




Effects of the COVID-19 Pandemic on Pediatric Nasal Fractures

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Abstract

Objectives: Nasal bone fracture is a frequent entity consulted to the otolaryngologists, approximately accounting for 39% of all facial bone fractures. The most frequent mechanisms of injury consist of assault, sport-related injuries, falls, and motor vehicle accidents. In this study, we examined the effects of the COVID-19 pandemic on pediatric nasal fractures. **Methods:** Children with nasal fracture who applied to Malatya Training and Research Hospital during the year before the first case and the following year were included in this study. Data of 172 patients for the pre-pandemic period and 79 patients for pandemic were available and included in the study. Demographic information, clinical features, nasal fracture etiology, nasal fracture type, type and time of intervention, and other accompanying pathologies were recorded. **Results:** While falls was the leading cause of fracture etiology before the pandemic (64 patients [37.21%]), assault seems to be the leading cause during the pandemic period (27 children [34.18%]). In the pre-pandemic period, the intervention for patients with nasal fractures was performed on an average of 5 days, while this period was calculated as an average of 6 days during the pandemic period. When the 2 groups are compared in terms of nasal fracture intervention time, it was seen that the intervention time was statistically significantly later in the pandemic period ($P < .001$). According to the results of the analysis, the most cases in the pandemic period were seen in the fourth month, which indicated a-month period between 11 June and 11 July. **Conclusions:** In conclusion, our number of nasal fracture cases was decreased during the pandemic period compared to the 1-year period before the pandemic. We observed the most common type IIA nasal fracture. We gave outpatient treatment to most of the patients. Our most common cause of fracture was assault. We intervened in our cases in an average of 6 days and preferred closed reduction most frequently. We could not find any study on the same subject in the literature, and we aimed to contribute to the literature with this study.

Keywords

COVID-19, pediatric, nasal, fracture

Introduction

In December 2019, numerous undescribed pneumonia cases were detected in the city of Wuhan, China. The pathogenic agent was found to be severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The World Health Organization defined the disease as 2019-ncov (COVID-19) in February 2020. The COVID-19 microorganism may cause mild symptoms, including rhinorrhea and cough, but these symptoms can develop into acute respiratory distress syndrome (ARDS), require intensive care unit support, and may be fatal. Human-to-human transmission takes place between symptomatic and asymptomatic carriers, and it is believed that

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transmission occurs mainly via respiratory droplets. The unexpected COVID-19 pandemic has brought about challenges for the global medical community. To cope with the effects of COVID-19 and to control the number of cases, many governments published mandates, which included social distancing rules, eliminated social gatherings, and advocated for appropriate hand hygiene. In almost every country, curfews were declared.¹ In the present study, we examine the effects of the COVID-19 pandemic on pediatric nasal fractures. A nasal bone fracture is a frequent entity consulted on by otolaryngologists, accounting for approximately 39% of all facial bone fractures. This type of fracture is especially common due to the injury site's prominent place on the face. The most frequent mechanisms of injury include assault, sports-related injuries, falls, and motor-vehicle accidents. Epistaxis or septal hematoma may be associated with a nasal bone fracture and should be treated immediately. Nasal deformity and/or nasal obstruction may contribute to complications in the long term. Simple, closed nasal bone fractures can be treated under anesthesia in order to improve esthetic appearance and nasal function.² The pediatric midface is preserved by a reduced facial-to-cranial proportion, flexible structures of osseous suture lines, and a thick fat pad that acts as a shock absorber. In addition, pediatric facial bones are quite resistant to traumas due to their elastic cancellous bone content. The higher incidence of nasal bone fractures in children may be due to the more prominent location of the nasal bone compared to other midfacial bones and the relative thinness of the cortices and fat pad.³

Trauma is an unavoidable entity, and the COVID-19 pandemic has proven to have a complicated effect on the delivery of trauma care globally. Studies from Italy, New Zealand, and the UK have noted a significant reduction in the number of trauma cases during the COVID-19 lockdown period.⁴⁻⁶ Fahy et al⁷ found a significant reduction in sports injuries and in road traffic accidents. They also observed a significant increase in patients experiencing injuries at home, with domestic accidents most frequently occurring due to mechanical falls, falls down stairs, and falls from ladders. Thornton et al⁵ reported a 25% decrease in injuries and emergency-department applications during the first week after lockdown in the UK. They explained this reduction by the effect of social isolation and lower vehicle usage during the lockdown period. Fahy et al⁷ showed that the home was the most frequent location of injury, with falls from less than 2 m being the most frequent injurious mechanisms.

We were not able to find any studies in the literature that examined the effects of the COVID-19 pandemic on pediatric nasal fractures. Given this, we believe that our study may contribute to the literature. In the present study, we aimed to evaluate the effects of the COVID-19 pandemic, which has deeply affected the lives of people around the world in countless ways, on pediatric nasal fractures in particular. We analyzed the number of cases, fracture types, etiology, as well

as treatment approaches during the pandemic and 1 year before the pandemic.

Materials and Methods

This study investigated the effects of the COVID-19 pandemic on the etiology and epidemiology of pediatric nasal fractures. The first COVID-19 case in Turkey was detected on March 11, 2020. Children with nasal fractures who sought treatment at the Malatya Training and Research Hospital during the year preceding the first COVID-19 case and the following year were included in this study. Data from 172 patients during the pre-pandemic period and from 79 patients during the pandemic was available and is included in the study. The study was designed as a single-center retrospective comparative cohort and was conducted in accordance with the Declaration of Helsinki. Approval was obtained from the Malatya ethics committee before beginning the study (approval number: 2021/44). Demographic information, clinical features, nasal fracture etiology, nasal fracture type, type and time of intervention, and other accompanying pathologies were recorded. Nasal bone fractures were classified into 6 types according to the CT scans as follows: Type I: Simple fracture without any displacement; Type II: Simple fracture with displacement/without telescoping, IIA (unilateral fracture), IIAs (unilateral fracture with septal fracture), IIB (bilateral fracture), and IIBs (bilateral fracture with septal fracture); Type III: Comminuted fracture with telescoping or depression.⁸

Both periods were divided into monthly intervals, and the number of cases per month was recorded. Patients younger than 18 years of age, whose full information was accessed in the hospital data system, were included in the study. Patients whose data could not be accessed were excluded from the study.

Statistical Analysis

Data were given as median (min–max) and count (percent). Compliance with the normal distribution was done with the Kolmogorov–Smirnov test. Mann–Whitney U test, Pearson chi-square test, continuity correction chi-square test, Fisher exact chi-square test were used in statistical analyzes. *P* value of <.05 was considered statistically significant. IBM SPSS Statistics 26.0 program was used in the analysis.

Results

A total of 251 pediatric patients with nasal fractures, 172 from the pre-pandemic period and 79 from the pandemic period, were examined (Table 1). While the average age of the pediatric patients admitted during the pre-pandemic period was 13, the average was only 11 during the pandemic period. The majority of patients during both periods were male—131 (76.16%) during the pre-pandemic period and 63 (79.75%)

Table 1. Demographics, nasal bone fracture type, etiology, type and time of intervention, and other accompanying pathologies.

	Group		P-value
	Before Pandemic Period	Pandemic Period	
	Median (Min–Max)	Median (Min–Max)	
Age	13a (1–17)	11a (1–17)	.153
Time to treatment (day)	5a (4–10)	6b (2–9)	<.001
Hospital stay (day)	0a (0–11)	0a (0–5)	.200
	Count (percent)	Count (percent)	
Gender			
Male	131a (76.16)	63a (79.75)	.640
Female	41a (23.84)	16a (20.25)	
Etiology			
Fall	64a (37.21)	20a (25.32)	.026
Assault	29a (16.86)	27b (34.18)	
Sport	22a (12.79)	4a (5.06)	
Daily activities/ play	32a (18.60)	16a (20.25)	
Traffic accident	21a (12.21)	10a (12.66)	
Other	4a (2.33)	2a (2.53)	
Treatment			
Closed reduction	141a (81.98)	62a (78.48)	.579
Follow-up	25a (14.53)	12a (15.19)	
Open reduction	6a (3.49)	5a (6.33)	
Fracture type			
Type 1	25a (14.53)	12a (15.19)	.803
Type 2A	59a (34.30)	26a (32.91)	
Type 2AS	22a (12.79)	12a (15.19)	
Type 2B	41a (23.84)	14a (17.72)	
Type 2BS	19a (11.05)	10a (12.66)	
Type 3	6a (3.49)	5a (6.33)	
Septal hematoma			
No	166a (96.51)	74a (93.67)	.329
Yes	6a (3.49)	5a (6.33)	
Hospitalization			
No	144a (83.72)	60a (75.95)	.197
Yes	28a (16.28)	19a (24.05)	
Additional fracture			
No	144a (83.72)	64a (81.01)	.727
Yes	28a (16.28)	15a (18.99)	
Additional fracture type			
None	144a (83.72)	64a (81.01)	.981
Orthopedic	12a (6.98)	7a (8.86)	
Skull	4a (2.33)	2a (2.53)	
Maxillary bone	3a (1.74)	1a (1.27)	
Frontal bone	3a (1.74)	1a (1.27)	
Mandible bone	4a (2.33)	2a (2.53)	
Orbital bones	2a (1.16)	2a (2.53)	

during the pandemic period. We did not observe a statistically significant difference in terms of age and gender in children between the 2 periods. While falls were the leading cause of fracture etiology before the pandemic (64 children [37.21%]), assault appeared to be the leading cause during the pandemic period (27 children [34.18%]). When the etiologies of nasal fracture were compared between the 2 periods, assault was statistically higher during the pandemic period ($P = .026$). Our treatment approach to patients was largely closed reduction (141 patients before the pandemic [81.98%] and 62 patients during the pandemic period [78.48%]).

During the pre-pandemic period, the intervention for patients with nasal fractures was performed on an average of every 5 days, while this period was calculated as an average of 6 days during the pandemic period. When the 2 groups were compared in terms of nasal fracture intervention time, it was observed that the intervention time was statistically significantly later during the pandemic period ($P < .001$).

Nasal bone fracture types were most commonly Type IIA during both periods (34.30% during the pre-pandemic period and 32.91% during the pandemic period). During both periods, it was revealed that most patients were treated as outpatients and that the vast majority of them had no other fractures accompanying the nasal bone fractures.

Both periods were divided into monthly intervals, and the number of cases was recorded. A comparison of the 12-month pandemic period from March 11, 2020, to March 11, 2021, and the 12-month pre-pandemic period from March 11, 2019, to March 10, 2020, is shown in [Figure 1](#). According to the results of the analysis, the highest number of cases during the pandemic period was seen in the fourth month, indicating a 1-month period between June 11 and July 11, 2020.

Discussion

In order to reduce and control the devastating effects of COVID-19 on global health systems, as well as the spread of the disease, various measures have been taken by the Turkish government as in many countries where COVID-19 has spread quickly. Efforts in this regard have included the implementation of social-distancing rules or guidelines, mask mandates or guidelines, and orders for people not to leave their homes unless necessary. The Turkish government announced the first large-scale, national lockdown on April 11, 2020, to reduce the number of patients and prevent the spread of the disease. Schools, restaurants, shopping centers, and so on were closed; sports competitions were canceled; and travel was stopped. Given the way the disease has acted in the Turkish context, 1- or 2-month closures were periodically implemented, with a moderate return to “normal life” being observed since this date. Ultimately, restrictive measures that were implemented in reaction to the COVID-19 pandemic have affected every city in Turkey, resulting in behavioral changes.

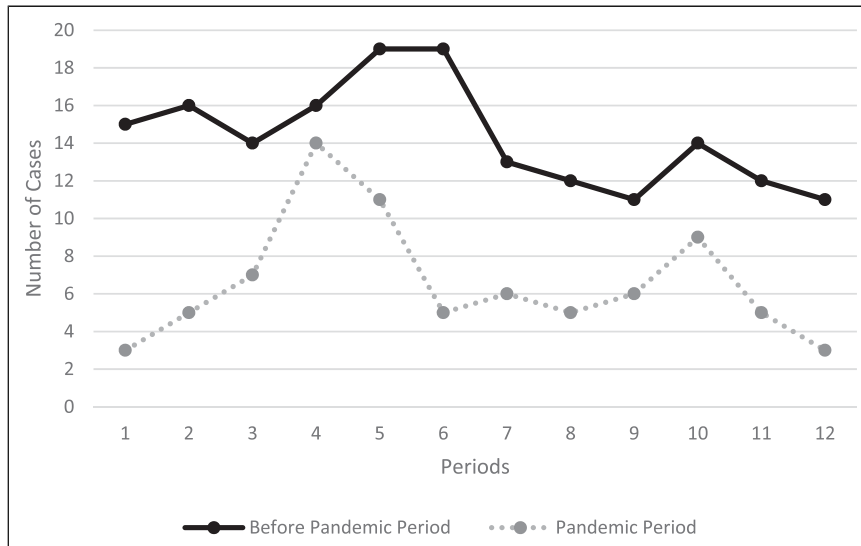


Figure 1. Distribution of the number of cases seen before the pandemic and during the pandemic period by months.

According to the results of the present study's analysis, the highest number of pediatric nasal fracture cases during the pandemic period was seen in the fourth month, indicating a 1-month period between June 11 and July 11, 2020. This period included the Ramadan Feast, which is celebrated as a religious holiday in Turkey, as well as the period immediately following. Unfortunately, the strict measures observed during the pandemic period were not well followed by the public during this period of celebration. In particular, the curfew was violated by many people. According to Turkish religious traditions, holidays are to be celebrated with close relatives and friends, and social visits are quite often part of this. It is thus not surprising that most pediatric patients with nasal bone fractures who were assessed at our clinic during this period suffered their injuries during such social visits, while driving, or in a manner somehow directly tied to increased social interaction, all despite the pandemic. When the 1-year period before the pandemic was examined, we observed that the highest number of cases occurred in the 2 months between July 11 and August 11, 2019, and August 11 and September 11, 2019 (shown in the chart as the fifth and sixth months pre-pandemic). An equal number of cases were reported during both months. Malatya is a city with a population of approximately 800,000 people and is located in the east of the country. Agriculture still constitutes the livelihood for a significant percentage of those living in the city. Within the agricultural industry, young people under the age of 18 years in particular are employed during the summer months. For this reason, falling from a height, falling from agricultural vehicles such as tractors, and other accidents are quite common. In this city, apricot farming for the majority of the world's supply of apricots is carried out, and large groups of young people under the age of 18 migrate to the city from the surrounding provinces in the summer as seasonal workers. This lifestyle in

the city during the summer months may explain the high incidence of general accidents, falls, traffic accidents, and assaults during these months.

We had 172 pediatric patients with nasal fractures whose data was accessible during the 1-year period before the pandemic; 79 patients were seen during the 1-year period during the pandemic. The emergency clinic of the hospital in the present study is among the top 5 most crowded emergency clinics in the country. During the pandemic period, the number of patients arriving at this emergency clinic with nasal fractures has decreased considerably compared to 1 year ago. This result is parallel to the literature. In our study, the average age of the pediatric patients during the pre-pandemic period was 13, while it was 11 during the pandemic period. Oleck et al⁹ observed that nasal bone fractures were high in children from 12 to 18 years of age. This high rate may be explained by the developmental anatomy of the pediatric facial skeleton. In early childhood, the relative prominence of the pediatric cranium provides important protection against nasal bone injuries. The reason pediatric nasal fractures are less common in children under 5 years of age may be because children in this age group are more sensitively protected and observed by their families. In addition, the fact that older children are often engaged in sports and activities, such as cycling, as well as the predisposition of teenage and adolescent children to be involved in motor accidents or mutual violence may explain the relatively higher incidence of nasal fractures in older children.¹⁰ In their study, Hwang et al⁸ found that only 3.9% of all nasal bone fractures occurred in children under the age of 10. Kim et al¹¹ noted that facial fractures were observed most commonly in patients between the ages of 13 and 15 years.

In our study, we observed that falls were the leading cause of fracture etiology before the pandemic (64 patients [37.21%]) and that assault appears to be the leading cause

during the pandemic period (27 children [34.18%]). Hwang et al⁸ showed that the most common cause of nasal injury in pediatric patients was fighting. Basheeth et al¹² indicated that accident-related injuries were the most frequent causes of nasal fractures (40.8%). The radiologic findings of nasal fractures may differ between children and adults due to the different types of mechanisms causing the injuries. The chance of experiencing sports-related injuries and violence-related fractures gradually increases with aging; on the other hand, the incidence of accidental falls generally decreases.¹³ Violence has a negative effect on children's physical, emotional, and cognitive well-being.¹⁴ There have been many studies that have shown that the mandatory lockdowns due to the COVID-19 pandemic have negatively affected the psychology of people around the world. A high incidence of domestic violence in the early peak period of the pandemic has been reported in many newspapers, particularly compared to previous years. Social isolation, economic stressors, boredom, lack of control, and anxiety have been shown as the main factors considered to increase the incidence of domestic violence. During the lockdown period, victims may not have been able to leave their homes to seek help from friends, medical professionals, or other community members.¹⁵ This high incidence may explain why assault was the most common cause of pediatric nasal fracture reported in our study. After such a nasal fracture occurs, it is recommended to allow the edema to resolve over the span of 3-5 days after the first diagnosis; after this time, a second evaluation should then be done to determine the most appropriate treatment approach for the patient. It has been reported that closed reduction can be performed up to the second week after the injury.¹⁰

During the pre-pandemic period, interventions for patients with nasal fractures were performed at an average of 5 days from injury; during the pandemic period of our study, an average 6 days was calculated. When the 2 groups were compared in terms of nasal fracture intervention time, it was seen that the intervention time was statistically significant later during the pandemic period ($P < .001$). Since the recommended optimal intervention time is between 3 and 5 days, our intervention time seems appropriate during the pre- and post-pandemic periods. However, we observed the difference between the 2 periods as statistically different. Delayed hospital admission of children due to the pandemic, waiting for the results of the COVID-19 diagnostic test for intervention, and the reluctance of doctors to intervene because nasal fracture reduction procedures contain aerosols may be the main causes of this delay in pandemic period. We preferred the closed reduction approach for our patients in both periods. The general approach to the isolated nasal bone fractures was closed reduction to maintain the optimal appearance and function of the nose. While fracture replacement is a simple procedure, the postoperative results of the surgical procedure may not be satisfactory. Conservative treatment modality can be preferable in cases where there are no external or functional problems due to the linear fractures, where there is lesser

displacement of the fracture particles, or in accordance with the preference of a patient's parent. The parents of children with nasal bone fractures frequently prefer non-surgical procedures. Therefore, conservative treatment is preferred in children with slight nasal bone fractures without prominent displacement of the fracture fragments. Computed tomography is superior to X-ray imaging in monitoring the recovery processes of children with nasal bone fractures whose parents prefer a conservative treatment approach. X-ray imaging may not provide an exact examination of pediatric nasal bone fractures during the recovery period because nasal fractures that have not completely ossified may be inadequately determined.¹⁶

Overall, the results of our study indicated that the number of nasal fracture cases decreased during the pandemic period compared to the 1-year period before the pandemic. We observed the most common fracture type to be the IIA nasal fracture. We provided outpatient treatment to most of the patients in our study. The most common cause of the treated fractures was assault. We intervened in our cases at an average of 6 days and preferred closed reduction most frequently. Although our intervention time for pediatric nasal fractures and the etiology of the fractures changed, we did not observe any different effects of nasal fracture on our patients in either period. We could not locate studies on the same subject in the existing literature, and thus, we aimed to contribute to the literature with this study.

The limitations of our study are such that it consists of a single center and a small sample number of patients; therefore, the ideas presented should be supported or confirmed by multicenter studies with larger sample numbers of patients.

Declaration of conflicting interests

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Ethical approval

This present study was carried out after the permission of the Ministry of Health in our country and the local ethics committee in Malatya Clinical Research Ethics (approval number 2021/44).

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References

1. Shelly A, Dina A, Steven LG, et al. Management of pediatric facial fractures during Covid-19 pandemic. *Oral Surg Oral Med Oral Pathol Oral Radiol*. 2021 May. In Press.

2. Bastianpillai J, Khan S, Acharya V, Tanna R, Pal S. How COVID-19 changed our management of nasal bone fractures and its impact on patient outcomes-a retrospective study [published ahead of print. *Ear Nose Throat J.* 2020.
3. Fujisawa K, Suzuki A, Yamakawa T, Onishi F, Minabe T. Pediatric-specific midfacial fracture patterns and management: Pediatric versus adult patients. *J Craniofac Surg.* 2020;31(3):e312-e315.
4. Fojut R. 2020 March. <https://www.trauma-news.com/2020/03/How-coronavirus-is-affecting-trauma-systems-in-Italy/>.
5. Thornton J. Covid-19: A&E visits in England fall by 25% in week after lockdown. *BMJ.* 2020;369:m1401.
6. Christey G, Amey J, Campbell A, Smith A. Variation in volumes and characteristics of trauma patients admitted to a level one trauma centre during national level 4 lockdown for COVID-19 in New Zealand. *N Z Med J.* 2020;133(1513):81-88.
7. Fahy S, Moore J, Kelly M, Flannery O, Kenny P. Analysing the variation in volume and nature of trauma presentations during COVID-19 lockdown in Ireland. *Bone Jt Open.* 2020;1:(6):261-266.
8. Hwang K, You SH, Kim SG, Lee SI. Analysis of nasal bone fractures; a six-year study of 503 patients. *J Craniofac Surg.* 2006 Mar;17(2):261-264.
9. Oleck NC, Dobitsch AA, Liu FC, et al. Traumatic falls in the pediatric population: facial fracture patterns observed in a leading cause of childhood injury. *Ann Plast Surg.* 2019;82(4S suppl 3):S195-S198.
10. Wright RJ, Murakami CS, Ambro BT. Pediatric nasal injuries and management. *Facial Plast Surg.* 2011;27(5):483-490.
11. Kim SH, Lee SH, Cho PD. Analysis of 809 facial bone fractures in a pediatric and adolescent population. *Arch Plast Surg.* 2012;39(6):606-611.
12. Basheeth N, Donnelly M, David S, Munish S. Acute nasal fracture management: A prospective study and literature review. *Laryngoscope.* 2015;125(12):2677-2684.
13. Yu H, Jeon M, Kim Y, Choi Y. Epidemiology of violence in pediatric and adolescent nasal fracture compared with adult nasal fracture: An 8-year study. *Arch Craniofac Surg.* 2019;20(4):228-232.
14. Kashani JH, Daniel AE, Dandoy AC, Holcomb WR. Family violence: impact on children. *J Am Acad Child Adolesc Psychiatry.* 1992;31(2):181-189.
15. Rhodes HX, Petersen K, Lunsford L, Biswas S. COVID-19 resilience for survival: occurrence of domestic violence during lockdown at a rural American College of Surgeons verified level one trauma center. *Cureus.* 2020;12:(8):e10059.
16. Kang WK, Han DG, Kim S-E, Lee YJ, Shim JS. Bone remodeling after conservative treatment of nasal bone fracture in pediatric patients. *Arch Craniofac Surg.* 2020;21(3):166-170.