Influence of Initial Nasal Fracture Management on Need for Septoplasty and Open Septorhinoplasty: Does Closed Nasal Reduction Reduce the Need for Subsequent Septoplasty or Septorhinoplasty? A Retrospective Cohort Study of Over One Million Nasal Fractures

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ABSTRACT

Objective
Closed nasal reduction (CNR) often serves as the initial treatment modality for nasal fractures, however a subset of patients require subsequent open septorhinoplasty (OSR) or septoplasty alone to address residual concerns. We seek to characterize the incidence of subsequent procedures including OSR and septoplasty after initial CNR, with particular interest in answering the question: does CNR reduce the future need for OSR or septoplasty?

Study Design
This project is a retrospective cohort analysis using the PearlDiver database (PearlDiver, Inc., Colorado Springs, CO), encompassing information on nasal fractures and subsequent intervention in 170 million adult patients across the United States.

Setting
The data extracted from this national database span from 2010 to 2024, covering all insurance payer types.

Results
There were 1,027,816 cases of nasal fractures, with 127,449 (12.4%) undergoing CNR. Of the adults who received CNR, 1.3% (1,659) underwent subsequent OSR compared with 1.5% (13,588) who underwent subsequent OSR without initial CNR. Of adults who received CNR, 2.7% (3,396) required subsequent septoplasty, while 4.5% (40,760) required subsequent septoplasty without initial CNR. Those who underwent initial CNR were significantly less likely to require subsequent OSR or septoplasty (p<0.0001). The average time between CNR and OSR (1 year and 168.4 days) and CNR and septoplasty was similar (1 year and 181.1 days).

Conclusions
We evaluate the outcomes of a large cohort of patients undergoing management of nasal fractures. Interestingly, only 12.4% of nasal fracture patients underwent CNR, which could represent under-referral, late presentation, or resource limitation. Patients who received a CNR had a significantly lower incidence of subsequent OSR and septoplasty, than those that did not undergo CNR. Therefore, we conclude that CNR may adequately restore nasal structure and function effectively reducing the need for future more extensive surgical interventions.

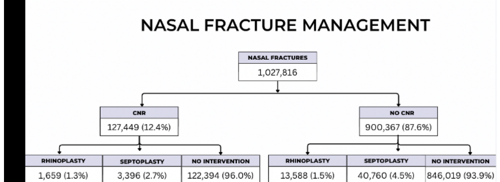

Figure 1. Nasal Fracture Management Schema

RESULTS

	OSR after CNR	Septoplasty after CNR
Sex		
Female	947	1738
Male	712	1658
Region		
Midwest	512	976
Northeast	406	804
South	481	1093
West	257	520
Insurance		
Cash	11	<10
Commercial	1416	2819
Government	26	60
Medicaid	167	391
Medicare	95	221
Unknown	30	47

Table 1. Demographic Information Secondary Procedure after CNR

- From 2010 to 2024, there were 1,027,816 patients diagnosed with nasal fractures in the Pearl Diver database. Of these, 12.4% (127,449) of them were treated with CNR (Figure 1).
- Of these patients who underwent CNR, 5,055 (4.0%) of patients required subsequent procedures with either OSR or septoplasty.
- In the CNR group, 1.3% (1,659) subsequently required subsequent OSR and 2.7% (3,396) required septoplasty (Figure 1).
- 900,367 (87.6%) patients with nasal fracture who did not undergo CNR, 54,348 (6.0%) of whom required subsequent procedures with either OSR or septoplasty.
- In this group who did not undergo initial CNR, there were 13,588 (1.5%) patients who later underwent OSR (Figure 1).
- Among those who did not undergo initial CNR, 40,760 (4.5%) later underwent septoplasty.

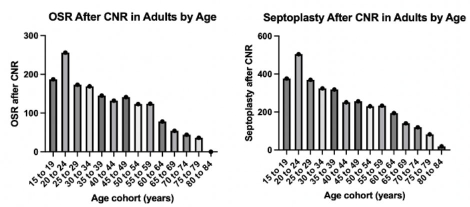

Figure 2: OSR after CNR by Age (left), Septoplasty After CNR by Age (right)

Outcome	CNR	No CNR	X^2 (df, X^2) (p statistic)
Subsequent surgery (OSR + septoplasty)	5,055	122,394	1, 878.0 (p<0.0001)*
Septoplasty	3,396	40,760	1, 941.4 (p<0.0001)*
OSR	1,659	13,588	1, 32.74 (p<0.0001)*

Table 2. Subsequent Procedures Following CNR versus No CNR

Subgroup	Average Time Between Surgeries	Standard Deviation (days)	Median Time Between (days)
OSR after CNR	1 year, 168.4 days	751.1	224.0
Septoplasty after CNR	1 year, 181.1 days	813.8	187.0

Table 3. Time Between CNR and OSR or Septoplasty

Age (years)	OSR after CNR	Septoplasty after CNR
15 to 19	187	376
20 to 24	256	504
25 to 29	173	369
30 to 34	169	324
35 to 39	145	318
40 to 44	132	251
45 to 49	141	256
50 to 54	123	230
55 to 59	124	233
60 to 64	78	194
65 to 69	54	140
70 to 74	44	119
75 to 79	36	82
80 to 84	<10	19

Table 4. Breakdown of procedure by age

DISCUSSION

- This large-scale retrospective cohort study provides rather compelling evidence that CNR significantly reduces the likelihood of patients requiring secondary open septorhinoplasty or septoplasty following nasal fractures.
- Drawing from a national dataset spanning over a decade and encompassing over one million patients with nasal fractures, we found that those who received initial CNR had statistically lower rates of subsequent surgical intervention compared to those who did not (p<0.0001).
- OSR after CNR was more common in female patients (F = 947, M = 712) (Table 5). Similarly, more female patients than male patients required septoplasty after CNR (F = 1738, M = 1658) in our cohort.
- These findings support the clinical utility of early CNR as an effective intervention not only for immediate anatomical realignment but also for reducing the burden of long-term surgical management.
- To this extent, the present study expands on and aligns with previous studies that have described the efficacy of CNR in initial management of nasal bone fracture.

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