

# A study of complications and outcome of acute fractures of lower end of radius

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## Abstract

**Introduction:** In the era of civilization, the frequency of fractures of the lower end and radius seems to be increasing. The probable causes for increased frequency of fractures are rapidly increasing rate of road traffic accidents, growing industrialization and lazy fair attitude in the patients. The incidence of comminuted intra articular fractures in younger patients is the resultant of high energy trauma whereas in the elderly patients the fracture occurs with the low energy. **Aims and Objectives:** To Study of Complications and Outcome of Acute fractures of lower end of Radius. **Methodology:** For the present study 103 followed cases of colles' fractures were studied. Out of these 87 cases were treated by below elbow plaster cast in pronation with wrist in either of following positions. Dorsiflexion, Neutral, Palmarflexion. These cases formed the man bulk of the study and were studied in detail. Remaining 16 cases were treated by various methods like above elbow plaster cast, external fixator and 'k' wire fixation. These cases were studied in short. The movement were measured with the help of goniometer. Finally all the assembled data was evaluated as per point system of Mc. Bride popularized by Gartland and werley and modified by sarmiento. This point system was modified in this study to bring the score to 100, so that the results are uniform as in conventional treatment. **Result:** Type II injuries were more frequent [41.37%] than any other type. The type V injuries were next in frequency [14.94%]. Satisfactory results (Good and Excellent) were seen in 71.26% of patients. The satisfactory results were almost comparable in each wrist position except slightly better position in neutral group. 24.13% patient had normal wrist appearance and 41.37% had prominence of ulnar styloid. There was displacement of fracture (especially the volar angle) in the plaster cast. The most important complication was the residual pain in 59.77% patients. **Conclusion:** Immobilization after reduction of colles' fracture in various wrist position of below cast gives identical results. However, the stiffness of the hand is significant in the wrists treated by plaster cast in palmarflexion. Hence it is advisable to select the position of the wrists either in neutral or dorsiflexion. Among these position the probable choice would depend on the stability of the fracture after reduction.


**Keywords:** Fractures of lower end of Radius, Frykman's Classification, Colles' fracture.

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## INTRODUCTION

Fractures of the distal radius are common injuries in young and elderly patients and are associated with a significant incidence or morbidity. It has been estimated that they account for one sixth and all fractures seen in the accident and emergency department. In the era of civilization, the frequency of fractures of the lower end

and radius seems to be increasing. The probable causes for increased frequency of fractures are rapidly increasing rate of road traffic accidents, growing industrialization and lazy fair attitude in the patients. The incidence of comminuted intra articular fractures in younger patients is the resultant of high energy trauma whereas in the elderly patients the fracture occurs with the low energy. Many methods have been recommended for the treatment of the distal radius fracture which includes plaster cast immobilization, 'k' wire fixation, nails external fixators and so on. Ford and key<sup>12</sup> in 1955. Drew attention to the diversity or treatment when they stated. "There are as many methods of treatment as there are fracture surgeons". There is cloudiness in the particular type of fracture. There is plethora of the treatment without specifications hence the present study was undertaken at General Hospital, Sangli to try and find out which method of treatment will give better functional and cosmetic result and is best suited for General Hospital set up. Distal

radius fractures are one of the most common injuries encountered in orthopedic practice. They make up 8%–15% of all bony injuries in adults.<sup>10</sup> Abraham Colles is credited with description of the most common fracture pattern affecting distal end radius in 1814, and is classically named after him.<sup>11</sup> The width of this angle influences the localization of the fracture. Pronation, supination and abduction determine the direction of the force and the compression of carpus and different appearances of ligamentary injuries.<sup>12</sup> The radius initially fails in tension on the volar aspect, with the fracture progressing dorsally where bending forces induce compressive stresses, resulting in dorsal comminution. Cancellous impaction of the metaphysis further compromises dorsal stability. Additional shearing forces influence the injury pattern, resulting in articular surface involvement.

**Frykman,s<sup>17</sup> Classification**

	Distal ulnar Fracture	
	Absent	present
Extra-articular intra-articular involving	I	II
Radio-carpal joint intra-articular involving	III	IV
Distal-radio-ulnar joint intra-articular involving	V	VI
Radio-ulnar joints	VII	VIII

This classification is the most commonly used classification. It has a scale of 8 different types with increasingly un-favourable results. This classification is used for the present study. Other classification are: 2. sarmiento’s<sup>8</sup> classification: It depends upon the displacement and involvement of the radio-carpal joint.

**Type I:** Non-displaced fracture without R-C joint involvement.

**Type II:** displaced fracture without R-c joint involvement.

**Type III:** Non-displaced fracture with R-C joint involvement.

**Type IV:** displaced fracture with R-C Joint involvement.

**MATERAIAL AND METHODS**

For the present study 103 followed cases of colles’ fractures were studied. Out of these 87 cases were treated by below elbow plaster cast in pronation with wrist in either of following positions. Dorsiflexion, Neutral, Palmarflexion. These cases formed the man bulk of the study and were studied in detail. Remaining 16 cases were treated by various methods like above elbow plaster cast, external fixator and ‘k’ wire fixation. These cases were studied in short. The cases coming to general hospital, Sangli from March 1993 to December 1993 were collected for the O.P.D hours and some as an emergency in casualty. General condition of the patient was assessed and associated injuries were excluded.

Detailed history of the patient was taken with emphasis on the time since injury, history or massage etc. x-rays of the injured wrist were taken. The clinical examination of the injured wrist was done. Oedema at the fracture site was compared with the normal side by measuring the circumference at the fracture site. X-rays of the normal wrists could not be done due to shortage of x-ray films at general hospital, Sangli Most of the reductions were done under short generalanesthesia though at times sedation with for twin and calmpose was used. GA has the advantage of muscle relaxation. Reduction was done by the method of traction for few minutes to disimpact the fragments followed by manual pressure on the distal fragment so as to achieve alignment. At each follow up visits, the subjective findings like pain, disability, limitation of movements were recorded. Objective findings like range of movements, hand grip, pain in distal radio-ulnar joint were also noted. Complication like carpal tunnel syndrome shoulder hand syndrome, rupture of extensor pollicislongus tendon, sudeck’ sosteodystrophy, finger stiffness were looked for. The movement were measured with the help of goniometer. Finally all the assembled data was evaluated as per point system of Mc. Bride popularized by Gartlandandwerley and modified by sarmiento<sup>8</sup>. This point system was modified in this study to bring the score to 100, so that the results are uniform as in conventional treatment.

**RESULTS**

**Table 1:** Frykman’s 14 classification of fracture

FRYKMAN TYPE	NO. of cases
I	10
II	36
III	06
IV	08
V	13
VI	09
VII	02
VIII	03
<b>Total</b>	<b>87</b>

Type II injuries were more frequent [41.37%] than any other type. The type V injuries were next in frequency [14.94%].

**Table 2:** Results of treatment

Grade	No. of cases
Excellent	12
Good	50
Fair	23
Poor	02
<b>Total</b>	<b>87</b>

Satisfactory results (Good and Excellent) were seen in 71.26% of patients.

**Table 3:** END Results as per frykman's<sup>17</sup> classification

Frykman's type	excellent	Good	Fair	Poor	Total
I	00	07	03	00	10
II	06	22	07	01	36
III	02	03	01	00	06
IV	00	07	01	00	08
V	02	06	05	00	13
VI	02	03	03	01	09
VII	00	01	01	00	02
VIII	00	01	02	00	03
<b>Total</b>	<b>12</b>	<b>50</b>	<b>23</b>	<b>02</b>	<b>87</b>

The table shows the end results in detail as per frykman's classification.

**Table 4:** Comparative results of various wrist positions

Wrist	excellent	Good	fair	poor	Total
Palmarflexion	00	20	08	01	29
Neutral	09	12	07	00	28
Dorsiflexion	03	18	08	01	30
<b>Total</b>	<b>12</b>	<b>50</b>	<b>23</b>	<b>02</b>	<b>87</b>

The satisfactory results were almost comparable in each wrist position except slightly better position in neutral group.

**Table 5:** Cosmetic end results (Lidstrom<sup>16</sup>) \*(except NO. 5)

	No. of cases
Normal appearance	21
Normal appearance except prominent	36
Slight radial deviation of hand	03
Moderate to pronounced Radial	00
Residual dorsal tilt	27
<b>Total</b>	<b>87</b>

24.13% patient had normal wrist appearance and 41.37% had prominence of ulnar styloid.

**Table 6:** Average radiological parameters

Radiological parameter	Before treatment	Post-reduction	End result
Radial length	4.666	8.689	7.781
Volar angle	+16.597	+0.724	+2.689
Radial angle	15.103	19.574	19.747

Table shows that, there was displacement of fracture (especially the volar angle) in the plaster cast.

**Table 7:** Complications

Complications	No. of patients
Nil	12
Causalgia	52
poor hand function due to cast	16
shoulder hand syndrome	05
carpal tunnel syndrome	00
Rupture of ext. poll. Longus	00
Sudeck's osteodystrophy	01
Osteoarthritis	01
<b>Total</b>	<b>87</b>

The most important complication was the residual pain in 59.77% patients.

## DISCUSSION

Cassebaum W.H.<sup>18</sup> (1950) reported 94% satisfactory results. Similarly, sarmiento<sup>8</sup> (1975) claimed 81.82% excellent and good functional results. G.N. golden<sup>14</sup> (1963) in his study with 2 different mode of immobilization, got successful results in 83% and 91% respectively. Mark manson<sup>15</sup>(1953) in a study of 100 cases reported 95% functionally good results, out of which 26% had mal-union. In the present study the satisfactory results of various position were-

1. Palmer flexion (20/29)-68.96%
2. Neutral (21/28)-75.00%
3. Dorsiflexion -(21/30)-70.00%

Though statistically the neutral position is better, the results of various positions are almost comparable. Only 24.13% cases had normal wrist appearance. The majority of cases had some deformity but for most of the time a deformity was minor and was found only on keen observation and comparing the normal wrist. 41.37% cases had prominence of ulnar styloid or head. Actually many times. The patient did not notice it and had no complaint. Thus this group formed the major bulk (65.51%) of cases and had minimal deformity. Residual dorsal tilt was found in 31.03% cases and radial deviation of hand in 3.44% cases. Lidstrom<sup>16</sup> studied 515 cases of colles' fracture and had found that 40% patients were having unsatisfactory cosmetic results. These findings are comparable to the present study in which 34.47% patient had unsatisfactory cosmetic results. In spite of these findings. Patient had satisfactory functional results in 71.26% cases. Thus it was noted in this study that cosmetic end result did not correlate with functional results when hand function is satisfactory, Indian patients are not worried about the cosmetic deformity. When patient presents with fracture many had severe deformities and displacements. The radial length was as low as 4 mm and one patients had volar angle of 40<sup>0</sup>. though the reduction was satisfactory, it was noted that many patients lost their reduction in the meantime. to prevent this displacement of fracture in the cast one should lake follow up check x-rays, may be at interval of 10 to 14 days. But because of lack of adequate facilities at general hospital, it was not because of lack of adequate facilities at general hospital, it was not because in this study. This displacement of fracture was confirmed in the x-rays taken at the time of cast removal. The volar angle was displaced in the majority of cases followed by the radial length. Thus the present study showed that, to check the re-displacement of fracture, the reduction should be checked by x-rays at a later period of immobilization. The plaster cast applied was below elbow, this is not the ideal plaster cast. Since it does not immobilize joint above and joint below. The compromise

is done in order to avoid stiffness of elbow in elderly patient. as result of this compromise all the parameters which were achieved just after reduction of fracture were not maintained in the final analysis of results. In the present study external pin fixation was used when patient were having severely comminuted fracture of unstable fractures. Out of 4 cases studied the results were satisfactory in all. Especially there was maintenance of radial length. This seems to be important because with plaster cast fixation. Many patients lose their reduction and whatever radial length was achieved, it is lost later on. So the external fixator seems to be promising in the future years. The main complication with this type of treatment is that of pin tract infection which was found in one case. But this was not troublesome and responded very well with proper dressings and antibiotics. Percutaneous 'k' wire fixation was tried in 4 cases. Out of this one patient lost the reduction because of improper placement of 'k' wire. It was found to traverse through the fracture site. One patients had pin tract infection and pin loosening, however the end result was satisfactory. Thus 3 patients got satisfactory results. 8 patient were treated with above elbow cast. The reason was many of these cases were children, and their fracture radius was located at higher level than the conventional one. Besides there was associated fracture neck of the ulnar in few cases. In order to get rigid immobilization above elbow plaster cast was selected. All of this patients got satisfactory results. Elbow or wrist stiffness was found in none. As the number of these cases was short, no statistical significance is drawn.

## CONCLUSION

Immobilization after reduction of colles' fracture in various wrist position of below cast gives identical results. However, the stiffness of the hand is significant in the wrists treated by plaster cast in palmarflexion. Hence it is advisable to select the position of the wrists either in neutral or dorsiflexion. Among these position the probable choice would depend on the stability of the fracture after reduction. The satble may be treated in dorsiflexion of wrist while the unstable one would be better stabilized in neutral position of the wrist

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