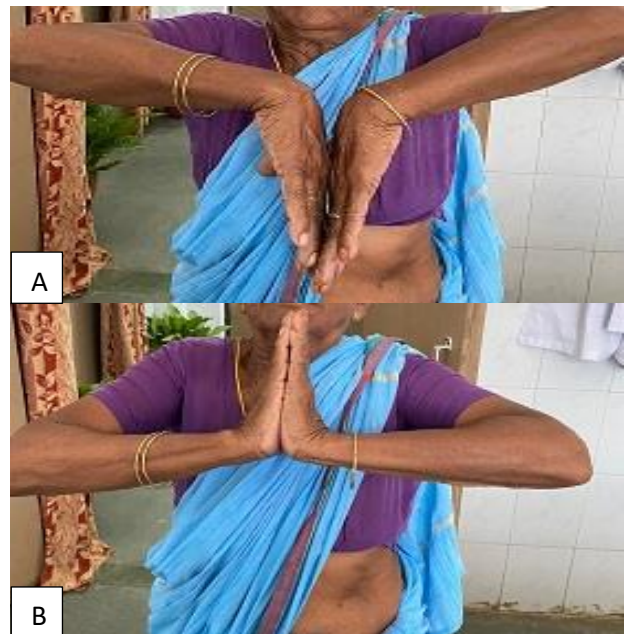
Patient with comorbid conditions and below 60 years age and patients with vascular injuries were excluded from the study.

**Operative techniques**

A standard volar Henry approach through the flexor carpi radialis tendon sheath was performed, and the pronator quadratus muscle was relieved from its distal and radial aspect of the radius.<sup>11</sup> After reducing the fracture, the LC-T plate was placed under fluoroscopic guidance and fixed to the shaft with a conventional screw through the "combination" hole. The holes for the locking-head screws were carefully drilled through the guide into the distal fragments. The screw length was measured using the depth gauge. To avoid irritation of the extensor tendons, screws were chosen not to overtop the dorsal cortex. According to the anatomic situation and the fracture pattern, T-plates with three to five, locking head screws were applied. For B-/C-type fractures, additional screws or K-wires were placed in a few cases to improve stability (n 19.8%). Depending on the bone quality, either one or two more screws (either conventional nonlocking or locking head screws) were finally placed through the plate into the shaft fragment. Additional bone grafting was not used in any case. The intervention finished by inserting a suction drain and the suturing of the antebrachial fascia and skin closure.



**Figure 2: Six months post op X-ray.**



**Figure 3: Wrist ROM after one year.**



**Figure 1: (A and B) Pre-op and immediate post-op.**

In the immediate postoperative period, fluid balance, IV antibiotic, and analgesics given as per the protocol. It helped us to mobilize the patient faster. Whenever stable internal fixation was gained; the patient was mobilized after 48 hours after removing the drains. After 2-3 days, the range of motion allowed in stable fixation from the 5<sup>th</sup> day. The range of motion was gradually allowed to increase to 90 degrees more after suture removal full range of movement was allowed. Plaster of Paris applied in unstable fixation. Cases were evaluated through clinical and radiological methods at six weeks, 12 weeks, six months, and one year for the range of movements. Clinical and radiological union evaluated by DASH and Gartland and Werley scores.

Figure 1 demonstrating right distal radial fracture with preoperative x-ray, immediate postoperative x-ray, six months postoperative x-ray, and range of movements.

**RESULTS**

This study was done in 35 patients with age 60 to 70 years, with a mean age of 62.9 years with male predominance. The most common cause is trivial trauma (20 patients, 57.1%) fall on an outstretched hand.

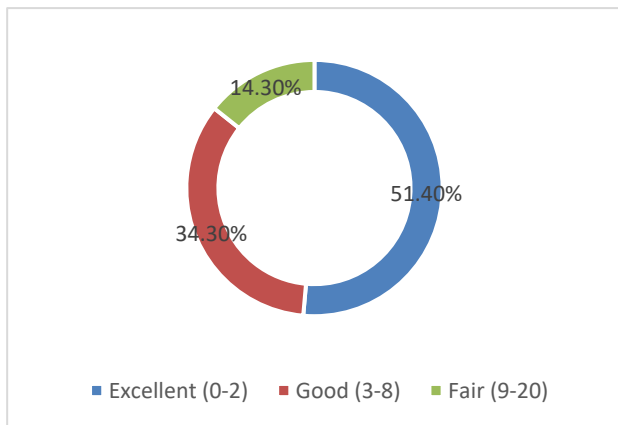
The fracture pattern by Frykman classification is given in Table 1.

**Table 1: Distribution of patients based on the Frykman classification of distal radius fractures.**

Classification	Frequency	Percent (%)	
Frykman classification of distal radius fractures	i	4	11.4
	ii	2	5.7
	iii	17	48.6
	iv	5	14.3
	v	2	5.7
	vii	2	5.7
	viii	3	8.6
	Total	35	100.0

According to Frykman classification of distal radius fractures, 11.4% belonged to type 1, 5.7% belonged to type 2, 48.6% belonged to type 3, 14.3% belonged to type 4, 5.7% belonged to type 5, 5.7% belonged to type 6 and 8.6% belonged to type 7.

Among 35 patients, eight patients had associated injuries include fracture shaft of femur (2 cases), contusional head injuries (2 cases), distal 3<sup>rd</sup> ulna fracture (1 case), right suprapubic rami fracture (1 case), and type 1 compound fractures (2 cases). The most commonly noted complications in our study were arthritis (2 cases 5.7%), extensor pollicis longus tendon irritation (1 case 2.9%), and reflex sympathetic dystrophy (1 case 2.9 %).



**Figure 4: Distribution of patients based on Gartland and Werley score.**

**DISCUSSION**

Distal radius fractures are the most common fractures of

the upper extremity and constitute nearly one-sixth of all fractures treated in emergency and has an approximate incidence of 1:10,000.<sup>5</sup> Treatment for unstable fracture of distal radius varies from the most common traditional method of close reduction and immobilization in a plaster cast to other invasive procedures such as external fixation/distractor and percutaneous fixation with K-wires and relatively more complex operative maneuvers with locking compression plate.

The conservative management by close reduction is a widely used treatment for distal fracture radius. Well, a fitted cast with three-point fixation is a must for adequate immobilization. Although cast application can avoid surgery and other complications related to it, it is associated with inadequate fixation and loosening of the reduction.<sup>6,7</sup> Also, it cannot maintain the distraction to correct length or control the distal fragment rotation in case of communication. Previous studies have observed a high incidence of displacement deformity in plaster cast treatment which was less with plate fixation.<sup>8</sup>

External fixation was thus, considered as one of the better treatment options. Better restoration of normal wrist anatomy achieved by external fixation in severely comminuted fractures.<sup>9</sup> External Fixator was found to maintain the radial length best due to the sustained counter traction utilizing ligamentotaxis. The procedure of external fixation is often accompanied by percutaneous fixation with K-wires to maintain the reduction of articular fragments. However, these are frequently associated with pin-track infections, loss of reduction, complex regional pain syndrome, and joints stiffness.<sup>10,11</sup> Margaliot et al performed a meta-analysis and concluded that there was no evidence to support that the use of open reduction and internal fixation is superior to external fixator.<sup>12</sup> However, there were significantly higher rates of postoperative neuritis, infections, pins loosening, and hardware failure in the external fixator group. In our study, there were no such postoperative complications.

Open reduction and plate fixation as a treatment for unstable fracture distal end radius has gained popularity over the years. In cases of fracture of the distal radius, open reduction and internal fixation with volar locking plate in elderly shown to restore articular congruity and restore excellent wrist function.<sup>5</sup> Open reduction and plate fixation are often considered the treatment of choice for fracture of the distal radius, especially in mild comminuted fractures and intra-articular involvement. As compared with Chung et al which performed on the treatment of unstable distal radial fractures with a volar locking plate system, our study shows a better outcome.<sup>14</sup>

**CONCLUSION**

A locked compression plate in unstable distal radius fractures provides excellent results with an effective correction of distal radius anatomy. By using these plates, joint motions and daily functioning recovered in a short

time. Early range of movements of joints leads to good functional recovery and preventing complications. Hence Volar locking plate provides better results in comparison to other modalities of management in distal radius fracture.

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