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Functional Bracing in Colles' Fracture – Rural India.

Dr. G.R. Reshi M.S Orthopaedics.
Senior Consultant Orthopaedics. M.M.A.B.M. Hospital.

Dr. S. Rasool
Resident Doctor. Govt. Medical College Sgr.

Dr. V.K. Panchnanda
Professor and Head Department of Orthopaedics. GMC Jammu.

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I. Introduction

Fifty cases of Colles' fractures were treated by Below Elbow functional brace of Plaster of Paris (simple and economical) All cases showed union by 6 weeks. Functional reses, was excellent good, or satisfactory in 94 percent cases, despite the loss in position of volar tilt, radial deviation and length in brace, In 80 percent cases. Early mobilization and functional bracing is an effective procedure for colles' fractures.

Colles' fracture is one of the commonest injuries seen in orthopaedic services. Since its description by Sir Abraham Colles' (1814) various methods of treatment have been described from time to time. Multiplicity of available treatment is itself the testimony for the fact that none of these methods offer excellent result. Augusto introduced functional bracing of Colles' fracture in supination position because his electromyographic study have revealed that brachioradialis acts as deforming force in pronation and causes displacement, of distal fragment and reported very functional result by treating Colles' fracture with Above Elbow brace in supination. We have studied result of a simple Below elbow functional bracing of Plaster Of Paris of Colles' fracture in supination position as described by Dias et Al (1987).

II. Material And Methods

A detailed study of 50 cases of Colles' facture has been carried out in the department of orthopaedic surgery in MMABM Hospital Anantnag 2016 -2019 . In all cases skiagram (Fig 2) of injured wrist was taken for measurement of volar tilt, radial deviation and radial length in pre-reduction position, post-reduction position and after discarding the cast by 6th week. In all the cases the fracture was displaced and it was reduced by usual procedure under sedation or General Anaesthesia and above elbow POP cast given in full supination for first 14 days. After fourteen days functional brace of POP was applied. Below Elbow brace was applied in full supination position of wrist. Fig 1

Fig 1: Showing B.E functional brace of P.O.P

Fig 2 : Showing Colles fracture

Cast was well moulded, oval and on volar aspect it extended up to proximal wrist crease and on dorsal aspect up to the Knuckle and in ulnar deviation and neutral flexion at wrist. An elastic strap was incorporated in cast's dorsal hood which was for fixing hand with brace. Patient was instructed to unfasten the strap each morning and use the hand and fingers comfortably throughout the day. The aim of brace is to maintain forearm in supination allowing full movement of elbow, fingers and only palmer flexion at wrist.

The anatomical result, were assessed by values of volar tilt, radial length and radial deviation on the lines of Lid stroam (1959) and functional result were assessed on the basis of point system, described by Sarmiento et al. (1975).

OBSERVATIONS:

There were 50 cases having Colles' fracture Thirty (30) were female and (20) male. All the cases were in age of 30 to 70 years. Twelve patients had fracture of styloid process of ulna and two bad dislocation of distal radioulnar joint. Thirty-five cases were having comminuted fracture and 15 were not comminuted. Roentgenogram of opposite normal wrist were taken for normal values. The normal volar tilt ranged from 0 to +14 degree (average +70). Normal radial deviation ranged from 15 to 35° (average 24 4° and normal radial length varies from 6 to 18 mm beyond the ulna (average 12 nm).

ANATOMICAL END RESULTS:

In our study we adopted criteria of Lidstrom (1959) for grading anatomical end results as follows:

Grade I: No or insignificant deformity, dorsal angulation not exceeding neutral, radial shortening of less than 3 mm. (18 fractures).

Grade II Slight deformity, dorsal angulation and radial shortening of 3 to 6 mm (12 fractures).

Grade III Moderate deformity dorsal angulation 11-14° and radial shortening of 7 to 11mm (14 fractures).

Grade IV: Severe deformity, dorsal angulation of at least 15° and shortening of 12 mm (6 fractures).

An analysis was also made of loss or gain in volar tilt radial deviation and radial shortening occurred during treatment in brace (from post reduction position to final) which is as follows:

Volar tilt-in 10 cases there was no change, in 32 cases there was a loss of 2° to 20° (average 8.5°) in 8 cases a gain in volar tilt ranging from 2° to 7°

TABLE I Showing Changes in Measurements after 6 Weeks from Post reduction position.

		No change	Loss			Gain		
			1-5	**6-10**	**11 or +**	**2-4**	**5-7**	**8 or +**
1.	Volar tilt (in degrees)	10	17	5	10	4	4	-
2.	Radial deviation (in degrees)	8	21	10	7	4	-	-
3.	Radial length (in mm)	10	22	12	6	-	-	-

Fig 3: Post reduction skiagrams showing R. D . 24 , V.T ¾ -12 , R.L . – 1 2 mm

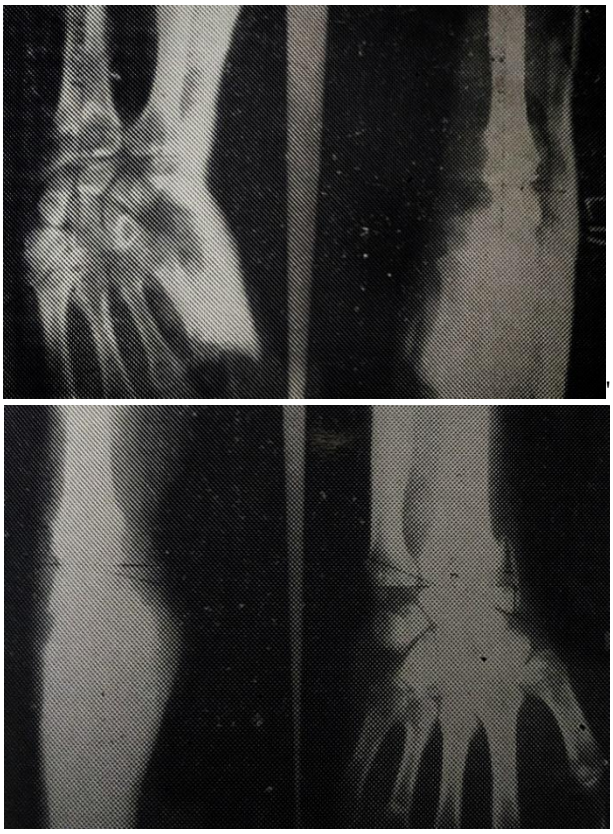

Fig 4: Final skiagram showing R.D ¾ 24 , V.T . ¾ - 12 , R.L . – 10 mm

RADIAL DEVIATION:
Eight patients showed no change. In 38 cases there was average loss of 66°, In 4 cases radial deviation increased by 2° to 4°. (Fig 3 & 4)

RADIAL LENGTH:
Shortening occurred during bracing ranged from 1 to 12 mm in 10 cases no change, in 40 cases there was loss from 1 to 12 mm. Average loss was 4.5 mm.

FUNCTIONAL END RESULTS:
Functional results were analysed on basis of subjective and objective criteria on point system based on modification by Sarmiento ett. al (1975) of the system of Gartland and Werley (1951). Merits and demerits were given to case according to analysis of the result. Sixty percent cases shown excellent result, 28 percent good result and 6 % fair result and poor result was seen in 6% cases. Functional results were satisfactory in 94 percent cases despite the loss in anatomical measurements in 80 percent cases during bracing.

COMPLICATIONS:
We did not notice pseudo atrophy and osteoporosis in any cases. Mal-union was obvious in 10 percent cases, stiffness of finger was seen in 6 percent cases, oedema in 8 percent cases, poor grip strength in 10% cases, painful inferior radio-ulnar joint in 6 percent cases.

III. Discussion

Various method available for treatment of Colles' fracture may be considered as testimony to the apparent dissatisfaction with any single technique. DE Palma (1951) Gartland and Werley (1951), Green and Gay (1956), Spira and Weigel (1968), Erie Hinding (1972) and Fenyo et al (1974) described high number of unsatisfactory results by various usual procedures. In 1975 Augusto Sarmento treated his cases of Colles fracture by functional brace and concluded that reduction of fracture can be maintained while allowing wrist motion. Supination helped in eliminating deforming force of brachioradialis muscle and found satisfactory result in great majority of cases and also described that functional result is good even if there is a loss in anatomical position of the distal fragment from post reduction in a brace. Sarmiento et al (1975) found excellent or good results in 82 percent cases treated by functional bracing of orthoplast.

IV. Conclusion

Functional bracing and early mobilization of injured part always helps in rapid soft tissue healing and decrease incidence of stiffness, osteoporosis, oedema (Cooney 1980). In 1987 Dias et al, studied 187 cases of Colle's fracture by below elbow brace and concluded early wrist motion hasten the resolution of various complication common with Colles' fracture. In our series we have obtained 94 percent satisfactory functional results in cases of Colles' fractures and only 6 percent had poor results.

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