

Enhancing Patient Selection for Nerve Decompression: A standardized computerized tomography protocol for frontal and rhinogenic neuralgia

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Conclusion

CT imaging is a valuable adjunct in the preoperative evaluation of patients with suspected frontal or rhinogenic neuralgia. Relevant anatomic findings are frequently underreported in standard radiologic interpretations. Incorporation of a structured imaging review protocol into preoperative assessment may enhance patient selection, optimize surgical planning, and ultimately improve outcomes following nerve decompression surgery.

Introduction

Appropriate selection of patients with frontal or rhinogenic site neuralgia is challenging yet critical for effective surgical treatment.

Objective

This study evaluates the utility of **CT imaging** in preoperative **assessment of frontal or rhinogenic** sites and introduces a protocol to improve **standardized review**.

Methods

Rhinogenic Site: CT Face and Perinasal Sinus Evaluation Tool

1. Nasal Septum

☐ Septal deviation
Direction: ☐ Right ☐ Left ☐ None
Shape: ☐ C-shape ☐ S-shape

☐ Septal spur
Direction: ☐ Right ☐ Left

☐ Septal contact with turbinate or nasal wall
Direction: ☐ Right ☐ Left

☐ Septal bullosa

2. Turbinate variations

	Right	Left
Superior Turbinate	☐ Paradoxical curve ☐ Hypertrophy	☐ Paradoxical curve ☐ Hypertrophy
Middle Turbinate	☐ Paradoxical curve ☐ Hypertrophy ☐ Concha bullosa	☐ Paradoxical curve ☐ Hypertrophy ☐ Concha bullosa
Inferior Turbinate	☐ Paradoxical curve ☐ Hypertrophy	☐ Paradoxical curve ☐ Hypertrophy

3. Turbinate Contact Points

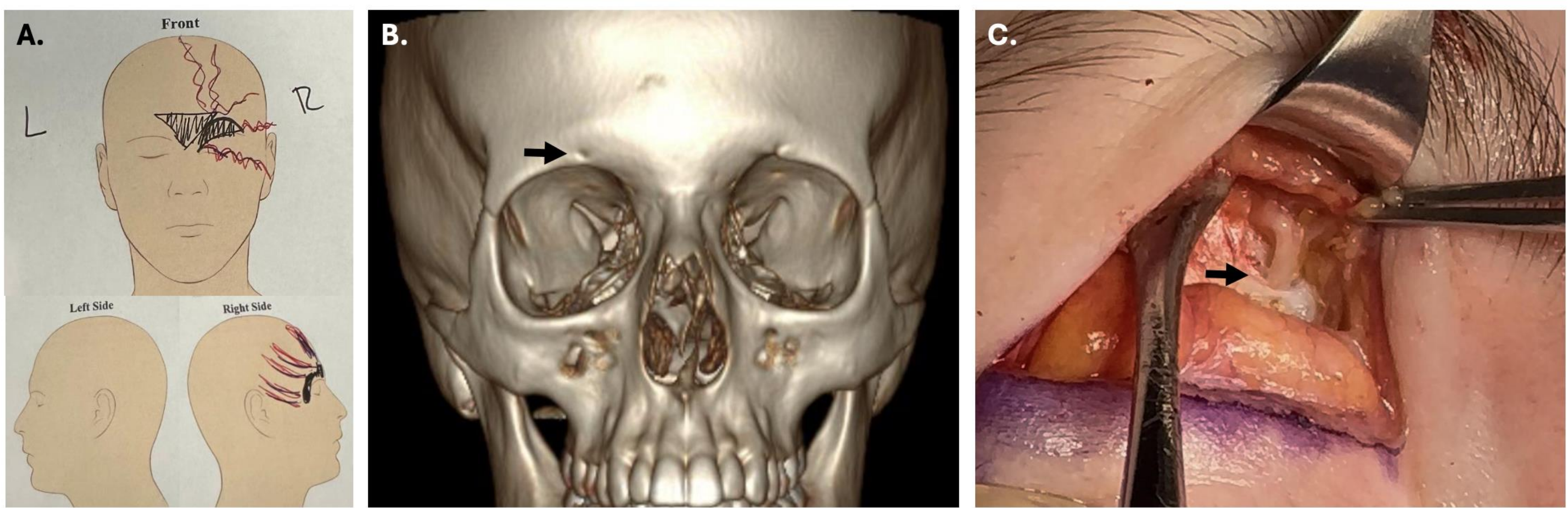
	Right	Left
Superior Turbinate	☐ Septum	☐ Septum
Middle Turbinate	☐ Septum ☐ Lateral wall ☐ Inferior turbinate	☐ Septum ☐ Lateral wall ☐ Inferior turbinate
Inferior Turbinate	☐ Septum ☐ Lateral wall ☐ Inferior wall	☐ Septum ☐ Lateral wall ☐ Inferior wall

4. Other Findings

☐ Nasal Polyps ☐ Haller cells ☐ Prior surgical changes

Frontal Site: CT Face and Perinasal Sinus Evaluation Tool

Right	Left
Supraorbital Notch ☐ Present ☐ Absent If present: • Diameter: _____	Supraorbital Notch ☐ Present ☐ Absent If present: • Diameter: _____
Supraorbital Foramen ☐ Present ☐ Absent If present: • Diameter: _____ • Length: _____	Supraorbital Foramen ☐ Present ☐ Absent If present: • Diameter: _____ • Length: _____



- ❖ A prospective cohort study was conducted of patients undergoing frontal or rhinogenic site surgery between 2012-2025.
- ❖ A standardized CT review protocol was developed and applied by blinded radiologists.
- ❖ Radiographic findings were compared with clinical and intraoperative anatomy, and detection rates were compared with original radiology reports.
- ❖ Pain outcomes were prospectively assessed longitudinally.

Results

The standardized protocol **significantly improved radiographic detection of intranasal contact points** (13.5% to 70.3%, $p<0.001$), **supraorbital notch** (0% to 72.3%, $p<0.001$), and **foramen** (0% to 36.6%, $p<0.001$). When correlated with clinical findings, CT demonstrated **83.3% accuracy for contact points**, **96.0% for supraorbital notch**, and **92.1% for foramen detection**. Frontal decompression resulted in a pain improvement of 75% (IQR, 50%–97%) and rhinogenic surgery improvement of 80% (IQR, 0%–100%), over mean follow-up periods of 24 and 32 months respectively.

Variable	Frontal Neuralgia (n=55)	Rhinogenic Neuralgia (n=37)
Gender, n (%)		
Female	51 (92.7)	33 (89.2)
Male	4 (7.3)	4 (9.8)
Age at surgery, years		
Mean (SD)	46 (12.1)	42.6 (12.9)
Range	18-74	18-68
Race, n (%)		
White	49 (89.1)	32 (86.5)
Black or African American	3 (5.5)	3 (8.1)
Asian	2 (3.6)	1 (2.7)
Other	1 (1.8)	1 (2.7)
Onset age, years, mean (SD)	21.7 (12.9)	22.3 (12.9)
Preceding event, n (%)		
No preceding event	41 (74.5)	22 (59.5)
Head-or neck injury	8 (14.5)	11 (29.7)
Viral illness	2 (3.6)	0 (0)
Iatrogenic/post-procedure	1 (1.8)	2 (5.4)
Other	3 (5.5)	2 (5.4)

Figure 1. Comparison of pre-protocol CT, post-protocol CT, and clinical findings for frontal and rhinogenic site evaluation

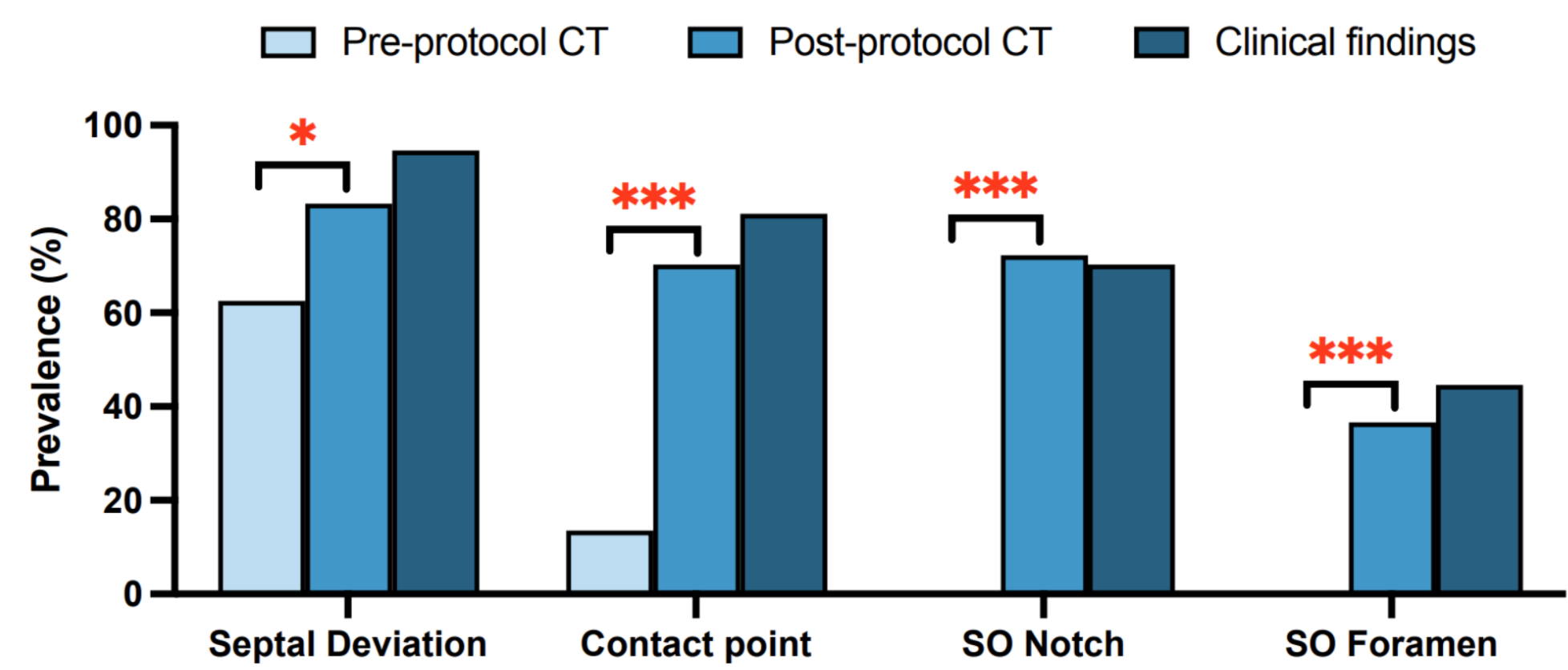


Figure 2. Frontal and rhinogenic neuralgia postoperative percent symptom improvement

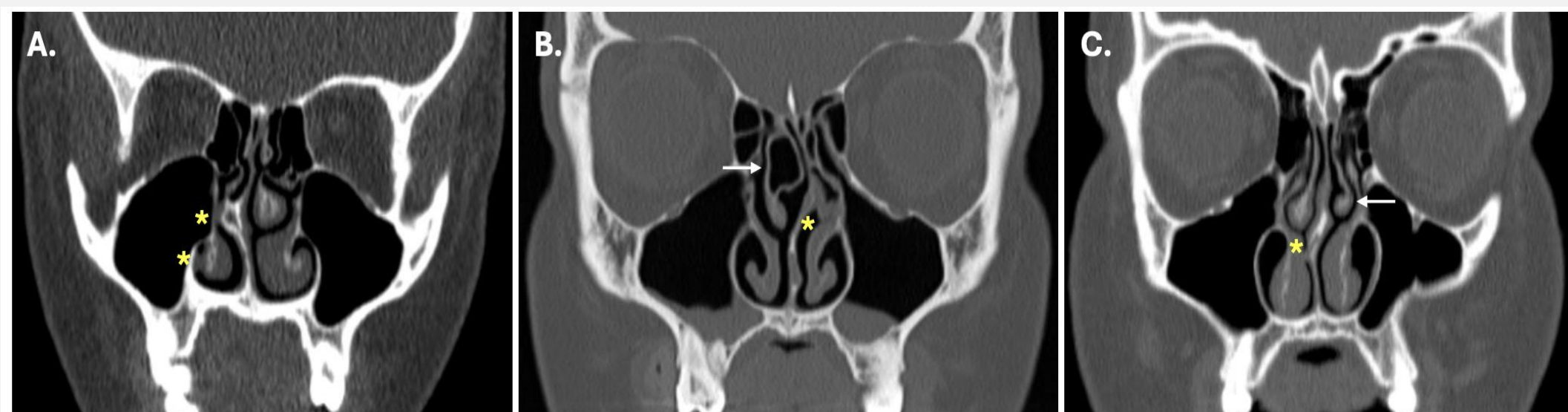
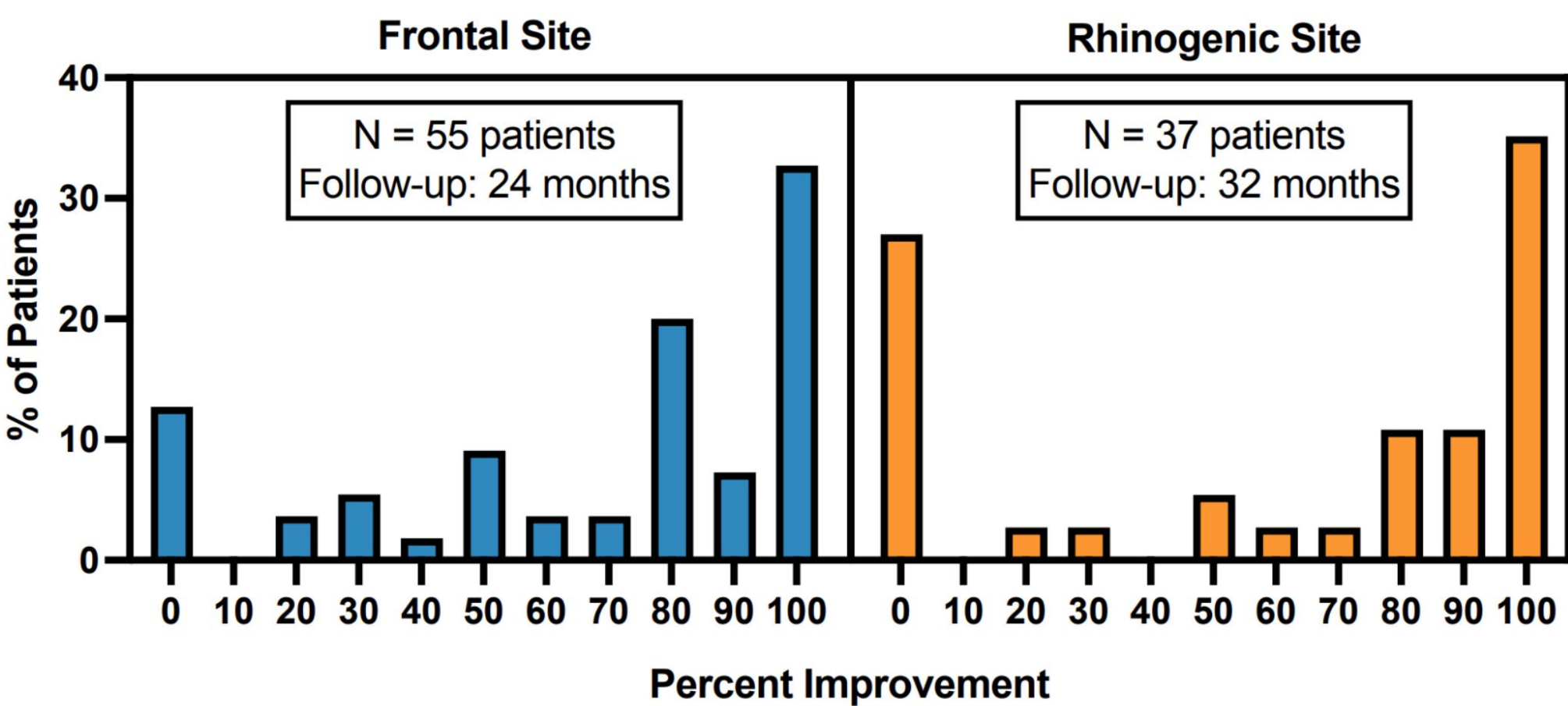


Figure 3. Preoperative intranasal findings in patients with rhinogenic neuralgia. (A) Rightward septal deviation with a septal spur contacting the lateral nasal wall, along with bilateral inferior turbinate hypertrophy and contact between the right inferior turbinate and lateral nasal wall. (B) Leftward septal deviation with a septal spur contacting the left inferior turbinate, as well as a concha bullosa of the right middle turbinate. (C) Rightward septal deviation with a septal spur contacting the right inferior turbinate, right middle turbinate paradoxical curve, and bilateral inferior turbinate hypertrophy.