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SURGICAL OUTCOME OF MALUNITED INTRA ARTICULAR DISTAL RADIUS FRACTURE

***[1]Dr.V.Manoojkumar, [2]Prof Dr.R.Neelakrishnan, [3]Dr.V.Barathiselvan and Dr.D.Dhiviya Raj**

*[1]Post Graduate, Department of Orthopaedics, Rajah Muthiah Medical College, Chidambaram
[2]Professor, Department of Orthopaedics, Rajah Muthiah Medical College, Chidambaram
[3]Lecturer, Department of Orthopaedics, Rajah Muthiah Medical College, Chidambaram

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ABSTRACT

BACKGROUND: Malunion is the most common complication following distal radius fractures. Malunion can present as asymptomatic radiographic abnormalities to disabling deformities associated with significant pain and functional impairment. Malunion of the distal radius results in kinematic alterations to the radiocarpal joint, the midcarpal joint, and the radioulnar joint. Distal radius malunion can have two potential effectson radiocarpal mechanics. First, loss of palmar tilt shifts the carpus distally on the radius, thereby increasing contact stress on the dorsal lip of the radius. In addition, the loss of radial inclination results in increased stress at the radiolunate articulation.**OBJECTIVE:** The purpose of this study is to evaluate the functional outcome following corrective osteotomy for malunited intra articular distal radius fracture using Gartland and Werley score. **METHODS:** The study was carried out on 15 patients with corrective osteotomy done for malunited intra articular distal radius fracture in the department of orthopaedics, Rajah Muthiah Medical College and Hospital, Annamalai University, Chidambaram from July 2013 to may 2015. Patient follow up was for a minimum of 3 months to a maximum of 24 months. **RESULTS:** Excellent to good results were obtained in 86% of cases after corrective osteotomy.The mean pre-operative radiological measurement with radial length 6.6mm, Radial inclination 13.3 degree and the mean post operative radiological measurement with radial length 8.6mm, radial inclination 17.5degree.The mean preoperative functional movements of palmar flexion 27 degree, dorsiflexion 36.3 degree, supination 48.3 degree and pronation 53 degree and the mean post operative functional outcome of palmar flexion 49 degree, dorsiflexion 53.3 degree, supination 64 degree and pronation 66 degree. Excellent anatomical results were achieved in 6 patients, good in 7 patients, fair in 2 patients based on Gartland and Werley scoring system. **CONCLUSION:** The results of corrective osteotomy for the treatment of malunited intra articular distal radius fracture produces good clinical and radiological results among sympto matic patients.It may help to limit the need for salvage procedures such as wrist arthrodesis.

Keywords: Malunion, Radius fracture

1.INTRODUCTION

Fractures of the distal radius are common injuries comprising approximately 8% to 17% of fractures seen in the emergency department. High energy fractures which are often seen in young adults. These injuries display significant variation in fracture pattern and stability, with certain fracture deformities leading to poor prognosis if left uncorrected. Complication rates from improper or failed treatment regimens remain high, ranging from 23% to 31%.Malunion is the most common complication following distal radius fractures. This occurs in approximately 23% of non surgically treated injuries and approximately 11% of operatively treated fractures. Malunions can present as asymptomatic radiographic abnormalities to disabling deformities associated with significant pain and functional impairment. Malunion of the radius results in alterations to the radiocarpal joint, the midcarpal joint, and the radioulnar joint. The effect of these changes can be significant with regard to both immediate functional impairment and the development of late degenerative changes. Radial malunion can have two potential effects on radiocarpal mechanics. First, loss of palmar tilt shifts the carpus dorsally on the radius, thereby increasing contact stress on the dorsal lip of the radius. In addition, the loss of radial inclination results in

Corresponding* author ***Dr.V.Manoojkumar**, Post Graduate, Department of Orthopaedics, Rajah Muthiah Medical College, Chidambaram*

increased stress at the radiolunate articulation[1,2,and3.] The increased contact stress result in a higher likelihood for degenerative changes[4]. Functionally, the shortening may account for the loss of grip strength that has been observed after malunion.

Intra-articular incongruity causes a significant change in contact stresses at the radiocarpal joint. Depression of the lunate facet results in significant increases in the contact forces at the radioscaphoid articulation. Clinical studies indicate that 2mm of lunate depression results in degenerative changes and worse functional outcomes[5,6]. The impact of distal radius malunion on radioulnar mechanics has received significant attention. Treatment for clinically significant malunion has been operative, consisting primarily of corrective osteotomies with adjunct bone grafting and fixation.In this study we are reporting the results of functional and radiological outcome of surgical management of malunited intra-articular distal radius fracture.

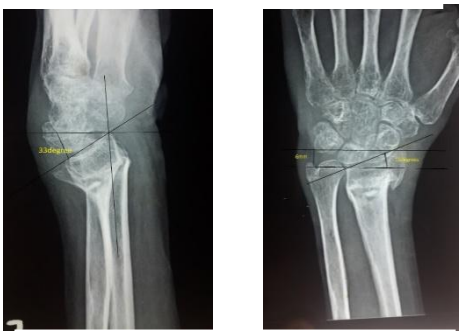
2.MATERIALS AND METHODS:

15patients diagnosed to have malunited intra articular distal radius fracture by X ray AP view and Lateral view from June 2013 to October 2015 at Rajah Muthiah Medical College And Hospital with a follow up of 6 month. The clinical and radiological outcome of patient who underwent corrective osteotomy using Gartland and Werley score. **INCLUSION CRITERIA:** Young active patients with high functional demands. **EXCLUSION CRITERIA:** Patients with age less than 18 years.2.Patients with more than 50 years.3.Patients with other associated forearm fractures. 4. Pathological fractures.5.Osteoporotic patients.

3.RESULTS:

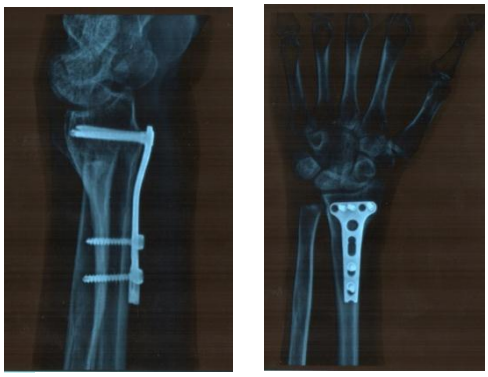
In our study 15 patients with malunited intra-articular distal radius fractures,Twelve patients were male and three were female.Ten patients resulted from native treatment, five patients following closed reduction.The mean pre-operative radiological measurement with radial length 6.6 mm, Dorsal tilt 28.3 degree, radial inclination 13.3 degree and the mean post operative radiological measurement with radial length 8.6mm, radial inclination 17.5 degree. The mean preoperative functional movements of palmar flexion 27 degree, dorsiflexion 36.3 degree, supination 48.3 degree and pronation 53 degree and the mean post operative functional outcome of palmar flexion 49 degree, dorsiflexion 53.3 degree, supination 64 degree and pronation 66 degree. Excellent anatomical results were achieved in 6 patients, good in 7 patients, fair in 2 patients based on Gartland and Werley scoring system. Two patients had fair outcome. Out of which one had pain due to implant irritation and treated with analgesics and anti inflammatory. Another one patient had sudek's osteodystrophy following native treatment and treated by intensive post operative physiotherapy. Among all patients no patient had evidence of non union and osteonecrosis.

CASE PHOTOS



Pre – OP

Post- OP



Follow up

CLINICAL PICTURES

PALMARFLEXION **DORSIFLEXION**

RADIAL DEVIATION **ULNAR DEVIATION**

4.DISCUSSION:

The present study shows that the corrective osteotomy for malunited intra articular distal radius fracture is a safe procedure, that can effectively improve the wrist function with reproducible result and a high subjective satisfaction rate[7,8]. In last few years many studies have shown good surgical outcome following corrective osteotomy and internal fixation for malunited intra-articular distal radius fracture.The intention of the present study is to encourage surgeons to surgically correct all cases of malunited intra articular distal radius fracture with unacceptable deformities.The good and satisfactory result can be achieved when,1.The indication are strictly followed.2.The risk of surgery is considered.3The patient expectation regarding the restoring of non-perfect wrist function are discussed.4.The corrective osteotomy is meticulously planned and performed.In comparison with other studies, in our study extra articular osteotomy showed excellent to good result when compared to intra articular osteotomy. These procedures are therefore often coupled with an ulna sided intervention, in the form of distal ulna resection for improving forearm rotation. Distal ulna is used as graft to fill the osteotomy gap to maintain the radial length and to attain better osteotomy site fracture healing. David ring et al 2005[9], studied 23 skeletally matured patients with malunited intra articular distal radius fracture for which corrective osteotomy was done, the excellent to good result was achieved in 83% of cases. In concordance with above mentioned study, in our study good to excellent result achieved in 86% of cases. The limitations of our study the sample size is small in number. In our study out of fifteen patients, two patients had fair outcome. One No patient had evidence of nonunion and osteonecrosis in our study.

The early results of treatment by this technique are encouraging. The patients were satisfied with the results of the operation and their wrists were functionally well at an average follow up of 2 years.Hence we recommend the corrective osteotomy for malunited intra articular distal radius fracture is meticulously planned and proper selection of patient can improve wrist function and to restore biomechanics. The treatment of malunited intra articular distal radius is still challenging requires an experienced surgeon to avoid complications.

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