

Distal Radial Fracture in the Relatively Young

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ABSTRACT: Thirty-five patients, aged 15 to 39 years who sustained distal radial fractures were studied to evaluate the results of conservative versus operative treatment.

Those operated on regained full function earlier. An earlier return to work was associated with the younger patients and the more complicated fractures fared badly regardless of the treatment method used.

INTRODUCTION

In 1814, Abraham Colles¹ wrote his classic description of a distal radial fracture which now inherits his name. He observed that this particular fracture occurred 2 cm proximal to the distal extremity of the radius; the distal fragment of which was displaced backwards and radially. Colles also stated that the fractured limb would later regain a full range of motion. This last statement has unfortunately not stood the test of time.

Although Abraham Colles first ascribed his fracture to one occurring in the elderly, this fracture also occurs in the relatively young. It is with the latter category of patients in mind that this study is undertaken. These fractures when they

occur in the young are termed distal radial fractures (as in this study) or Colles' - like fractures. They are potentially fraught with complications which include hand and wrist stiffness, carpal tunnel syndrome, Sudecks' dystrophy, reduced hand grip strength and deformity of bone.² Because this study focuses on the economically active patients, its aim is to utilise a system of predictability scores so as to assess the prognosis and hence decide on the mode of treatment best suited to the patient and also to avoid possible complications.

MATERIALS AND METHODS

All fractures of the distal radius occurring in patients between the ages of 15 and 39 years who had been treated at the Singapore General Hospital from 1983 to 1985 inclusive were studied. Forty such cases were recovered, but the casesheets of only 35 could be traced.

Standard antero-posterior and lateral radiographs of the fractures were examined to classify the type of injury, and measure the distal radial gap distances and the radial angles of the latest films. These were then chartered against a Munson and Gainor cumulative demerit point grading sys-

TABLE 1
Roentgenographic assessment (Munson and Gainor)

Parameter	Grade	Measurement	Demerit points
Radial angle	Excellent	18 deg. or more	0
	Good	10 - 17 deg	1
	Poor	Less than 10 deg	2
Volar angle	Excellent	6 deg. or more	0
	Good	0 - 6 deg.	1
	Poor	Negative volar angle	2
Radial length	Excellent	10 mm or more	0
	Good	5 - 9 mm	1
	Poor	Less than 5 mm	2

tem³ (Table 5).

Recovery was then assessed by noting the duration taken by the patients to regain satisfactory ranges of movements (0% compensation according to the Singapore Workmen's Compensation Act, 1975 guide⁴), full sensory and power modalities, and painfree status.

RESULTS

Ten patients were operated upon (Table 2): 5 had their fractures stabilised with a plate and another 5 with Kirschner wires. All those plated were males aged 16 to 36 years (mean 25.6 years). Their recovery took 1.23 to 6.70 months (mean 3.2 months). Four males and 1 female had Kirschner wires inserted and they ranged from 15 to 39 years of age (mean 20.8 years). All 5 took 1.20 to 5.30 months to regain their function (mean 2.1 months). (Figure 1).

In comparison, those 25 patients who were treated conservatively took between 1.20 to 15.80 months (mean 5.9 months) to regain satisfactory function. Their ages ranged from 15 to 39 years (mean 21.2 years). There were 22 males and 3 females in this group. (Figure 2).

When the Munson and Gainor demerit point system was used, (Table 5) those who had their

fractures plated scored a mean of 1.4 demerit points, and those who had their fractures wires scored a mean of 2.0 points. The mean score for all patients operated upon was 1.7 demerit points. On the other hand, those patients treated conservatively scored 2.7 points.

In addition, the period of medical leave was studied. However, not all patients had their leave

TABLE 2
Project's protocol

1. Patient's particulars		
Name:	I/C:	Sex/age:
2. Date of injury		
3. Diagnosis, classification		
4. Date of recovery of function		
5. Tilt angles and gap distances of latest x-rays		
6. Medical leave period		
7. Date of discharge		
8. Any operation		
Date of op:	Nature of op:	Date of implant removal:

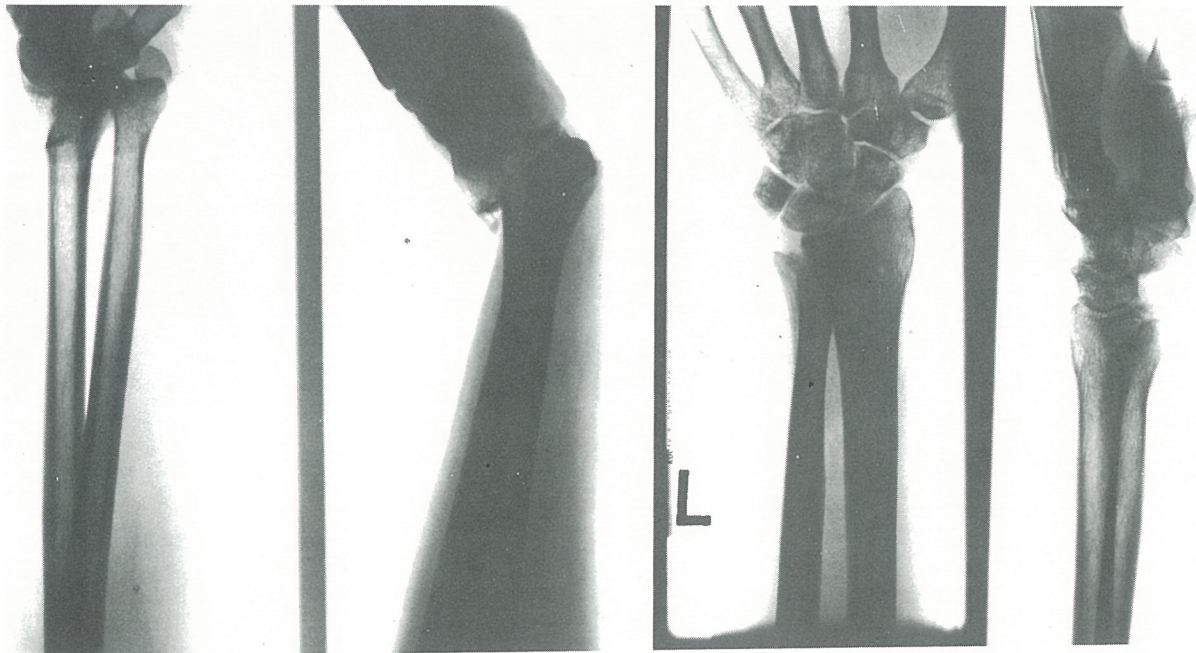


Fig. 1 GBC, a 24 year old male clerk, fell on his outstretched left hand in October 1983. He sustained a Frykman's Type III distal radial fracture for which manipulation and reduction was done and the position held with a plaster cast. The final result was a radial angle of 21 degrees, a volar angle of -1 degrees and a radial length of 14 mm.; 2 demerit points. The total medical leave taken was 61 days.

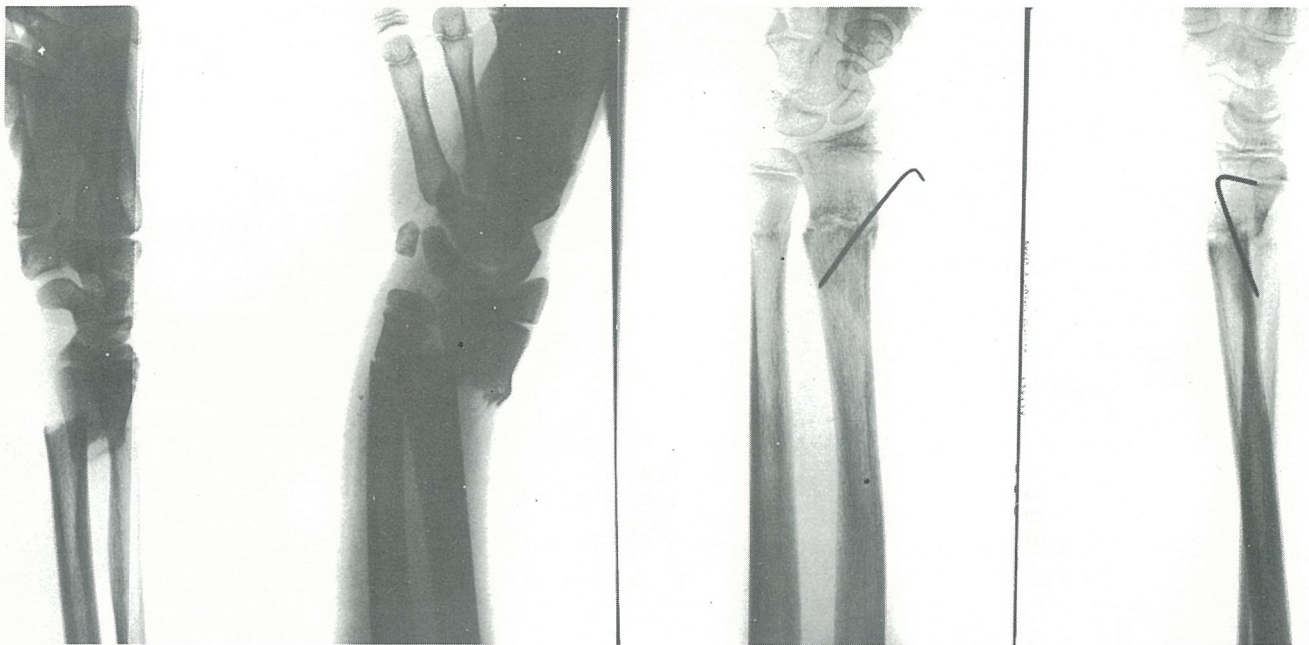


Fig. 2 GLK, a 15 year old school boy, fell on his outstretched right hand in February 1985. He sustained a Frykman's Type II distal radial fracture for which percutaneous Kirschner wiring was done. The final result was a radial angle of 21 degrees, a volar angle of 4 degrees and a radial length of 9 mm.; 2 demerit points.

recorded.

Nonetheless, in the conservative group, (Table 3) 10 of them had their period of medical leave documented, which ranged from 32 to 156 days (mean 82.8 days). Of the 3 patients who underwent operation, the medical leave granted ranged from 21 to 109 days (mean 65.3 days).

Next, an attempt was made to align the 2 broad groups of patients according to the Frykman classification. There were no patients with types VII & VIII fractures. Of those operated upon, none were of types III & V. There was no conservatively treated group of patients who had fractures of types V & VI (Table 4).

When a comparison of treatment results by Frykman type was made for each of the three available for comparison (types I, II and IV), those categories treated conservatively took a longer time to recover.

DISCUSSION

A review of the recent literature on distal radial fracture in the relatively young group of patients seems to favour some form of operative procedure in the various studies. However the difference between a Colles' fracture in an elderly and a fracture of the distal radius in a young adult lies in the

mechanism of injury in which the former is usually due to a trivial fall on an outstretched hand whereas the latter is often due to a violent force such as a result of a road-traffic accident.

Benke and O'Connor in 1982⁵ documented a problem of difficulty in maintenance of fracture reduction in the case of a 38-year old lady who had manipulation and reduction done with good initial anatomical position. However, on sequential follow-up, the fragments slipped, resulting in restricted motion even after 6 months leading to poor results. She subsequently had to undergo corrective osteotomy and T-plating, with excellent functional results regained after 2 years (Table 5).

Plating is not the only method of openly reducing and internally fixing this radial fracture. Katznelson, Volpin and Lin in 1980⁶ studied 4 patients with unstable comminuted and/or intra-articular fractures of the distal radius. They found that it was essential to re-constitute the normal anatomical relationship to both the carpus and the ulna. This they did by use of Kirschner wires and adding a tension band. These patients were followed up for 6 months and all regained full wrist function without unsightly deformity by 6-8 weeks.

Percutaneous pinning with Steinmann pin was described by Munson and Gainor in 1981.⁷ A total of 22 patients was involved and their study found that poor functional results tended to be associat-

ed with poor anatomical results. They tried to achieve good functional results by making maintenance of reduction their goal in treatment. This they did by using percutaneous single pin pinning the radial styloid fragment. With a mean follow-up period of 7 months and assessed at 8 weeks, they found that 5 had excellent result (radial trial in excess of 8 degrees and volar tilt more than 6 degrees) and 16 had good result (10 to 17 degrees, 0 to 6 degrees respectively). These correlated with functional results.

Lucas and Sachtjen in 1981² retrospectively analysed 33 patients treated with Rush rod fixation over some 15 years.^{9,10} The rod stabilisation was employed as a means of diminishing the incidence of hand complications. They found that 14 had excellent (according to their demerit point rating system) and 18 had good result.

Percutaneous Kirschner wire fixation was described by Clancy in 1984.⁸ Thirty such patients were followed-up for a year and 27 cases regained full function by then. Two had minor loss of re-

TABLE 3
Patient data

Name/Sex/Age	Classification	Nature of operation	Period taken to regain function (months)	Period of medical leave (days)	Tilt angle and gap demerit points
AR /M/16	II	plate	1.23	—	0
FWH /M/30	II	plate	4.53	—	0
LPH /M/22	IV	plate	2.23	21	3
AK /M/36	VI	plate	6.70	—	2
MCK /M/24	VI	plate	1.57	66	2
CEK /F /15	I	wire	5.30	—	0
LN /M/39	I	wire	1.20	109	2
MSY /M/17	I	wire	1.23	—	3
GLK /M/18	II	wire	1.20	—	2
SKW /M/15	II	wire	1.67	—	3
CPH /M/20	I	—	5.07	—	2
CWM /M/17	I	—	3.13	—	2
GAE /F /24	I	—	1.67	—	2
J /M/16	I	—	14.20	—	4
LYT /M/31	I	—	7.50	32	3
NGC /M/15	I	—	4.03	—	2
NGD /M/15	I	—	4.13	—	2
PK /M/24	I	—	2.03	—	2
CLF /M/27	II	—	3.80	86	2
LYH /F /15	II	—	2.17	—	2
LHT /M/21	II	—	15.80	80	3
LLH /M/37	II	—	1.33	—	2
NA /F /15	II	—	2.87	—	2
THB /M/23	II	—	4.13	127	2
WHS /M/22	II	—	10.50	—	3
YYY /M/16	II	—	2.70	—	3
YYZ /M/16	II	—	14.20	—	3
YKH /M/24	III	—	7.00	61	2
NFS /M/16	III	—	8.63	—	4
NHK /M/22	III	—	4.43	—	4
OCG /M/27	IV	—	3.36	82	3
SKS /M/32	IV	—	10.27	38	4
TSL /M/16	IV	—	5.10	156	3
YMY /M/24	IV	—	8.47	—	3

TABLE 4
Recovery versus type of fracture

Fraykman's classification		Type of treatment			
		Conservative		Operative	
		No. of patients	Mean months to recover	No. of patients	Mean months to recover
Extra-articular, ulna intact	I	8	5.2	3	2.5
Extra-articular, fractured ulna	II	10	5.7	4	2.1
Intra-articular radio-carpal	III	3	6.7	—	—
Intra-articular radio-carpal, fractured ulna	IV	4	6.9	1	2.2
Intra-articular radio-ulnar	V	—	—	—	—
Intra-articular radio-ulnar, fractured ulna	VI	—	—	2	4.1
Intra-articular radio-ulnar, radio-carpal	VII	—	—	—	—
Intra-articular radio-ulnar, radio-carpal, fractured ulna	VIII	—	—	—	—

TABLE 5
Results of studies by other authors

Authors	Year	Patient number	Treatment method	Results
Katznelson, Volpin, Lin	80	4	K tension band	All recover by 6-8/52
Munson, Gainor	81	44	Percutaneous pin	8/52: 22.7% excellent 72.7% good
Lucas, Sachtjen	81	33	Rush rod	42.4% excellent 54.5% good
Benke, O'Connor	82	1	Conservative → plating	Poor → excellent
Wahlstrom	83	42	Conservative	Forearm pronated better

TABLE 6
Recovery status of patients

Treatment type	Patient number	Mean demerit points accumulated	Mean time taken to return to acceptable function	Mean time taken to return to work
Plate	5	1.4	3.2 months	
K wire	5	2.0	2.1 months	65.3 days
Conservative	25	2.7	5.9 months	82.8 days

duction but their function was not compromised.

Wahlstrom,³ in 1982, after evaluating 42 patients separated into 3 groups with forearm immobilised in positions of pronation, neutrality⁷ and supination,¹⁰ found that the position of pronation yielded less incidence of fracture tilt.

In Singapore, the orthodox treatment till recently was to manage such fractures conservatively with plaster of Paris immobilisation. In the light of the above articles, this study is formulated to help assess local results in respect of the above stated results. The results of this study appear to be in line with the findings of other authors.

The scores obtained from the radiological findings appear to match the functional results (Table 6). It showed that the 10 operated cases scored a mean of 1.7 points. Whereas, the 25 conservatives scored a mean of 2.7 points mean.

A third avenue of comparison is reflected in

the period of medical leave. Those operated on took a mean of 65.3 days of such leave. This figure contrasts with the 82.8 days mean for the group treated conservatively.

One other observation is that the higher the grade of fracture, the worse the outcome is: moreso in the conservative group than the operated group (Table 4).

CONCLUSION

Hence, while inviting a local prospective study in this area for comparison and confirmation, the authors would like to conclude that the relatively young patients who sustain distal radial fractures fare much better with accurate anatomical reduction, done preferably through open reduction and internal fixation.

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