

# Septal Deviation in Newborns: A Prospective Study and Literature Review

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## ABSTRACT

**Introduction:** In this study, our aim is to investigate the frequency of nasal septum deviation in newborns and the reasons for the emergence of these pathologies; then to follow and determine the results in the following year and review the literature.

**Methods:** Three hundred and seventy-two babies of the mothers between the ages of 14 and 45, including the mothers who gave birth in a hospital and migrated from Syria, were included in the study. The sex of all babies, birth weight, head circumference, presence of nasal septum deviation, as well as the age of all mothers, gestational period, delivery method (normal vaginal birth/cesarean birth), and the number of births was determined. Nasal septa of the infants with some nasal septal deviations were reposed, and follow-up results were reported.

**Results:** Among all 372 newborn babies, 210 of them (56.4%) gave birth with vaginal delivery, and 162 of them (43.6%) with cesarean delivery. The nasal septum deviation was detected in 45 of the 372 newborn babies (12%). A closed reduction was performed using a nasal septal elevator. Because of the 12-month follow-up case, it was observed that the deviation in the nasal septum showed improvement in 32 babies. In conclusion, no statistically significant difference was found between neonatal nasal septum deviation and maternal age, gender ( $p>0.05$ ). However, a statistically significant difference was found between neonatal nasal septum deviation in the form of birth, the number of births, pregnancy duration, weight, head circumference ( $p<0.05$ ).

**Conclusion:** It is necessary to have an early diagnosis and intervention for nasal septal deviations in newborn babies. To prevent nasal obstruction and permanent impairment, all newborn babies must be examined by an ENT specialist immediately after birth.

**Keywords:** Nasal septum, newborn, infant

## Introduction

The causes of nasal deformities in infants may be congenital malformations, intrauterine pressure, and fetal malposition, of which, the most common cause is the minor traumas during childbirth. Most of the simple deformities are resolved spontaneously in a short time; however, some of them are not resolved in time and need to be corrected by closed reduction (1). There are two types of nasal deviations in newborns: The nasal septal dislocations that can be replaced replicated in the midline by manipulation and those that cannot be replicated (2).

The nasal septum deviation usually occurs because of mild or severe trauma in the face, but in some cases, it does not necessarily have any facial trauma in the face (3). Although trauma during child birth is an important factor, other intrauterine factors may lead to this deformity (4).

The diagnosis of nasal septal dislocation should be made as early as possible after delivery and should themselves. Various hypotheses have been claimed to explain the etiology of nasal septal dislocation in patients without a history of trauma; however, there are no definitive finding.

Intrauterine pressure, strain in newborns, strain at the first stage of birth in prim parous are the factors affecting nasal septal dislocations. When the nasal septum deviation is detected at birth, the nose should be immediately corrected to prevent nasal obstruction and permanent impairment. This is the main reason why it is so crucial to diagnose nasal septum dislocation at an early stage. The nasal deviation should be distinguished from the temporary flattening of the nose, which appears during childbirth and heals spontaneously in time. For definitive diagnosis, the nasal septum dislocation is felt with the porthole inserted along the base of the nose, and both nasal passages are examined with an otoscope (5).

It is recommended to use the Metzenbaum sign (asymmetry of the nostrils) and the test of Jeppesen and Windfeld (pressure at the tip of the nose) together with rhinoscopy. The diagnosis and treatment of nasal septum deviation are of great importance (6).

According to Stoksted and Schønsted-Madsen (7), there are 3 types of nasal deformities in newborns: 1) Self-healing-fixed deviations caused by trauma in the prenatal period, 2) repository deviations, 3) pressure deformities requiring treatment.



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According to Sooknundun et al. (8), communication between a pediatrician, an ENT, and an obstetrician is important for early detection and treatment of nasal septal deviation. The incidence of nasal septum deviation varies between 0.08% and 23% in newborns reported in the literature (9).

## Methods

This was a prospective study, included the mothers who gave birth in the Beykoz State Hospital between October 2018 and March 2019 and the newborn, including the Syrian immigrant child-mothers under 18, and discussed the findings obtained after 12 months follow-up. Nasal examinations of newborn babies were performed with a Karl-Storz 0 degrees 2.7x110 mm optic otoscope. When moderate curvature was seen in the nasal septum, the Cottle elevator was used to direct the nasal septum toward the midline without anesthesia in the first three days after birth. The elevator was placed in the nose and the nasal septal cartilage was placed in the groove of the vomer. Sometimes a clicking sound is heard when replacing the nasal septum and the nasal septum position is felt to improve. Follow-up examinations were performed on the second day after the reduction, one month later and then twelve months later. The mothers of the newborn were informed about the possibility of unsuccessful repositioning and spontaneous flattening in the following months, and their written consent was obtained. The sex, birth weight, head circumference, presence of nasal septum deviation and deformation of all babies and the age, gestational period, delivery method (normal vaginal birth/cesarean birth), and the number of mothers were recorded.

The study was approved by the Beykoz State Hospital Ethics Committee (approval number: 45, date: 18.07.2018) and the written informed consent was obtained from the parents of all patients.

## Statistical Analysis

Data were analyzed with SPSS 15.00 package program. Percentage, mean, standard deviation (SD), and chi-square tests were used in the analysis of the data. Statistical significance was set as a statistically significant  $p < 0.05$  in the study.

## Results

In the hospital, the birth outcomes included mothers aged 14 to 45 (mean age:  $28.59 \pm 5.53$ ), including children who migrated from Syria, and the findings of 372 newborn babies were examined. It was determined that 210 (56.4%) of 372 newborn babies were born with vaginal delivery and 41 of these were difficult births. 162 (43.6%) of the remaining births were delivered through cesarean section. Fifty-two of them were emergency cesarean. The maximum number of deliveries by mothers was 8, and most of them being 2 deliveries. Births after 39-40 weeks of gestation were more common. The weight of the newborn babies ranged from 1735 to 4800 g. The babies born at a weight of 3000-3500 g made up the majority. There were 24 babies with a birth weight of more than 4000 g. The nasal septum deviation was detected in 45 (12%) babies in total, particularly in difficult and large births (Table 1).

When the findings were compared statistically: There was no statistically significant difference between the formation of neonatal septum

deviation and maternal age, gender ( $p > 0.05$ ). In the study, the presence of deviation was found in 26 patients with difficult vaginal deliveries. The head circumference was found to be 34-36 cm in 25 newborns. The neonatal septum deviation seen in first births is more common. When the head circumference is large, neonatal septum deviation is more common. A statistically significant difference was found between the formation of newborn deviation and form of birth, number of births, pregnancy duration, weight, head circumference of the newborn ( $p < 0.05$ ) (Table 2).

In the study, 1 twin birth was detected in 371 pregnant women with age ranging from 14 to 45 years (mean:  $28.59 \pm 5.53$ ). The number of births ranged from 1 to 8 ( $1.98 \pm 0.98$ ). While the gestational period is 33-42 weeks ( $38.96 \pm 1.28$ ) the weight of newborn babies ranged from 1735 to 4800 gr ( $3337.43 \pm 434.77$ ), and the head circumference from 28 to 39 cm ( $34.71 \pm 1.42$ ) (Table 3).

The nasal septum deviation was observed in babies born with emergency and elective cesarean section. Because of the 12-month follow-up of these babies, 32 nasal septum deviations were improved. The remaining babies were considered to be operated at an advanced age and their follow-up would be kept in time.

## Discussion

The development of the nose is completed in the 16<sup>th</sup> week of intrauterine life. After that time on, the nose is susceptible to all kinds of trauma. According to the general belief, treatment should be performed a few days after birth because babies tolerate interventions better in the early period than 1-2 weeks later. Anesthesia was not required. The nose is pulled upward by the gauze with the thumb and forefinger from the dorsum. The tip is inserted into the nasal passage with dislocation along the base. The elevator is lifted or rotated along its axis and seated in the nasal septum groove. During this time, a clicking sound is heard (5).

It is critical to detect nasal septal dislocation immediately after birth. It does not require treatment and should be distinguished from the temporary nasal flattening, which is caused during delivery and improves spontaneously. Although the external nasal deformity causes both cosmetic and psychological problems, internal deformity in the nasal cavity results in a significant discomfort in the respiratory system. It is observed that humidification deteriorates, nasal airflow decreases, scab and snoring increase, sinusitis occurs, a tendency to upper respiratory tract infection grows, and impaired tooth development occurs (4).

Deformities of the nose and nasal septum are divided into 3 groups: 1) Flattened nose that does not require treatment, 2) cartilage nasal septum subluxation, 3) combined deformities. They have reported that neonatology and otolaryngology specialists should have an early diagnosis and early treatment together (10).

While the frequency of neonatal nasal septum deviation in babies who have spontaneous births has a rate of 22%, Kawalski and Spiewak (11) found that the frequency of neonatal nasal septum deviation in babies by cesarean section at a rate of 3.8%.

Brain (12), said that nasal septum deviations occur in prenatal, newborn, and postnatal periods. Newborn deviations were first reported by

**Table 1. Parameters of neonatal septum deviation**

		No deviation		Deviation			
				Mild		Moderate	
		n	%	n	%	n	%
Maternal age (years)	14-19	11	2.96	3	0.81	1	0.27
	20-24	73	19.62	8	2.15	2	0.54
	25-29	104	27.96	6	1.61	3	0.81
	30-34	96	25.81	8	2.15	3	0.81
	35-39	32	8.60	4	1.08	6	1.61
	40-45	11	2.96	0	0.00	1	0.27
Form of birth	Vaginal normal	161	43.28	5	1.34	3	0.81
	Vaginal hard	15	4.03	18	4.84	8	2.15
	Cesarean emergency	43	11.56	4	1.08	5	1.34
	Cesarean elective	108	29.03	2	0.54	0	0.00
Number of births	1.00	102	27.42	13	3.49	10	2.69
	2.00	146	39.25	12	3.23	2	0.54
	3.00	59	15.86	3	0.81	4	1.08
	4.00>	20	5.38	1	0.27	0	0.00
Pregnancy duration	33-35 weeks	5	1.34	0	0.00	0	0.00
	36-38 weeks	116	31.18	6	1.61	2	0.54
	39-40 weeks	174	46.77	19	5.11	13	3.49
	41 weeks >	32	8.60	4	1.08	1	0.27
Gender	Female	163	43.82	17	4.57	9	2.42
	Male	164	44.09	12	3.23	7	1.88
Weight (gr)	2000<	2	0.54	0	0.00	0	0.00
	2001-2500	9	2.42	0	0.00	0	0.00
	2501-3000	62	16.67	2	0.54	2	0.54
	3001-3500	151	40.59	12	3.23	4	1.08
	3501-4000	91	24.46	9	2.42	4	1.08
	4001-4500	11	2.96	4	1.08	6	1.61
	4500>	1	0.27	2	0.54	0	0.00
Head circumference (cm)	28-30	2	0.54	0	0.00	0	0.00
	31-33	55	14.78	5	1.34	0	0.00
	34-36	245	65.86	14	3.76	11	2.96
	37-39	25	6.72	10	2.69	5	1.34
Nasal septal deviation	Normal	327	87.90	0	0.00	0	0.00
	Right	0	0.00	16	4.30	5	1.34
	Left	0	0.00	13	3.49	11	2.97

Metzenbaum in 1936. The reason for these deviations has been linked to developmental factors and a trauma that occur both at birth and during pregnancy. After all: 1) Nasal septum deviations occur at a rate of 3% in the newborn. 2) The two most common causes are developmental factors and birth trauma.

Na et al. (13) found that the rate of neonatal nasal septum deviation was 11.5% in 131 newborn babies. There was no statistically significant difference between these and pregnancy conditions. As a result, they said that nasal trauma is likely to occur in birth and pregnancy during nasal septal deviation. In the absence of postpartum trauma, the nasal septal deformity is thought to be caused by congenital etiology, or a

trauma either during intrauterine life or during the passage through the birth canal. There is no difference in the frequency of nasal septal deformity between normal delivery and cesarean delivery (6).

Al-Amro (14) carried out a study on 130 newborn babies, of which 67 (51.5%) were unattended normal birth, and 63 (48.5%) were delivered by cesarean. No statistical significance was found between the nasal septal deviation and delivery method. He concluded that, in uncomplicated cases, the mode of delivery is not the cause of nasal septal deviation.

When Saim and Said (15) examined 674 newborn babies, they detected nasal septal deformity in 147 (21.8%) of the babies. In the prevalence of this, they found that the mode of delivery and the difficulty of delivery

		Deviation		p
		Yes	No	
Maternal age (years)	≤24	14	84	0.109
	25-29	9	104	
	30-34	11	96	
	≥35	11	43	
Form of birth	Vaginal normal	8	161	0.000
	Vaginal hard	26	15	
	Cesarean emergency	9	43	
	Cesarean elective	2	108	
Number of births	1.00	23	102	0.008
	2.00↑	22	225	
Pregnancy duration	≤38 weeks	8	121	0.037
	39-40 weeks	32	174	
	≥41 weeks	5	32	
Gender	Female	26	163	0.318
	Male	19	164	
Weight (gr)	≤3000	4	73	0.000
	3001-3500	16	151	
	3501-4000	13	91	
	4001-4500	12	12	
Head circumference (cm)	≤33	5	57	0.000
	34-36	25	245	
	≥39	15	25	

Chi-square test, ↑: ≥2

	Minimum	Maximum	Mean ± SD
Maternal age (year)	14.00	45.00	28.59±5.53
Number of births	1.00	8.00	1.98±0.98
Gestation period (week)	33.00	42.00	38.96±1.28
Newborn weight (gram)	1735.00	4800.00	3337.43±434.77
Head circumference (cm)	28.00	39.00	34.71±1.42

SD: Standard deviation

was statistically insignificant. They recommended routine screening to reduce the morbidity associated with this disease and to correct it early.

Alpini et al. (16) said that the etiology of the congenital deviations of newborn babies in the nasal septum is still controversial. They reported that the age was unimportant in the occurrence of neonatal nasal septum deviation, but the number of births and the duration of the tram was significant. The incidence of newborn according to birth weight: In the current series, it has been observed that the incidence of nasal septum deviation increases increasing birth weight. No statistically significant relationship was observed between the weight of the newborn and nasal deformities. Nasal septal deviation incidence according to the mother's parity: In this series, it has been observed that the incidence of DNS is highest in the primipara (48%) and decreases as the parity increases (4).

The study has been conducted on 423 babies; 315 of them were natural births, and 108 were cesarean births, including 10 pyramid deformations and 12 nasal septal deviations. As a result, they reported that age was unimportant, but the number of births and the duration of the tram were significant (16). In this study, it was found that maternal age, gestational period, and number of births given was unimportant, but newborn weight and head circumference was significant.

Bhattacharjee et al. (17) prospectively found the incidence of SD to be 14.5% in a 1-year follow-up of 200 babies. The vaginal delivery rate was 55%, delivery with forceps was 24%, and cesarean delivery was 21%. They found that 55% of babies with SD had higher birth weights and 48% of them had more frequent first births. Besides, intrauterine malposition was found to occur at a rate of 45%, particularly breech, and prolonged labor was also involved in the SD formation.

Approximately 1/5 of the babies were found to have nasal septal deformities at birth, and the frequency of deformity was prolonged with younger babies and it was high in difficult deliveries (18).

The nasal septum dislocation may cause intrapartum due to nasal septal trauma intrauterine pressure, but more commonly occurs during vaginal delivery. Most of the specified nasal septal deviations are mild and spontaneously resolve within 1 month after birth. The nose should be conservatively corrected using immediate nasal septal manipulation (19).

In their study on 273 newborns, Kawalski and Spiewak (11) found the nasal septum deviation in 22.2% of infants who were delivered spontaneously and this rate to was 3.9% in cesarean babies.

Kent et al. (20) detected nasal septal deformity in 29 (2.9%) of 1,000 babies. 44% of these babies were not excised, but after 5 months, the nasal septum recovered spontaneously. Korantzis et al. (21) detected the nasal septum dislocation at a rate of 17% of 447 newborn babies' research. 5% of them constitute birth by cesarean.

Patel and Carr (22) in his 34-case series, found a nasal septal deviation in 2 (6%) babies in which neonates investigated nasal obstructions, and nasal septal deviation would improve rapidly with the presence of maternal estrogens in newborns. The nasal septum is composed entirely of cartilage during the neonatal period. At the end of the 1<sup>st</sup> year, the ossification of the nasal septum begins and is completed at the end of the adolescent age (23).

Spiewak and Kawalski (24) included 254 normal births and 52 cesarean births and their newborn in their study. They detected deformations in the cartilage part of the nasal septum in 26 babies and the bone part in 6 babies. These babies were automatically reposed in 19 (73%) of 26 deformations in the following 3-4 weeks after birth. They said that all bone deformities remained the same.

When Collo (25) examined 1,030 newborn babies, they detected traumatic nasal septal deviations in 19 of them and corrected them without surgery.

Emami et al. (26) reported that closed manipulation of the nasal septum on the first 1-2 days of a baby's life was performed by many

otolaryngologists with good results. However, the use of this technique is generally limited to subluxations of the anterior cartilage, which are diagnosed immediately after birth or within a very short time.

Pentz et al. (2) detected a nasal deviation in 110 (3.23%) of 3425 newborn babies. Eighty-one (2.37%) of these 110 babies were reclassified with closed repositioning. It was impossible to reposition in the remaining 29 (0.86%).

Soboczyński et al. (27) researched 410 newborn babies, of which 297 were born with natural birth and 113 of them with a cesarean. 14.3% of the nasal septum deviation was detected. It was followed for 4-6 months; most of them were observed deviation.

### Study Limitations

First, the short follow-up time limited this study. It will be more comprehensive if the nasal examination findings of childhood are included in the study. Second, there is a need for studies with larger study samples.

### Conclusion

The nasal examination of newborns should be performed carefully, particularly in the first days after birth, traumatic nasal septum dislocations should be brought to their anatomical positions to avoid a more aggressive surgery in the future. All newborns should be routinely examined at birth to detect nasal septal deformity.

**Ethics Committee Approval:** The study was approved by the Beykoz State Hospital Ethics Committee (approval number: 45, date: 18.07.2018).

**Informed Consent:** The written informed consent was obtained from the parents of all patients.

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