

# Comparison Of Outcomes Between Early and Delayed Reduction of Nasal Bone Fractures

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## Abstract

**Objective:** To determine the outcomes of early versus delayed reduction of nasal bone fractures in terms of patient satisfaction and postoperative pain.

**Study Design:** Comparative study.

**Study Setting & Duration:** Department of Otorhinolaryngology, at Rawalpindi Teaching Hospital, Rawalpindi. The duration of the study was 6 months after approval by the Ethical Committee from February 2023 to July 2023.

**Materials and Methods:** A total of 96 patients were selected. The study participants were individuals who, according to operational definitions, had nasal bone fractures and presented for evaluation at the Department of Otorhinolaryngology, Head & Neck Surgery at Rawalpindi Teaching Hospital, Rawalpindi. Patients were divided into two groups. Patients who underwent early reduction (within 2 weeks of trauma) were included in Group A while those who underwent delayed reduction (more than 2 weeks) were included in Group B. They also met all inclusion and exclusion criteria requirements and these requirements were strictly adhered to to control confounders and bias. Patients were chosen via a series of non-probability sampling. SPSS 28 was used to determine the frequencies in the data.

**Results:** A total of 96 patients were included in this study. Out of which 52(54.17 %) were males and 44(45.8 %) were females. Patients who underwent early reduction had higher mean satisfaction scores on the seventh and fourteenth postoperative day ( $4.22 \pm 0.75$  and  $4.60 \pm 0.49$  respectively) than those who underwent Delayed reduction ( $2.41 \pm 0.82$  and  $2.93 \pm 0.80$  respectively). Patients who underwent early reduction had a better mean Pain Intensity score at 0( $2.37 \pm 0.81$ ), 3rd ( $1.37 \pm 0.81$ ), and 7th-day ( $0.58 \pm 0.49$ ) than the Delayed reduction, at 0( $5.83 \pm 1.20$ ), 3rd ( $5.08 \pm 0.67$ ), and 7th-day ( $4.31 \pm 0.58$ ). Patient discomfort was more intense in the delayed reduction group than in the early reduction group. Early reduction led to higher patient satisfaction and a better mean pain intensity score.

**Conclusion:** The results of nasal fractures between the early and delayed reduction groups did differ statistically significantly. Early reduction decreased pain intensity and increased patient satisfaction.

**Keywords:** early reduction, delayed reduction, nasal bone fractures, Nasal bone.

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## 1. Introduction

Nasal fractures account for greater than 50% of all facial fractures in adults, but they are often unrecognized and untreated at the time of injury. Its central position and anterior projection on the face predisposes the nose to traumatic injury.<sup>1</sup> Nasal fractures are the third most common type of bone fracture in humans, the mechanisms of injury for which are many which include road traffic accidents, sports injuries, physical assaults as well as falls.<sup>2</sup> Nasal fractures are common in males than females. Nasal bone fracture can occur alone or can be associated with the fracture of other bones of the face or skull base.<sup>3</sup>

Nasal bone fractures are also one of the most commonly encountered paediatric facial fractures

which can lead to significant deformities.<sup>4</sup> The main objective of the surgical correction of such injuries is to restore cosmesis and functionality. If proper management is not done early and timely it can lead to long-term cosmetic deformity and increase patient pain.<sup>5</sup>

The surgical treatment varies significantly with regards to the approach to surgery (open versus closed reduction), the timing (delayed versus early intervention) and the type of anaesthesia (local versus general).<sup>6</sup> Closed reduction of nasal bone fractures is a safe procedure with minimal post-operative morbidity, if results of closed reduction are not satisfactory rhinoplasty can easily be performed afterwards.<sup>7</sup> The optimal timing for closed reduction has a great difference of opinion among the otorhinolaryngologists. Some suggest a period between 3 and 30 days, while others suggest that the

reduction should be performed earlier i.e. within 2 to 3 hours, before significant tissue oedema develops or after 3 to 5 days to allow the oedema to disappear.<sup>7</sup>

Some studies suggest reducing the fracture within 10 days in adults and 7 days in children. Early reduction is associated with better outcomes.<sup>8</sup> A period of 2 to 4 weeks is suggested for adequate reduction of nasal bone fractures by a few authors.<sup>9</sup>

Sharma et al conducted a study comparing early versus delayed reduction of nasal bone fractures with patient satisfaction being the primary outcome and found that patient satisfaction scores were higher the earlier the procedure was performed:  $4.56 \pm 0.25$  points when the surgery was performed between 1-2 weeks versus  $4.0 \pm 0.30$  points,  $3.68 \pm 0.37$  points and  $3.17 \pm 0.42$  points when it was performed between 2-3 weeks, 3-4 weeks and 4-5 weeks, respectively.<sup>10</sup>

The incidence, aetiology, available treatments, and outcomes of nasal fractures have been studied, but few studies have examined the duration between injury and reduction.<sup>11</sup>

While there is ample data on the demographics, cause of injury, and types of nasal bone fractures, there is less information on the outcomes of different methods of treatment for this common ailment. The timely and appropriate management of nasal bone fractures will lead to reduced morbidity and costs which will have multiple levels of benefit to our healthcare system. This study provides a framework for the establishment of a guideline for the best surgical timing in terms of outcome.

## 2. Materials & Methods

This study was conducted in the Department of Otorhinolaryngology-Head & Neck Surgery at Rawalpindi Teaching Hospital from February 2023 to July 2023 after approval from the Hospital Ethical Committee. 96 Patients (48 in each group) who had nasal bone fractures as per operation definitions were included. Patients from both genders and all age groups where closed reduction is indicated were included in this study. Patients where open reduction of fracture was required, those who were suffering from poly-trauma, diabetic, hypertensive, or immunocompromised and patients not willing for the surgery were excluded from this study. Patients were selected via consecutive non-probability sampling. Patients were divided into two groups. Patients who underwent early reduction (within

2 weeks after injury) were included in Group A while those who underwent delayed reduction (more than 2 weeks) were included in Group B. All participants were evaluated with a thorough medical history and clinical examination on enrollment in the study.

All data was collected using Performa. Patients were documented for age, gender, numeric pain intensity scale, and Likert's patient satisfaction scale.

All patients underwent local anesthesia with 1% lidocaine including 1:100,000 epinephrine across the septum, premaxilla, as well as lateral aspect of the nasal bones. Decongestion was performed with oxymetazoline nasal spray. The depressed nasal bone segments were then reduced with Freer elevators which were put across the nasal bones after having been pushed into the nasal cavity. When the nasal pyramids are angled to the side, the elevator is placed in the nares corresponding to the concave side, and the pyramid is elevated anteriorly and towards the concavity, with gentle pressure on the opposite side. Septal dislocations were reduced with the help of Ash forceps. At the end of the procedure, a dorsal splint was applied for 7 days and then removed. All patients were receiving post-operative analgesia with diclofenac 1.2g per day for 7 days.

All patients underwent scoring for pain with the 10-point Numeric Pain Intensity scale which was calculated on days 0, 3, and 7 post-procedures, in person or via telephonic conversation. On the 7th and 14th post-procedure day, all patients underwent a 5-point Likert Patient Satisfaction scale and a physical examination for a deviated nasal septum.

A pre-designed questionnaire was used to collect information. To minimize the possibility of bias, the researcher herself collected all of the data.

The result was deemed outstanding if there was no fracture sector malalignment, bone variation, or movement, and satisfactory if there was minor fracture segment misalignment with one segment of bony abnormality or displacement. To lessen bias in selection and preserve the integrity of the data, the researcher was gathering all available information.

Data was analyzed using SPSS version 28. Mean and standard deviation was calculated for quantitative variables like age, a 10-point Numeric Pain Intensity scale on days 0, 3 and 7 post-procedure, 5-point Likert Patient Satisfaction scale. Qualitative variables like gender was expressed as frequency and percentages.

### 3. Results

The Otorhinolaryngology department selected 96 patients for the study (48 patients in each group). 52(54.17%) were males and 44(45.8 %) were females. The mean age calculated was 43.<sup>16</sup> According to Table 3, patients who underwent early nasal reduction had higher mean satisfaction scores on the seventh and fourteenth days ( $4.22 \pm 0.75$  and  $4.60 \pm 0.49$

respectively) than those who underwent the Delayed reduction ( $2.41 \pm 0.82$  and  $2.93 \pm 0.80$  respectively).

**Table 1: Age in years**

Mean	St. Deviation	Range
43.16	20.31	10_78

**Table 2: Finding on Numeric Pain Intensity scale at 0,3<sup>rd</sup> and 7<sup>th</sup>-day post-procedure in Early reduction vs Delayed reduction**

Study groups		Numeric Pain Intensity scale at 0-day post procedure	Numeric Pain Intensity scale at 3 <sup>rd</sup> -day post procedure	Numeric Pain Intensity scale at 7 <sup>th</sup> -day post procedure
<b>A (Early reduction)</b>	Mean	2.3750	1.3750	.5833
	Std. Deviation	.81541	.81541	.49822
<b>B (Delayed reduction)</b>	Mean	5.8333	5.0833	4.3125
	Std. Deviation	1.20872	.67896	.58913

**Table 3: Finding on Likert's Patient Satisfaction scale at 7<sup>th</sup> and 14<sup>th</sup> day post-procedure in Early reduction vs Delayed reduction**

Study groups		Likert's Patient Satisfaction scale at 7 <sup>th</sup> day post procedure	Likert's Patient Satisfaction scale at 14 <sup>th</sup> day post procedure
<b>A (Early reduction )</b>	Mean	4.2292	4.6042
	Std. Deviation	.75059	.49420
<b>B (Delayed reduction)</b>	Mean	2.4167	2.9375
	Std. Deviation	.82083	.80968

Patients who underwent Early reduction had better mean Pain Intensity scores at 0 ( $2.37 \pm 0.81$ ) 3<sup>rd</sup> ( $1.37 \pm 0.81$ ), and 7<sup>th</sup> post-operative day ( $0.58 \pm 0.49$ ) than the Delayed reduction at 0( $5.83 \pm 1.20$ ),3<sup>rd</sup> ( $5.08 \pm 0.67$ ), and 7<sup>th</sup>-day ( $4.31 \pm 0.58$ ) as shown in Table 2. Patient discomfort was more intense in the delayed reduction group than in the early reduction group. Early reduction led to higher patient satisfaction and a better mean pain intensity score.

### 4. Discussion

Nasal bone fractures are the third most common type of fractures due to their anatomical location.<sup>12</sup>

The main causes are physical assaults, road traffic accidents falls or sports injuries.<sup>13</sup>

In our study males made up the majority which is consistent with the earlier studies.<sup>14</sup> 52(54.17%)were males and 44(45.8 %) were females.

The timely reduction of nasal bone fractures is important for the restoration of the anatomy and function of the nasal pyramid as fractured nasal bones can undergo

union and fibrous adhesions early. If there is unnecessary delay reduction becomes difficult.<sup>15</sup>

There are different opinions regarding the proper timing for the closed reduction of isolated nasal fractures.

If a patient presents within 6 hours of nasal trauma immediate reduction should be done before edema and swelling sets in. If edema has already developed patient should be reassessed in 4 to 5 days. Closed reductions should generally be performed between 3 and 10 days following the trauma.<sup>16</sup>

Early treatment of the nasal fractures is associated with improved outcomes and fractures can be reduced satisfactorily up to 2 weeks after the trauma.<sup>17</sup>

In previous studies patient satisfaction was higher for mildly displaced fractures if reductions were performed within the proper time In a study by Sharma et al. contrasting early versus delayed reduction of nasal bone fractures alongside patient satisfaction as the elementary result, it was discovered that the earlier the surgery was carried out, the better the patient satisfaction scores were:  $4.56 \pm 0.25$  points versus  $4.0 \pm 0.30$  points,  $3.68 \pm 0.37$  points, and  $3.17 \pm 0.42$  indicate when it was

accomplished among 2-3 weeks, 3-4 weeks, and 4-5 weeks, accordingly.<sup>18</sup>

In this study, we assessed the postoperative outcomes of patients with nasal bone fractures and looked into whether the outcomes varied depending on how long had passed from the injury before the reduction.

Findings on Likert's Patient Satisfaction measure at 7 and 14 days after the treatment in the early reduction group were better than those in the delayed reduction group. Findings on the Numeric Pain Intensity Scale demonstrate that Early reduction was superior to Delayed reduction at the third and seventh post-procedure days.

## 5. Conclusion

Early reduction lessened the severity of the pain and improved patient satisfaction.

**CONFLICTS OF INTEREST-** None

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**Potential competing interests:** None to report

**Contributions:**

A.K, - Conception of study

A.K, A.U.A, A.J, A.B.P - Experimentation/Study Conduction

S.C, S.M - Analysis/Interpretation/Discussion

A.K, - Manuscript Writing

S.C, S.M - Critical Review

S.C, A.U.A, A.J, A.B.P - Facilitation and Material analysis

All authors approved the final version to be published & agreed to be accountable for all aspects of the work.

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