

## To Evaluate the Long-Term Results of Malunited Distal End Radius Fractures with Triangular Fibrocartilage Complex Injury Treated with Conservative Therapy

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### Abstract:

**Background:** The physical and mental health of the human plays a critical role in managing the lifestyle and completing the daily operations. The issues with physical and mental health have direct impact on the performance and approach of the individual as they feel pain or uncomfortable while managing the tasks. The triangular fibro cartilage complex damage combined with a malunited distal end radius fracture is seriously impairing the patient's general health and bodily function. The stable distal radius fracture can be treated without any operation and help to improve the health of the individual. However, the issue occurs due to high amount of unbalanced pressure on the wrist and articular deformity may lead to arthritis. Regaining congruence in the radiocarpal joint and the distal radioulnar joint (DRUJ) is the goal, regardless of the date, in order to improve function, lessen pain, and prevent arthritis in the future. These techniques have been associated with extensor tendon irritation or rupture on occasion, although they offer effective anatomic repair and pain alleviation.

**Aim:** The study aims to evaluate the long-term results of malunited distal end radius fractures with triangular fibrocartilage complex injury treated with conservative therapy.

**Method:** This prospective study was carried out in period of May 2020 to July 2022 at BB MCH, Balangir. There were 25 patients recruited in the trial, 12 of them were female and 13 of whom were male. The patient's age ranged from 18 to 64 years, with a mean of 58.18 years. The malunion takes into account the results of the conservative treatment while selecting participants. Additionally, individuals exhibiting a dorsal tilt greater than 20° on the distal radial articular surface as well as more than 2 mm of articular displacement producing wrist pain and impaired wrist movement were included in the study. The examination of passive Range of Motion (ROM), discomfort, grip strength and everyday activities are all part of the clinical analysis process. Additionally, the 10cm Visual Analogue Scale (VAS) is used to analyse functional impairments of the arm, shoulder, and hand (DASH). The grip strength was examined using a Jamar dynamometer. Additionally, the radial inclination, palmar tilt and ulnar variance were included in the radiography evaluations.

**Results:** There were 25 patients involved in the study in which 13 male and 12 female. The mean age of the patients were 58.18 (SD=9.70) years and monthly follow-up period of patient was 14.98 (SD=3.87). The analysis of score of patient recovery after the conservation approach for offering the treatment has suggested that the DASH baseline score was 33.14 (SD= 12.90), PRWE 28.18 (SD=8.20) and VAS was 4.34 (1.19). Apart from this, the range of motion was 38.60 (SD= 16.98) extension, 36.87 (SD= 19.10) flexion, 53.93 (SD= 25.03) Supination and 55.98 (SD= 22.89) Pronation as well as the grip strength was 54.64 (SD= 22.99). As per the outcome, all motion scores were significantly lower compared to baseline score (<0.05). In addition to this, the grip strength of the patient was significantly increase up to 91.80% at follow up as well as no other complications were identified among the patients.

**Conclusion:** Based on the investigation, it has been determined that conservative treatment contributes to DRUJ stability. Furthermore, radiographic studies have shown that long arm splinting using the radioulnar joint can be used to treat distal radius fractures.

**Keywords:** Distal Radius Fracture, Conservative Treatment, Triangular Fibrocartilage Complex Injury.

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## Background

The physical and mental health of the human plays a critical role in managing the lifestyle and completing the daily operations. The issues with physical and mental health has direct impact on the performance and approach of the individual as they feel pain or uncomfortable while managing the tasks [1]. The triangular fibro cartilage complex damage combined with a malunited distal end radius fracture is seriously impairing the patient's general health and bodily function [2]. The most frequent medical condition that results in the loss of the articular surface's typical palmar tilt in the sagittal plane and alters length in relation to the ulna is malunited distal end radius fractures [3,4]. According to the clinical analysis, the problem related to the malunited distal end radius fracture has different types that require the proper diagnosis and treatment for better recovery of the patients. There are different approaches used for offering the treatment to the patients [5]. The stable distal radius fracture can be treated without any operation and help to improve the health of the individual [6]. However, the issue occurs due to high amount of unbalanced pressure on the wrist and articular deformity may lead to arthritis [7].

In addition, the decrease of radial height and dorsal angulation may contribute to an increase in the improvement in pressure on the ulna [8]. Furthermore, achieving correct wrist biomechanics mostly depends on the anatomical position of the distal and terminal of the radius in relation to the carpus [9]. Regaining congruence in the radiocarpal joint and the distal radioulnar joint (DRUJ) is the goal, regardless of the date, in order to improve function, lessen pain, and prevent arthritis in the future [10]. These techniques have been associated with extensor tendon irritation or rupture on occasion, although they offer effective anatomic repair and pain alleviation [11,12].

## Aim

The study aims to evaluate the long-term results of malunited distal end radius fractures with triangular fibrocartilage complex injury treated with conservative therapy.

## Method and Material

This prospective study was carried out in the period May 2020 to July 2022 at BB MCH, Balangir. There were 25 patients recruited in the trial, 12 of them were female and 13 of whom were male. The patient's age ranged from 18 to 64 years, with a mean of 58.18 years. The malunion takes into account the results of the conservative treatment while selecting participants. Additionally, individuals exhibiting a dorsal tilt greater than 20° on the distal radial articular surface as well as more than 2 mm of articular displacement producing wrist pain and impaired wrist movement were included in the study. In addition, 16 patients experienced problems with their dominant arm, and 9 patients experienced problems with their non-dominant arm.

The examination of passive Range of Motion (ROM), discomfort, grip strength and everyday activities are all part of the clinical analysis process. Additionally, the 10cm Visual Analogue Scale (VAS) is used to analyse functional impairments of the arm, shoulder, and hand (DASH). The grip strength was examined using a Jamar dynamometer. Additionally, the radial inclination, palmar tilt and ulnar variance were included in the radiography evaluations. In addition, X-ray pictures were examined in order to comprehend the problems and handle the communication with a focus on Fuji Synapse PACS software.

## Results

**Table 1: Patient details**

Particulars	Details
Numbers of patients	25
Male	13
Female	12
Mean age	58.18 (9.70)
Monthly follow-up period	14.98 (3.87)

According to outcome of table 1, there were 25 patients involved in the study in which 13 male and 12 female. The mean age of the patients were 58.18 (SD=9.70) years and monthly follow-up period of patient was 14.98 (SD=3.87).

**Table 2: Score outcome**

Variables	Baseline score	Follow-up	P-value
DASH score	33.14 ± 12.90	11.46 ± 1.69	<.05
PRWE score	28.18 ± 8.20	11.37 ± 1.87	<.05
VAS	4.34 ± 1.19	1.48 ± 1.19	<.05
<b>Range of motion</b>			
Extension (°)	38.60 ± 16.98	64.98 ± 6.10	<.05
Flexion (°)	36.87 ± 19.10	51.10 ± 2.78	<.05
Supination (°)	53.93 ± 25.03	84.21 ± 2.23	<.05
Pronation (°)	55.98 ± 22.89	84.27 ± 2.77	<.05
Grip strength	54.64 ± 22.99	91.80%	<.05
<b>DRUJ</b>			
	<b>Pre-treatment patient</b>	<b>Post-treatment patients</b>	<b>P-value</b>
0	0	8	<.05
1	12	6	<.05
2	10	10	<.05
3	3	1	<.05

According to the outcome of the table 2, the analysis of score of patient recovery after the conservation approach for offering the treatment has suggested that the DASH baseline score was 33.14 (SD= 12.90), PRWE 28.18 (SD=8.20) and VAS was 4.34 (1.19). Apart from this, the range of motion was 38.60 (SD= 16.98) extension, 36.87 (SD= 19.10) flexion, 53.93 (SD= 25.03) Supination and 55.98 (SD= 22.89) Pronation as well as the grip strength was 54.64 (SD= 22.99). As per the outcome, all motion score were significantly lower compared to baseline score (<0.05). In addition to this, the grip strength of the patient was significantly increase up to 91.80% at follow up as well as no other complications were identified among the patients.

### Discussion

The triangular fibro cartilage complex damage combined with a malunited distal end radius fracture is seriously impairing the patient's general health and bodily function. The most frequent medical condition that results in the loss of the articular surface's typical palmar tilt in the sagittal plane and alters length in relation to the ulna is malunited distal end radius fractures. Furthermore, achieving correct wrist biomechanics mostly depends on the anatomical position of the distal and terminal of the radius in relation to the carpus [13]. Regaining congruence in the radiocarpal joint and the distal radioulnar joint (DRUJ) is the goal, regardless of the date, in order to improve function, lessen pain, and prevent arthritis in the future.

According to the outcome of the current study, there were 25 patients involved in the study in which 13 male and 12 female. The mean age of the patients were 58.18 (SD=9.70) years and monthly follow-up period of patient was 14.98 (SD=3.87). The analysis of score of patient recovery after the conservation approach for offering the treatment has suggested that the DASH baseline score was 33.14 (SD= 12.90), PRWE 28.18 (SD=8.20) and VAS was 4.34 (1.19). Apart from this, the range of motion was

38.60 (SD= 16.98) extension, 36.87 (SD= 19.10) flexion, 53.93 (SD= 25.03) Supination and 55.98 (SD= 22.89) Pronation as well as the grip strength was 54.64 (SD= 22.99). As per the outcome, all motion score were significantly lower compared to baseline score (<0.05). In addition to this, the grip strength of the patient was significantly increase up to 91.80% at follow up as well as no other complications were identified among the patients.

According to the study outcome of Von Matthey et al., (2020) [14], a statistically significant increase in the objective range of motion, with the pronosupination arc rising from 121 to 162 degrees and the average flexion-extension arc improving from 79 to 105 degrees. The average Visual Analogue Scale (VAS) pain score decreased from 4.1 to 1.9 and the Quick Disabilities of the Arm, Shoulder, and Hand (Quick DASH) score decreased from 43 to 11, indicating a significant improvement in patient-reported outcomes.

Following surgery, 77 (64.7%) patients lacked RJS and 42 (35.3%) patients had it. Following surgical treatment, the incidence of RJS is 35.3%. According to multivariate analysis, the incidence of RJS during follow-up was correlated with intra-articular fracture (OR, 1.43; 95% CI, 1.13–1.81), pre-operative severe swelling (OR, 1.35; 95% CI, 1.05–1.74), post-operative unsatisfied volar tilt (OR, 1.38; 95% CI, 1.01–1.89), and improper rehabilitation exercise (OR, 1.72; 95% CI, 1.18–2.51) [15].

### Conclusion

Based on the investigation, it has been determined that conservative treatment contributes to DRUJ stability. Furthermore, radiographic studies have shown that long arm splinting using the radioulnar joint can be used to treat distal radius fractures.

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