



FUNCTIONAL OUTCOME OF NEGLECTED DIAPHYSEAL FRACTURES OF BOTH BONE OF FOREARM IN ADULT TREATED WITH PLATE OSTEOSYNTHESIS; A PROSPECTIVE STUDY

Orthopaedics

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| Dr. Md Rafiq A* | III Year Pg, Department Of Orthopaedics, Santhiram Medical College, Nandyal, A.P *Corresponding Author |
| Dr. G. Sreekanth | Assistant Professor, Department Of Orthopaedics, Santhiram Medical College, Nandyal, A.P |
| Dr. B. Someswara Reddy | Professor & Hod, Department Of Orthopaedics, Santhiram Medical College, Nandyal, A.P |

ABSTRACT

The forearm is a complex anatomical structure serving an integral role in upper extremity function. It has been universally recognised that diaphyseal fractures of both bone forearm in adult require operative fixation. This study attempts to describe both bone diaphyseal fractures of forearm in adults which have been mostly managed by traditional bone setters with native bandages and manipulation and present late to modern orthopaedic care. This is a prospective study done in Santhiram Medical College, Nandyal in the Department of Orthopaedics. 24 patients who presented to us with neglected both bone diaphyseal fractures of forearm in adults & were operated with limited contact dynamic compression plate (LC-DCP) were analysed over a period of 6 months regarding the functional and radiological outcome of LC-DCP. LC-DCP aids in early post-operative mobility, improve the blood supply to the underlying bone cortex, lessen the risk of partial bone necrosis which can improve healing, decrease infection rate, compression at fracture site and eventually the early union of the fracture. **Source of the study** : Santhiram Medical College & General Hospital, Nandyal. **Study design**: Prospective study. **Duration of study**: June 2022 to November 2022. **Sample size**: 24 patients of either sex. **Inclusion Criteria**: Patients who are willing to give written informed consent. Patients who sustained diaphyseal fractures of both bones forearm and presented for definitive intervention at least one month after the injury. **Exclusion Criteria**: Patients who are NOT willing to give written informed consent. Age before physal closure

KEYWORDS

LC-DCP (Limited contact dynamic compression plate), DCP (Dynamic compression plating)

INTRODUCTION:

Diaphyseal forearm fractures account for about 5% of all upper limb fractures. Forearm consists of the radius and ulna, the proximal radioulnar joint, the distal radioulnar joint and the interosseous membrane. The forearm is a complex anatomical structure serving an integral role in upper extremity function. The forearm bones can be considered struts linking 2 halves of a condylar joint formed by proximal and distal radioulnar joints. So, any change in the geometry of radius and ulna changes the congruency and range of motion of this condylar joint. It was found that the contact compression factor which incorporates compression forces in physiological muscle balance stimulates osteogenesis and fracture union. This compressive force is achieved by internal fixation with plates. The most widely used implants for fixation of both bones forearm are the 3.5mm dynamic compression plate (DCP) and the 3.5mm limited contact- dynamic compression plate (LC-DCP). The contact area between the bone and the plate is about 50% reduced in LC-DCP as compared to DCP. This is presumed to improve the blood supply to the underlying bone cortex and lessen the risk of partial bone necrosis which can improve healing and decrease infection rate.



Figure 1: DCP

Source:

https://www.google.com/search?q=dynamic+compression+plate&source=lnms&tbn=isch&sa=X&ved=2ahUKewjqO6U3Zv8AhWu1jgGHU7wD10Q_AUoAXoECAEQAw&biw=819&bih=500&dpr=1.25#imgcr=bbhMuyubF4McGM&imgdii=H21-x27iWoZUyM

AIMS AND OBJECTIVES:

To assess the clinical, radiological and functional outcome of neglected diaphyseal both bone forearm fractures in adult treated with plate osteosynthesis.

RESULTS:

Table 1 – Age Group Pattern

| AGE GROUP | NUMBER | % |
|-----------|------------|------|
| 20 – 30 | 3 | 12.5 |
| 31 – 40 | 9 | 37.5 |
| 41 – 50 | 9 | 37.5 |
| 51 – 60 | 3 | 12.5 |
| MEAN | 41.5 Years | |

Table 2 – Sex Ratio

| SEX | NUMBER | % |
|--------|--------|----|
| MALE | 18 | 75 |
| FEMALE | 6 | 25 |

Table 3 – Interval Between Injury & surgery

| Interval in weeks | NUMBER | % |
|-------------------|------------|------|
| 5-8 weeks | 16 | 66.6 |
| 9-12 weeks | 8 | 33.3 |
| MEAN | 7.33 weeks | |

DISCUSSION:

Fractures of the diaphysis of both bones forearm are common injuries encountered in orthopedic practice. Open reduction and plate osteosynthesis is the commonest and currently the most favored treatment method of these injuries. Several authors have reported good functional outcome after plate osteosynthesis for fracture of the both bones forearm. In this study an attempt is being made to describe a special group of patients who sustain both bone forearm fractures but present late for definitive surgical management with bone grafting. 24 who satisfied the inclusion criteria presented for review. Road traffic accident and work place injuries accounted for majority of the injuries. Out of the 24 patients there were 18 males (75%) and 6 females (25%). The mean age was 41.5 years. The fractures were classified as per the AO/OTA classification system. All patients underwent bone grafting from iliac crest site. At the time of assessment none of the patients had clinical or radiological evidence suggestive of nonunion. 71.4% of patients sustained injury to their non-dominant limb. There was clinical recorded evidence of nerve injury in 1 patient and no case of post operative neurological injury. The mean elbow flexion was 128.6°, mean elbow extension was 1.90°. The mean DASH score was 14 ± 10 points (range 10-75). The mean range of forearm supination was 76.8 ± 10.3°. The mean range of forearm pronation 68.81 ± 12.32°. The mean range of wrist dorsiflexion was 70.48 ± 18.57° and wrist palmar flexion

was $65.95 \pm 24.78^\circ$. The delay in definitive fixation did not significantly affect union or soft tissue complications. Proximalisation of the maximum radial bow resulted on loss of forearm pronation. The maximum radial bow has to be restored as close to the normal anatomical location possible for normal forearm function. The initial management of the forearm fracture, whether it was native splinting or other forms of management, did not significantly affect the outcome of plate osteosynthesis. All the 24(100%) patients had achieved full clinical and radiological union at follow up irrespective of the delay in presentation or any other local or systemic factors.

CONCLUSION:

Open reduction and plate osteosynthesis is seen to be a very good modality of treatment diaphyseal both bones forearm fractures in adult and as per this study and has resulted in 100% fracture union even in late presentation when reviewed at a mean follow up of 6 months. DASH is a widely accepted standardized scoring system to assess upper limb function and correlates strongly with forearm supination. Reconstruction of the maximum radial bow to near normal (8.08 ± 2.46) and the anatomic location of the restored maximum radial bow are vital in restoration of forearm function even in patients with delayed treatment.

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