

## Abstract

**Background:** Nasal fractures are one of the most common facial fractures in pediatric patients, occurring in up to 69% of facial trauma. Common practice is to repair nasal fractures within seven days of injury with emphasis on 3-5 days after injury. Timing is accelerated rate of healing and callus formation in children. Our study assesses if treatment of nasal bone fractures be delayed greater than 14 days and still have favorable outcomes without need for revision rhinoplasty.

**Methods:** All closed reduction nasal bone cases from Children's Hospital New Orleans were reviewed from 2018-July 2022 with age ranges from 0-17 years. Subjects were divided into early group if repaired within 13 days of injury and late group if repaired 14 days or greater from injury. Pre and post-operative symptoms were collected and compared.

**Results:** 48 subjects were identified. Out of 48 subjects, 45 underwent closed nasal bone reduction with only 3 patients required open technique. Of the 48 subjects who underwent closed technique, 23 subjects, approximately 56%, were delayed at 14 days or greater from injury. The three patients who underwent open reduction were treated >14 days from injury. Only 1 subject who underwent closed technique required an open septorhinoplasty. Only 13% of subjects reported nasal deformity with the delayed technique and only 8% of subjects reported post-operative nasal obstruction with the delayed technique.

**Conclusion:** Management of pediatric nasal bone fractures can be treated in delayed closed technique with minimal post-operative complications and overall satisfaction from patients and family, however 13% of subjects in delayed treatment did require open reduction.

Table 1. Pre-operative characteristics

Pre-operative characteristics	Yes	No
Nasal obstruction	32	16
Reported cosmetic deformity	48	0
Deviated septum	15	33
Nasal pyramid deviation	44	4
Step off	48	1
Prior facial trauma	3	39

## Introduction

Nasal fractures are one of the most common facial fractures in pediatric patients, occurring in up to 69% of facial trauma. Common etiologies include motor vehicle crashes, sports injuries, falls and physical assault. It has long been thought that repair of nasal fractures in children must occur within seven days of injury with many recommending reduction 3-5 days after injury. This timing is earlier than for adults due to the accelerated rate of healing and callus formation in children. A couple recent studies have demonstrated satisfactory outcomes with treatment outside of this window.

According to the AO Surgery Reference, closed reduction of nasal fractures should occur within two weeks of the injury but may be possible up to 21 days. Although this has been a treatment guideline for years, there is little evidence to support that delayed treatment results in worse outcomes. Our study aims to extend this time point out to 14 days, based on the AO recommendation, and compare post-operative outcomes in early and late treatment groups. Prior studies have proven that treatment delayed treatment of pediatric nasal bone fractures after 7 days have satisfactory outcomes compared to treatment within 7 days; however, no other study was found to compare outcomes within treatment within 14 days and after 14 days.

## Methods and Materials

Our study was designed as a retrospective cohort. Our database was taken from the Children's Hospital New Orleans, which is apart of the LCMC Health System. Subjects who underwent closed nasal bone reduction in the operating room were reviewed from 2018-July 2022. All subjects within the age range from 0-17 years were included in the study. Subjects were divided into early group if repaired within 13 days of injury and late group if repaired 14 days or greater from injury. Using chart review, pre and post-operative symptoms that were reported by the patients themselves and by family were collected and compared.

## Results

A total of 48 subjects were identified. Of these 48 subjects, only 3 required open technique. Of the 45 subjects who underwent closed technique, 23 subjects, approximately 56%, were delayed at 14 days or greater from injury. Both of the patients who underwent open reduction were treated >14 days from injury. Only 1 subject who underwent closed technique required an open septorhinoplasty at a later date for persistent symptoms. Only 13% of subjects reported nasal deformity within the delayed technique and only 8% of subjects reported post-operative nasal obstruction with the delayed technique. Overall, only 8% of subjects with delayed treatment required open revision.

## Discussion

The majority of our subjects underwent delayed nasal bone reduction, meaning their surgery took place at 14 days or greater from the day of injury. The average days from injury for reduction was 18 days. A total of 23 subjects underwent delayed reduction and only 3 of these patients required open technique. None of the patients within the first 13 days required an open technique; however the reported outcomes including cosmesis and nasal obstruction did not appear to differ between the early and delayed group. Only 3 subjects within the delayed group reported persistent nasal deformity compared to 2 subjects with persistent deformity in the early group. Only 1 subject reported persistent nasal obstruction compared to 2 subjects within the early group.

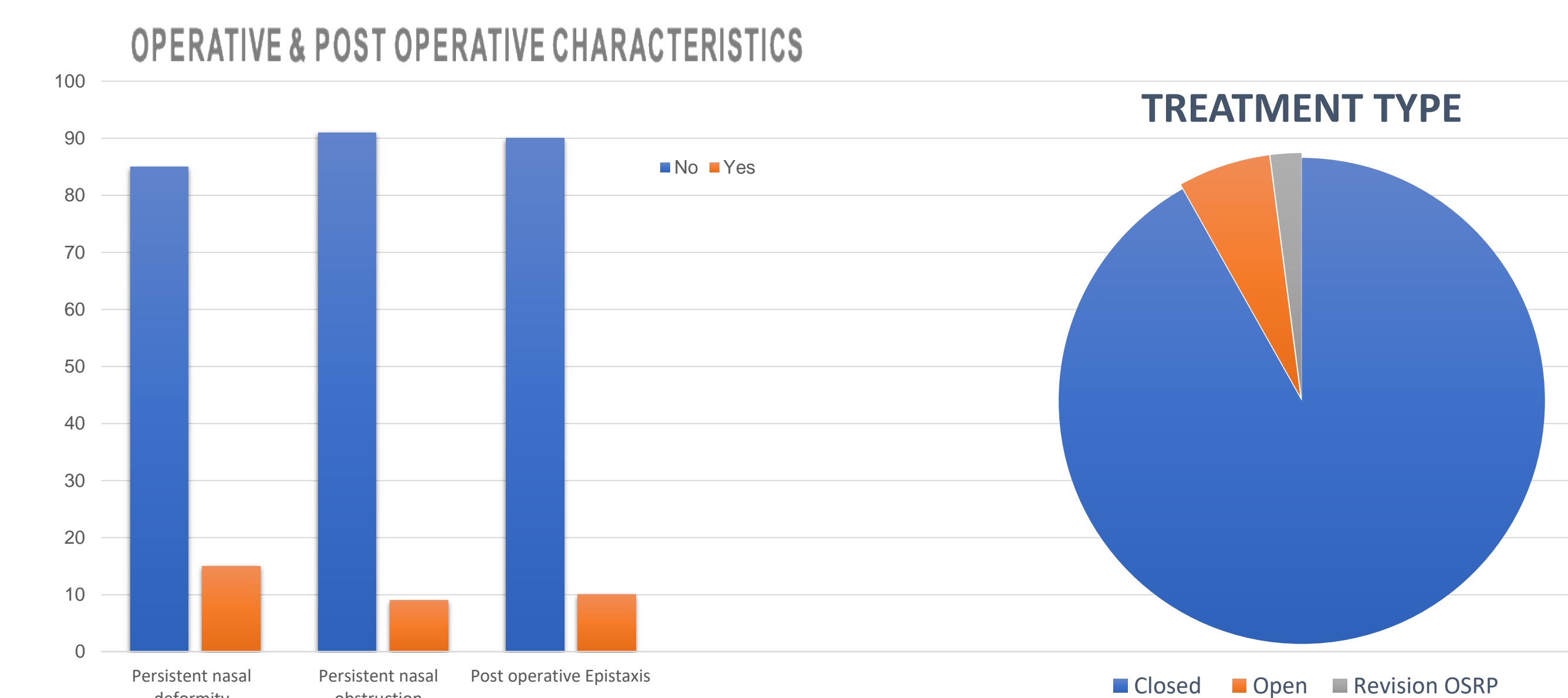


Chart 2. Operative and post operative characteristics

## Conclusions

Management of pediatric nasal bone fractures can be treated in delayed closed technique with minimal post-operative complications and overall satisfaction from patients and family, however 8% of subjects in delayed treatment did require open reduction and the only patient who required an open septorhinoplasty after attempted open technique was from the delayed group.

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