

# Method of Choice for Disphyseal Fracture of Humerus; Closed Intramedullary Interlocking Nail or Functional Brace

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## Author's Contribution

<sup>1</sup>Selection of cases, operative procedure and data collection

<sup>2</sup>Selection of cases on basis of radiographs.

<sup>3</sup>Analysis and interpretation of data and formatting

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## ABSTRACT

**Objective:** To compare the intramedullary nailing versus functional brace in the cases of disphyseal humeral fractures.

**Methodology:** This was a descriptive comparative analysis study done Shaikh Zayed Hospital from Jan 2016 to March 2018, Pakistan. 60 cases who were presented with the disphyseal fracture of humerus were enrolled. After random allocation in the two different groups viz functional brace and intramedullary nailing. All the patients irrespective of gender and presented with humerus fracture were added. While all other type of fracture cases was excluded.

Each patient was treated standardized by a specialist having somewhere around 5 years of experience after post-graduation. All patients were pursued at third week, sixth week and at 3 months to survey the radiological result according to the radiological sign of union i.e formation of callus on the fracture point.

**Results:** Both treatment group in this study were same with non-significant difference with respect to age, gender and history of the smoking. But the union was noted in 45% cases in the intramedullary group and 54% in the functional brace group (p-value > 0.05). But it was observed that at the 6th week there was a significant difference with respect to the union in both operative groups. P-value of the union at 6th week was < 0.05 shows that difference is significant.

**Conclusion:** Functional brace method is more effective for the union of the disphyseal humerus fractures

**Key Word:** Intramedullary nailing, functional brace, disphyseal fracture, humerus.

## Introduction

Crack of the humerus was not all that basic before the modernization of society. It was noticed that roughly 370,000 cases were accounted for in the crisis bureau of various doctor's facility of US.<sup>1</sup>

A large portion of the breaks of the humerus are those crack that is insignificantly dislodged and it is extremely hard to oversee them without intrusive systems. It is likewise truth that osteoporosis can likewise result in the damage to the humerus. It is extremely extraordinary that anyone has seen the nerve contribution in the break of humerus.<sup>2, 3</sup>

Humeral diaphyseal breaks are the slightest basic kind of fracture among every single other sort of cracks of Humerus found in only 1.2% of case.<sup>4</sup>

It is anything but difficult to separate the patients who have diaphyseal crack among every other kind of breaks. By and large clinical introduction the patients observed to be suffering from the agony in the distorted arm and furthermore has nerve palsy. Some related clinical discoveries are the shortening of arm and crepitus.<sup>5</sup> in another study the union was noted in 95% of cases.<sup>6</sup>

The benefits of intramedullary nailing (IMN) of intense humeral shaft breaks have been bantered since the

presentation of this strategy. Intense cracks of the humerus have a decent mending inclination with non-agent treatment, on account of the great blood supply of the encompassing muscles; subsequently, useful supporting is as yet the treatment of decision in numerous injuries focuses. In the investigation there were 58(92%) with the association and only 2(8%) were discovered not joined following multi month postoperatively.<sup>7</sup>

Forty five patients with humerus crack were treated with either interlocking nailing or plating. Rodriguez-Merchan et al criteria was utilized to look at consequences of the two gatherings postoperatively. Breaks with unsuitable arrangement was the most widely recognized sign for agent intercession (53%). While just half of the interlocking gathering had recuperated by about four months, 75% of the practical support had joined at this point. By and large outcomes (Rodriguez-Merchan) demonstrate 65% phenomenal and great outcomes in interlocking gathering and 93% comparative outcomes in the plating gathering.<sup>8</sup>

Humeral diaphyseal fractures at risk for nonunion with functional brace treatment. Forty-nine of 52 consecutive patients treated nonoperatively for an isolated diaphyseal fracture of the humerus during a 6-year period were followed until either union and full or near-full restoration of shoulder and elbow motion, or until 6 months had passed, or until a reconstructive surgery was performed. Union was achieved in 44 of 49 patients (90%).<sup>6</sup>

This study was planned to confirm the efficacy of the two procedure in terms of union. There were many individual studies available that have highlighted the union rates of both procedures individually but only two studies are available that had compared the two procedures. The frequency of diaphyseal humerus fracture is high in local population due to unhygienic condition and high accident rates.

## Methodology

Sixty patients meeting incorporation criteria were taken from the division of Orthopedic Surgery Lahore General Hospital Lahore. Subsequent to taking an educated assent from guardians of patient's statistic data, for example, name, age and sex were noted. Patients were treated with shut intramedullary

interlocking nailing (Group-A) or with practical support (Group B) haphazardly utilizing lottery strategy. All medical procedures were done under general anesthesia. This was a randomized clinical trial. The sample size was estimated using 95% confidence interval and 5% margin of error. Inclusion criteria consisted on the age 18-50 year of either gender. Patients diagnosed with radiological evidence of diaphyseal fracture of the humerus. All those patients who have limb disability, and being operated for any surgery related to the humerus and segmented fracture were excluded.

All patients had suitable clinical and radiological evaluation before a choice to offer careful mediation was made. All cracks were grouped by the AO order. An antegrade interlocking procedure was utilized with an intramedullary nail and care was taken to limit harm of the rotator sleeve amid nail inclusion. A 3.5-mm or 4.5-mm dynamic useful prop was utilized in the useful support assemble contingent upon the width of the bone with fitting AO standards. The decision of careful methodology (antero-horizontal or back) for the plating bunch was left to the prudence of the working specialist. All patients were prompted on the quick postoperative shoulder and elbow activities and radiographs were taken at standard interims amid development.

Each patient was treated standardized by a specialist having somewhere around 5 years of experience after post-graduation. All patients were pursued at third week, the sixth week and at 3 months to survey the radiological result according to the radiological sign of union i-e formation of callus on the fracture point. This data was gathered through a proforma. Data was entered and analyzed using SPSS version 20.0. The radiological union will be compared in both study groups using Chi-square test.  $P \leq 0.05$  will be taken as significant.

## Results

The mean age of the study population was  $33.61 \pm 7.77$  years who were enrolled in this study. The majority were males with a frequency of 47(78.3%) and females were 13(21.7%). Obese patients were 16(26.7%) and normal weight were 44(73.3%). Smokers were lesser in number with the frequency of 14(23.3%) and 46(76.7%) were

nonsmokers. Patients were randomized into groups and their findings are mentioned in the Table#1 below.

		<b>Interlocking Nailing</b>	<b>Functional Brace</b>	<b>P-value</b>
Age	Mean, SD	34.46±7.83	32.76±7.74	0.72
Gender	Male	23(48.9%)	24(51.1%)	0.50
	Female	7(53.8%)	6(46.2%)	
Obesity	Yes	9(56.3%)	7(43.8%)	0.38
	No	21(47.7%)	23(52.3%)	
Smoker	Yes	7(50%)	7(50%)	0.61
	No	23(50%)	23(50%)	
Union at 3 <sup>rd</sup> week	Yes	11(45%)	13(54%)	0.39
	No	19(52%)	17(47%)	
Union at 6 <sup>th</sup> week	Yes	14(38%)	22(61%)	0.03
	No	16(66.7%)	8(33.3%)	

## Discussion

Traditionalist administration is as yet the treatment of decision for diaphyseal humeral breaks, as agent systems have not yet created a powerful proposition of a treatment technique that offers the advantages of insignificant intrusiveness alongside high association and low complexity rates, and hence permit quick shoulder and elbow joint useful recuperation and incite come back to work and exercises. Intramedullary nailing offers these favorable circumstances in the treatment of diaphyseal cracks of the femur and tibia however it has not yet created comparable outcomes in the upper appendage. It appears that additional time is expected to achieve an accord about the vital issues that have been examined. A profound comprehension of the anatomical and biomechanical qualities of the humerus is fundamental for touching base at choices about critical issues, for example, nail determination criteria, agent system, and a recovery program, at whatever point intramedullary nailing of diaphyseal humeral breaks is examined. A helpful rule that could enhance the aftereffects of intramedullary nailing in the administration of diaphyseal humeral cracks is

that a 'settled' nail can be embedded with both antegrade and retrograde systems paying little respect to the break example and area. Despite what might be expected, break area could assume a vital job in the handiness of 'bio' nails as these nails are more compelling if their entrance entry (antegrade or retrograde strategy) is nearer to the crack site.

The principle issues of antegrade nailing for humeral cracks are three: Violation of the rotator sleeve, delicate tissue damage around the shoulder, and distal locking. Adjustments of the careful strategy with modern nail plans have been proposed with the end goal to beat issues of the sleeve, yet no further investigations have approved these proposals.<sup>9, 10</sup> It ought to be noted however that shoulder brokenness may likewise happen after traditionalist treatment or plating or retrograde nailing.<sup>11</sup> Delicate tissues are defenseless at the addition of proximal screws, as demonstrated by numerous studies. Nails that don't utilize proximal locking have been proposed, yet they are related with less soundness and are viewed as more successful if their entrance entryway is nearer to the crack site. Proximal and distal locking are indispensable components for rotational solidness of an IMN. However distal locking is related with a few issues: The Lateral perspective of the humerus isn't effortlessly gotten, locking openings are tight, the sidelong surface of the humerus is "dangerous" and the threat of damage to the outspread nerve and other powerless structures lurks. The success of business focusing on gadgets is as yet conflicting.<sup>12</sup>

Shazar N et al., performed a retrospective review of 94 patients treated with ender's nailing. In 91.5% of the patients union occurred without any additional intervention and the functional result was good in 74% of the patients.<sup>13</sup> The result obtained by various authors using different modalities of treatment has varied from 75%-100% of good or excellent result.<sup>14, 15</sup> But in this study we have noted different results as per quoted above in the previous literature.

Papasoulis *et al.* in their review article analyzed the outcome of 16 case series of functional cast brace treatment of humeral shaft fracture and two comparative studies. They concluded that average healing time is 10.7 weeks, the union rate 94.5%, proximal shaft fractures have a higher nonunion rate.<sup>16</sup> In our series, only 44% of patients showed

excellent to good results. Compared with other series which reported union in more than 90% of fractures, low success rate with humeral brace. Nonunion was a major complication in 29% patients which is again high as reported by others (0-2.5%). Our observation is in accordance with Nahum Rosenberg 10 that adjacent joint function remains impaired following treatment of humeral diaphyseal brace with brace.<sup>17</sup> as observed clinically. In another study it was noted that union rate was high in the functional brace group which supports the results of this current study.<sup>6</sup>

This study has the limitation of the sample size. It was also noted that patients were reaching the hospital at a later time. Most of the cases have already been attendant by the local quacks. Moreover, there are more studies needed for further confirmation of the results and help the physicians to decide the best method. It will help in the early recovery of the patient.

## Conclusion

Conclusively, it is noted that the functional brace method is good for the treatment of the diaphyseal humerus fracture. This is due to the presence of more union in a functional brace group as compared to the intramedullary nailing for the diaphyseal humerus fracture.

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