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Dr. Tanmay Dua
Senior Resident, Dept. of
Orthopaedics, Datta Meghe
Institute of Medical Sciences,
Sawangi (Meghe), Wardha,
Maharashtra, India

Dr. R Ambade
Professor, Dept. of Orthopaedics,
Datta Meghe Institute of Medical
Sciences, Sawangi (Meghe),
Wardha, Maharashtra, India

Clinical and radiological evaluation of distal radio ulnar joint (DRUJ) in injuries around the wrist joint

Dr. Tanmay Dua and Dr. R Ambade

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Abstract

Background & Method: This prospective, non randomised cohort study was carried out in the Department of Orthopaedics, Jawaharlal Nehru Medical College & Acharya Vinoba Bhave Rural Hospital, Datta Meghe Institute Of Medical Sciences (Deemed University) Wardha, with an aim to Clinico-radiological evaluation of distal radio ulnar joint (DRUJ) in injuries around the wrist joint. All patients who presented to our hospital were included in the study, Patients with compound wrist injuries were excluded from the study. In standardised format, data concerning patient's history and clinical examination were collected. Those patients who fulfilled the inclusion criterion and gave a valid informed written consent were recruited in the study.

Result: The wrist evaluation in cases of Acute DRUJ disruption were treated primarily along with associated wrist injuries was done after 24 week of treatment. PRWE (Patient Related Wrist Evaluation) score. However in patients of Chronic DRUJ disruption they also evaluated using Mayo Wrist Score and PRWE Score.

Conclusion: In our study total 132 patients of Acute DRUJ disruption and 28 patients of Chronic DRUJ disruptions were studied clinically and radiologically. Clinical and Radiological suspicion of DRUJ disruption should always be kept in mind while dealing with wrist, hand or forearm injuries. Distal Radio Ulnar Joint injury needs to be treated primarily along with the associated wrist, hand or forearm injury to restore near normal function of the Forearm and Wrist.

Keywords: Clinico-radiological, DRUJ, injuries & wrist

Introduction

The Distal radio ulnar joint (DRUJ) is a part of complex forearm articulation that includes Proximal radio ulnar joint (PRUJ), forearm bones, and interosseous membrane (IOM) allowing pronation - supination.

It is functionally and anatomically integrated with the ulno carpal articulation of wrist [1]. The osseous structure of the DRUJ has minimal inherent stability, Thus the DRUJ relies heavily on the soft tissue structures and instability of the joint is a common clinical problem [2]. DRUJ Subluxation is very easy to miss in the first presentation, it would appear that a common cause of misdiagnosis is to dismiss the appearance as positional/projectional.

Injuries of Distal Radio ulnar joint (DRUJ) may occur in isolation or along with associated wrist or hand injury. They may present as acute or chronic instabilities or painful arthritis of the DRUJ [3].

The diagnosis and management of these injuries require a good knowledge of anatomy and clinical evaluation, the joint is important in the transmission of the load and its anatomic integrity should be respected in surgical procedure if normal biomechanics are to be preserved [4].

Distal radio-ulna joint disruption (DRUJ) occurs in approximately 40-70% of distal radius fracture due to injury to triangular fibro cartilage complex (TFCC). Injuries of the DRUJ may occur in isolation, or along with fractures of the distal radius (Colle's fracture, Smith fracture, Bartons fracture) and ulna, Isolated fracture of ulnar styloid, with the eponymous Galeazzi or Essex-Lopresti fractures, metacarpal fractures such as Scaphoid fracture [5].

This fracture was common in older age people with osteoporosis. In late 20th century with the advent of high speed transportation, mechanized farming and industrialization, this fracture has shifted its target from old to younger socially productive age group with increased

Corresponding Author:
Dr. R Ambade
Professor, Dept. of Orthopaedics,
Datta Meghe Institute of Medical
Sciences, Sawangi (Meghe),
Wardha, Maharashtra, India

propensity for intra-articular extension with consequent compromised outcome.

Initial management of isolated TFCC injury is nonsurgical such as immobilization with splinting, medication, and physical therapy according to the stability of the DRUJ. When the DRUJ is unstable, the forearm should be immobilized for 4 to 6 weeks, and the stability should be reevaluated. When DRUJ instability is associated with a distal radius fracture, accurate reduction of the fracture and maintenance of the radial alignment is important to allow stable healing of soft tissues around the DRUJ [6]. When there is an ulnar styloid fracture, stable fixation of the radius alone without fixation of the styloid can obtain equivalent results compared with ulnar styloid fixation. However, in young patients with a distal radius fracture, unrepaired peripheral tears of the TFCC can be a common cause of persistent

Material & Method

This prospective, non randomised cohort study was carried out in the Department of Orthopaedics, Jawaharlal Nehru Medical College & Acharya Vinoba Bhave Rural Hospital, Datta Meghe Institute of Medical Sciences (Deemed University) Wardha, between April 2013 and September 2015.

Inclusion Criteria

1. All patients of injuries around wrist joint aged between 10 -

60 years.

2. Neglected cases of DRUJ instability.

3. All patients willing to give consent.

Exclusion Criteria

1. Age < 10 years or > 60 years.

2. All the patients without distal radioulnar joint involvement.

3. All the patients who lost follow up or did not give consent for the research work.

Protocol and Technique

The Institutional ethics committee approved this study. All patients who presented to our hospital from April 2013 to September 2015 were included in the study after fulfilling the inclusion criteria. Total 160 patients of acute DRUJ disruption as well as chronic DRUJ disruption were included in the study. (110 - Males, 50 - females).

Patients with compound wrist injuries were excluded from the study. In standardised format, data concerning patient's history and clinical examination were collected. Those patients who fulfilled the inclusion criterion and gave a valid informed written consent were recruited in the study.

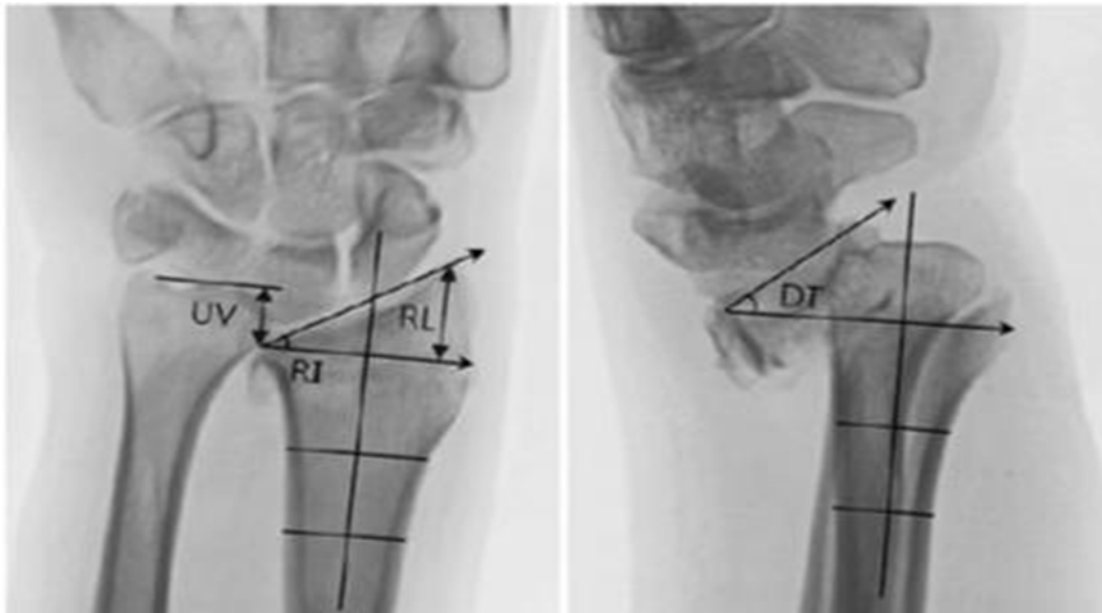


Fig 1: Radiological Findings

Results

Table 1: Range of motion at 24 weeks for untreated patients

Range of motion	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Supination	28	55.00	25.00	80.00	46.60	12.17	148.24
Pronation	28	30.00	25.00	55.00	36.96	9.16	83.96
Dorsi flexion	28	20.00	25.00	45.00	31.42	6.78	46.03
Palmar flexion	28	20.00	25.00	45.00	32.64	6.30	39.72
Ulnar Deviation	28	3.00	13.00	16.00	14.78	1.10	1.21
Radial deviation	28	2.00	11.00	13.00	12.35	0.95	0.90

Table 2: PRWE Score

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Pain	28	10.00	30.00	40.00	33.39	3.86	14.91
Function	28	30.00	20.00	50.00	33.57	9.89	97.88

The wrist evaluation in cases of Acute DRUJ disruption were treated primarily along with associated wrist injuries was done after 24 week of treatment. PRWE (Patient Related Wrist

Evaluation) score. However in patients of Chronic DRUJ disruption they also evaluated using Mayo Wrist Score and PRWE Score.

Table 3: Radiological Evaluation

	N	Range	Minimum	Maximum	Mean	Std. Deviation	Variance
Ulnar Variance	28	10.00	4.00	14.00	8.64	2.89	838
Radial inclination	28	8.00	10.00	18.00	14.35	1.74	3.05
Radial height	28	5.00	3.00	8.00	5.17	1.38	1.93

Table 4: Range of motion at 24 weeks for treated and untreated patients

Range of motion	Treated (n=132)		Untreated (n=28)		t-value	p-value
	Mean	SD	Mean	SD		
	Supination	61.49	9.03	46.60		
Pronation	61.98	7.47	36.96	9.16	15.43	0.0001,S
Dorsi flexion	68.27	8.27	31.42	6.78	22.02	0.0001,S
Palmar flexion	61.98	8.41	32.64	6.30	17.42	0.0001,S
Ulnar Deviation	27.65	2.50	14.78	1.10	26.58	0.0001,S
Radial deviation	17.52	2.53	12.35	0.95	10.62	0.0001,S

By using student's unpaired t test statistically significant difference was found in six range of motions (p=0.0001).

Table 5: PRWE Score at 24 weeks for treated and untreated patients

PRWE Score	Treated (n=132)		Untreated (n=28)		t-value	p-value
	Mean	SD	Mean	SD		
	Pain	12.42	4.03	33.39		
Function	27.32	2.79	33.57	9.89	6.23	0.0001,S

By using student's unpaired t test statistically significant difference was found in pain and function PRWE score (p=0.0001).

Discussion

The Distal RadioUlnar Joint (DRUJ) links the radius and ulna with the proximal Radioulnar Joint. The osseous structure of the DRUJ has a minimal inherent stability [7]. Thus, the DRUJ relies heavily on soft tissue structures, and instability of the joint is common clinical problem.

Isolated distal radioulnar joint (DRUJ) dislocations are rare and are more commonly part of complex forearm fracture-dislocations.

Trauma, degenerative diseases, and pathoanatomy of the distal forearm can result in dysfunctional DRUJ mechanics [8]. Conditions such as arthritis, osteoarthritis, ulnocarpal ligament syndrome, chronic instability, malunion and posttraumatic disorders can cause DRUJ dysfunction that must be addressed [9].

Though in our series we have studied only traumatic injuries of wrist joint, other conditions as discussed above needs to be studied as well, of all the injuries around wrist joint distal radial fracture was the most common cause for DRUJ instability [10].

In 132 Patients dorsal wrist pain and limitation of movements of pronation and supination were main clinical complaints along with the associated injury. Where as in 28 patients of chronic DRUJ instability main clinical complaint was ulnar wrist pain associated with the other complaints like localised swelling, crepitus, weakness, in severe cases painful clunk, loss of rotation due to chronic subluxation, Ulnar positive variance was also noted [11]. In some cases Ulnar impaction syndrome has also been described in literature however in our series it was absent.

Conclusion

In our study total 132 patients of Acute DRUJ disruption and 28 patients of Chronic DRUJ disruptions were studied clinically and radiologically. Clinical and Radiological suspicion of DRUJ

disruption should always be kept in mind while dealing with wrist, hand or forearm injuries. Distal Radio Ulnar Joint injury needs to be treated primarily along with the associated wrist, hand or forearm injury to restore near normal function of the Forearm and Wrist.

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