Book reading
R1 陳竑瑋

CHAPTER
104

NASAL SEPTAL PERFORATIONS

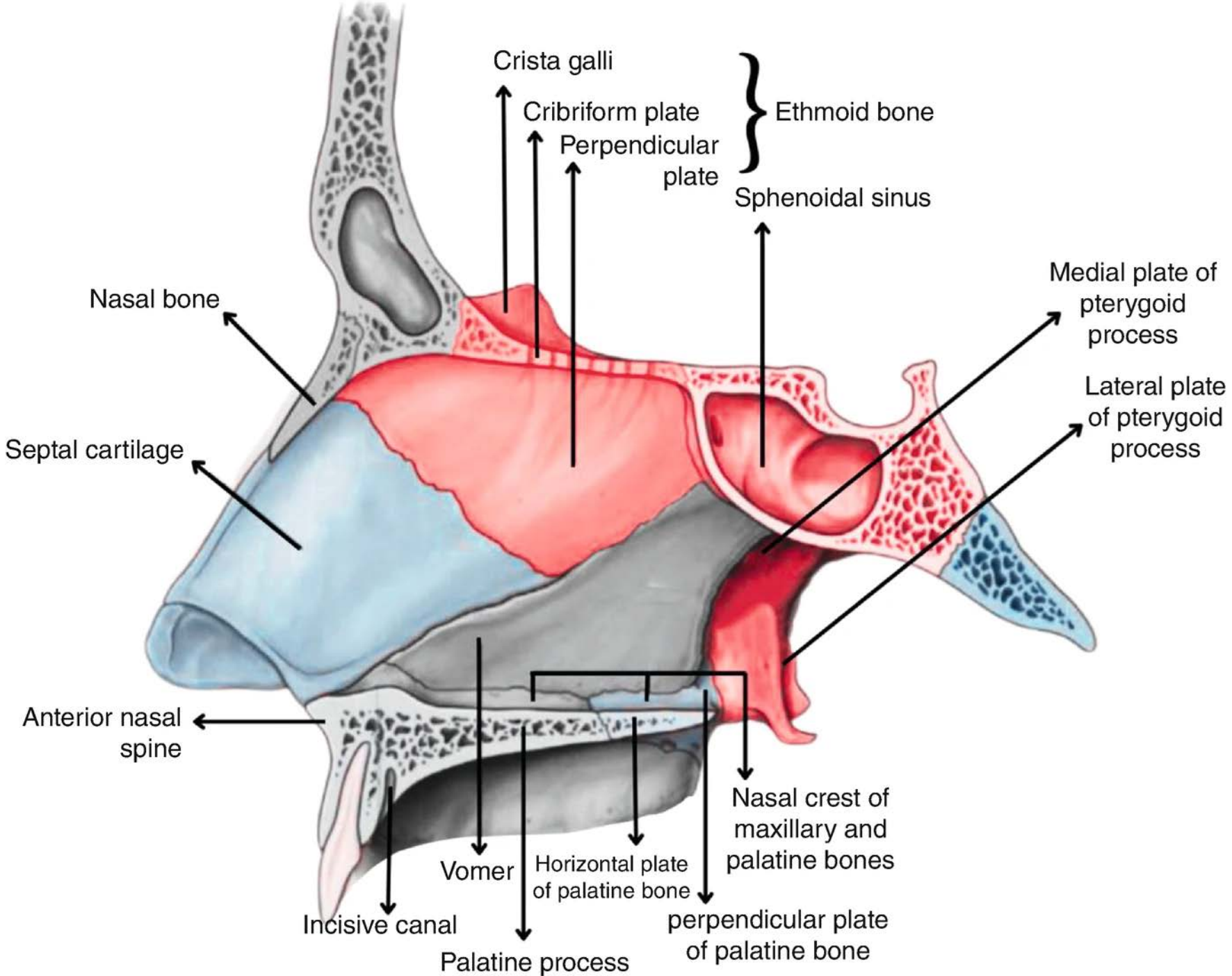
Charles Fast and Kevin Kulendra

Introduction

- **What is Nasal Septum Perforation?**
  - A condition characterized by a hole or fissure in the nasal septum
- **Purpose of Discussion:**
  - To explore causes, symptoms, diagnosis, treatment, and preventive measures for nasal septum perforation.
- Exact prevalence of septal perforations is unknown as many perforations are asymptomatic
- Racial traditions and fashion

Anatomy of the Nasal Septum

- **Structure:**
  - Made of cartilage (anterior) and bone (posterior).
- **Function:**
  - Provides structural support for the nose.
  - Helps regulate airflow through the nasal cavities.
  - Supports mucous membranes for humidifying and filtering air.



Causes of Nasal Septum Perforation

1.Trauma:
1. Nasal injuries or surgeries (e.g., rhinoplasty, septoplasty).

2.Infections:
1. Chronic nasal infections or syphilis.

3.Substance Use:
1. Cocaine or other nasal drugs.
2. an association between nasal steroid sprays and the development of nasal perforation.(cause inflammation, vasoconstrictor)

4.Medical Conditions:
1. Granulomatosis with polyangiitis, sarcoidosis.

5.Environmental Factors:
1. Prolonged exposure to irritants (e.g., chemicals, dust).

6.Idiopathic:
1. Unknown causes in some cases.

TABLE 104.1 Aetiologies of nasal septal perforations

Traumatic causes	Surface irritants	Infections	Neoplastic	Inflammatory
Nasal surgery	Cocaine insufflation	Syphilis	Melanoma	Sarcoidosis
Nose picking	Cocaine adulterants	Typhoid	Adenocarcinoma	Crohn's disease
Septal cauterization (bilateral)	Heroin inhalation	Diptheria	Squamous cell carcinoma	Dermatomyositis
Nasal packing for epistaxis	Decongestant nasal sprays Intra-nasal corticosteroids	Tuberculosis	Metastatic carcinoma	Rheumatoid arthritis
Septal hematoma/abscess	Lime, cement, glass, salt, dust	Rhinoscleroma	Lymphoma	Relapsing polychondritis
Cryosurgery	Tar and pitch	Lepromatous leprosy		Granulomatosis with polyangiitis (GPA)
Intubation (nasogastric/ tracheal)	Fumes (chromic/sulfuric acid)	Leishmaniasis		Systemic lupus erythematosus
Desiccation (ozena, deviated septum)	Arsenicals, mercurials	Mucor		
Radiation	Calcium nitrate, cyanide	Rhinosporidiosis		
Stab and gunshot wounds	Phosphorus, sodium carbonate	Alternaria		
Foreign bodies (button batteries)	Copper-smelting fumes	Actinomycosis		
		Aspergillosis		
		Histoplasmosis		
		Cryptococcosis		
		Coccidioidomycosis		
		Paracoccidioidomycosis		
		Candidiasis		

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		Candidiasis		

Symptoms

- **Common Symptoms:**
  - Nasal obstruction or congestion.
  - Crusting and epistaxis.
  - Whistling noise during breathing.
- **Severe Cases:**
  - Altered nasal shape (saddle nose deformity).
  - Difficulty breathing.
- (69 septal perforations, Brain showed that 62.4% were completely free from any symptoms)

Brain D. Septo-rhinoplasty: the closure of septal perforations. *J Otolaryngol* 1980; **94**: 495–505

Symptoms

- Anterior perforations and large perforations where the anterior margin is in front of the nasal valve appear to be the most troublesome.
  - slow mucociliary clearance
  - low humidity
  - loss of mucosa
- Blockage
  - large stable perforations, patients may feel the nose is empty or complain of ‘blockage’, even when nasal airflow is greater than average (there is little evidence to support this)
- Epistaxis
  - Inflammation in the perforation margin leads to recurrent epistaxes

Diagnosis

1.Medical History:

1. Questions about trauma, infections, or substance use.
2. Nasal questionnaires (clinical not routine usage)

2.Physical Examination:

1. Nasal endoscopy to inspect the septum.(ruler into contralateral airway)

3.Imaging Studies:

1. CT scan for detailed assessment of the nasal structure.

4.Lab Tests:

1. Ruling out infections or systemic diseases.

Further evaluation

- Wegener’ s granulomatosis
  systemic lupus erythematosus (SLE)
  dermatomyositis
  tuberculosis
  syphilis
- full blood count, erythrocyte sedimentation rate (ESR), urea and electrolytes, urine analysis, C-ANCA, treponemal investigations
  chest X-ray
- little evidence that extensive investigations for patients with healed, stable and asymptomatic perforations

Routine biopsy or not

- Routine biopsy of septal perforations to exclude vasculitis has been suggested, but almost chronic inflammation
- Biopsy may convert an inactive perforation to an active state→resulting in significant enlargement of the hole
- It is clear that the diagnosis of Wegener’ s or its reactivation cannot be reliably inferred from biopsy of the nasal septum alone →The role of routine biopsy in idiopathic perforations has recently been questioned.
- Perforations should be biopsied if there is an unexplained aetiology, with persistent inflammation, or if the perforation is irregular

Management

- The majority of septal perforations are asymptomatic and require no specific treatment
- The more anterior the lesion, the more likely it is to cause symptoms

Prevention

- 60% had a previous history of septal surgery
- Starting the dissection on the easier (usually the concave) side
- Autograft of cartilage or ethmoid plate
- Remove large spur
- Suture loosely to
  - allow post-op edema
  - Avoid ischemia necrosis
- Avoid irritation
  - Eradication of bacteria
  - Avoid aggressive clearance
  - Mucosal protection usage(petroleum jelly, sesame seed sprays)□ better than simple saline douching

Prevention

- **Substance Abuse Awareness:**
  - Avoid using drugs through the nasal route.
- **Timely Treatment of Nasal Issues:**
  - Early management of infections and other conditions.

Treatment Options- non surgical

1.Non-Surgical:

1. **Moisturizers, Saline Sprays:** Maintain nasal hydration.
2. **Nasal Septal Buttons:** Temporary closure of the perforation.

2.Treat underlying disease

Treatment Options- surgical

1. Surgical:
    1. Enlargement of a nasal septal perforation to prevent whistling (with persistent inflammation who could not retain a nasal obturator and who were deemed unsuitable for surgical repair.)
    2. Surgical repair(sufficient mucosa, connective tissue interposition graft)
        1. Free graft
            1. Autograft
            2. Allograft
        2. Pedicle flap
            1. Local nasal mucosa
            2. Buccal mucosa
            3. Septal cartilage and mucosa
        3. Rotation mucoperichondrial or mucoperiosteal flap

Complications

- Chronic discomfort and crusting.
- Recurring infections.
- Structural deformities like saddle nose.
- Reduced quality of life due to symptoms.

The Laryngoscope

Assessment of a Novel Tool for the Clinical Grading of Nasal Septal Perforation

Amar Miglani, MD; India Rangel, BS; Cody Smith, MD; Stephen F. Bansberg, MD; Devyani Lal, MD; Michael J. Marino, MD

Introduction

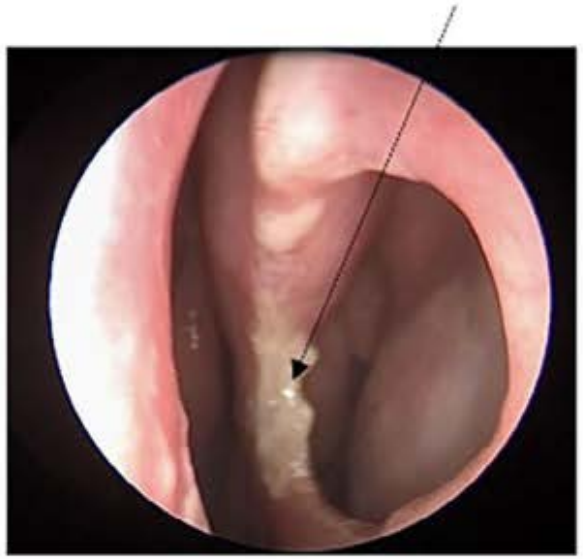
- (1) develop and validate a novel endoscopic grading tool based on five common physical exam findings for NSP(nasal septum perforation) including crusting, scarring, granulation, edema, and deviation
- (2) determine if nasal endoscopy scoring correlates with patient symptom burden using the NOSE-Perf score

Method

- 40 adult patients
- patients were excluded if video endoscopy could not be obtained
- The videos were edited to show only the relevant structures and to remove any identifiable patient features
- rigid 30-degree nasal endoscope
- Videos were then reviewed by five independent raters (varied levels of training which ranged from a senior otolaryngology resident to an experienced nasal septal perforation surgeon)
- **3-point** scale (0–2) scale
  - Crust, scar, Granulation tissue, Edema, deviation
- The raters repeated scoring a minimum of 14 days after their initial pass

Crust, scar, Granulation tissue, Edema, deviation ?

A

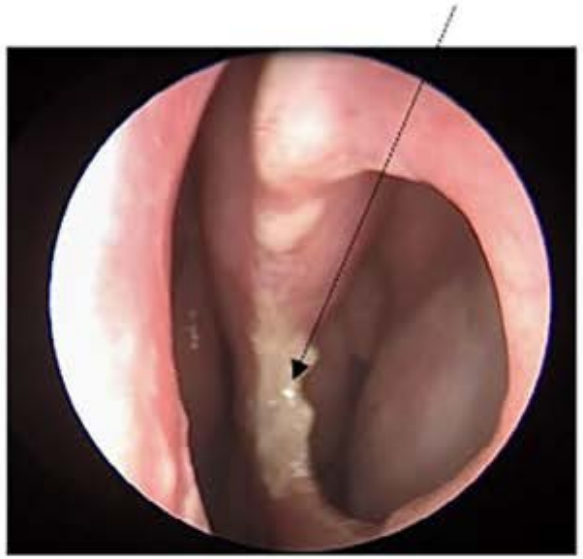


B

C

Crust, scar, Granulation tissue, Edema, deviation ?

A



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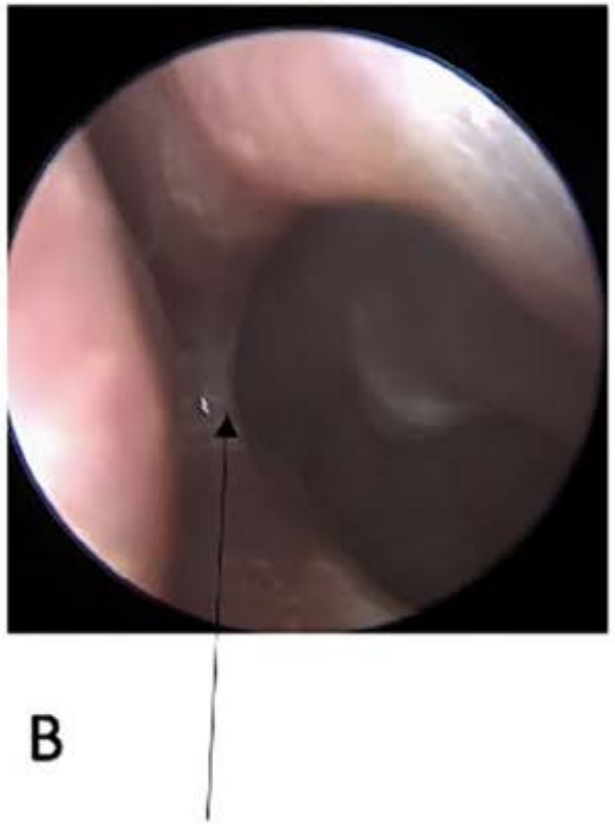
crust

Crust, scar, Granulation tissue, Edema, deviation ?

A



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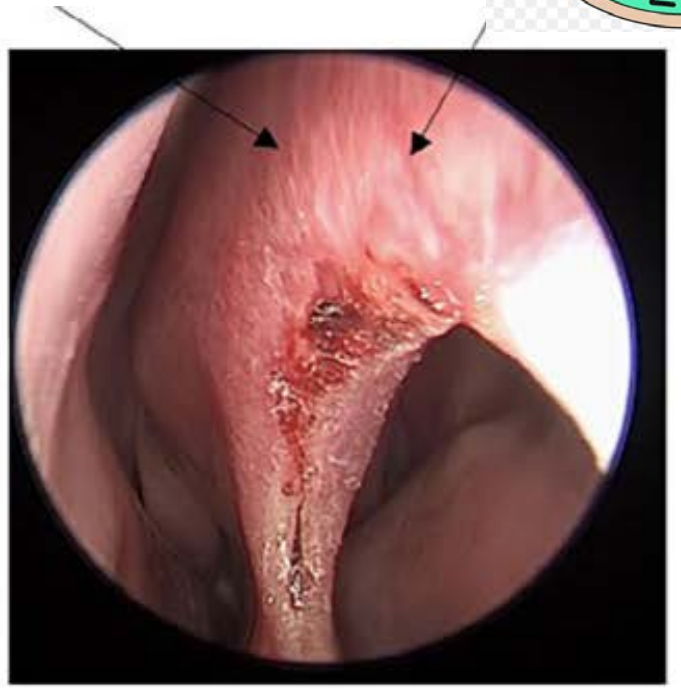

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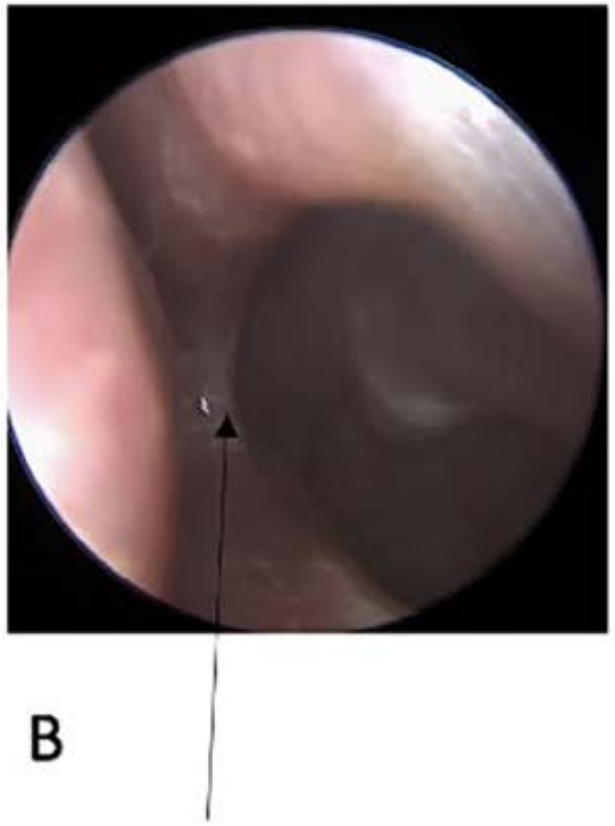

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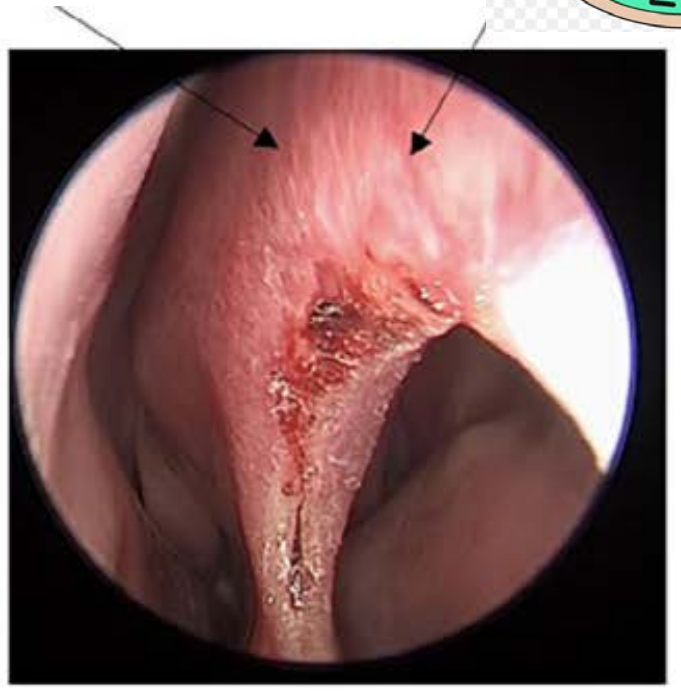
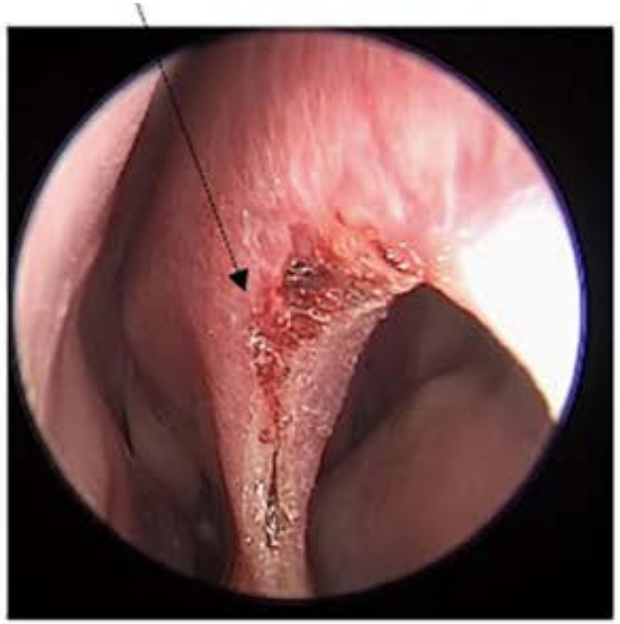


C

scar

Crust, scar, Granulation tissue, Edema, deviation ?

A



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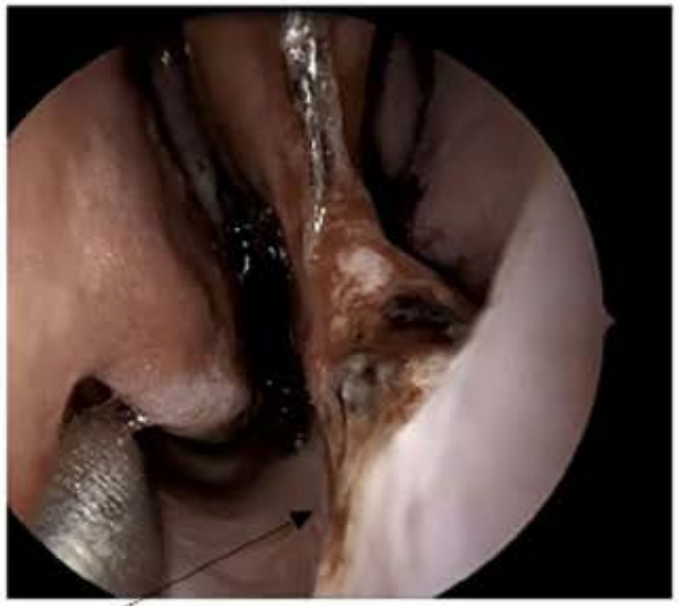
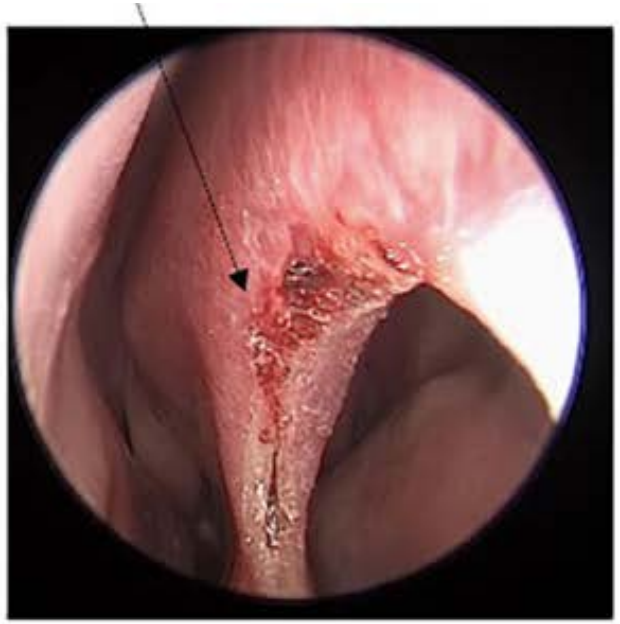


C

Crust, scar, Granulation tissue, Edema, deviation ?

A



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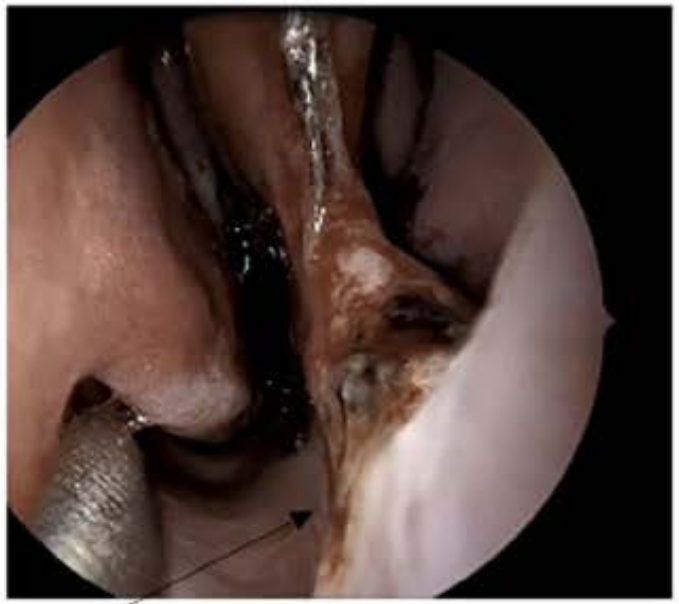
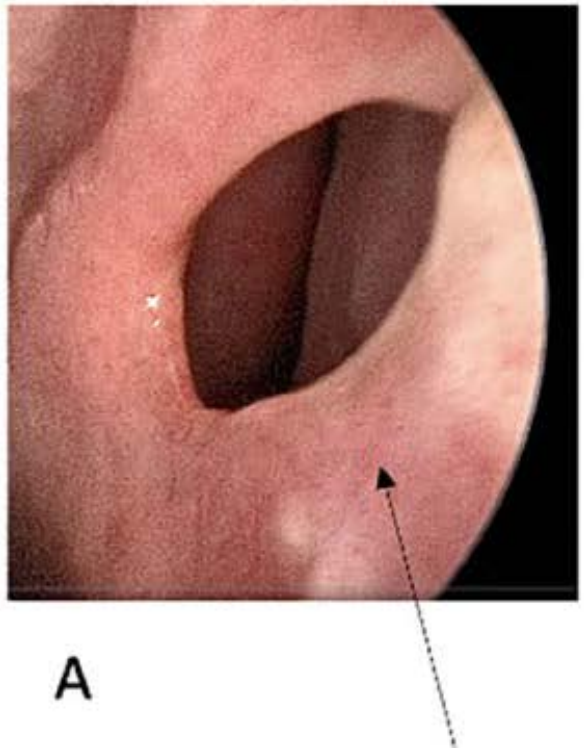


C

Granulation tissue

Crust, scar, Granulation tissue, Edema, deviation ?

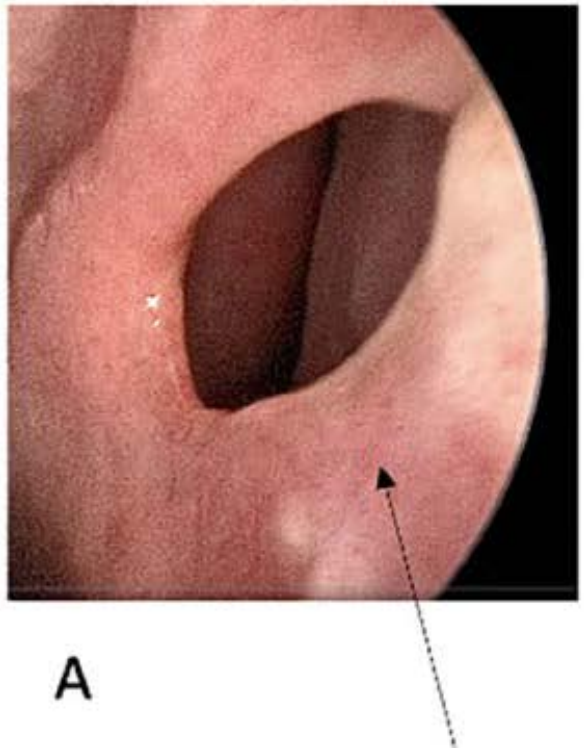


A

B

C

Crust, scar, Granulation tissue, Edema, deviation ?



A

edema

B

C

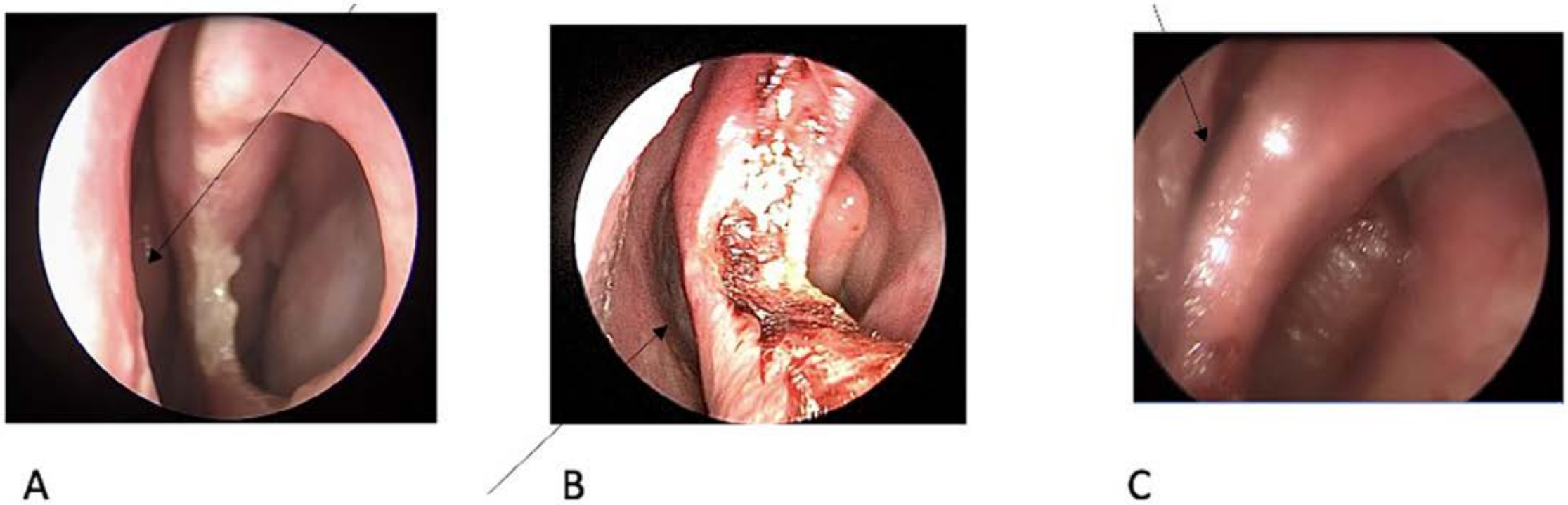
Crust, scar, Granulation tissue, Edema, deviation ?

A

B

C

Crust, scar, Granulation tissue, Edema, deviation ?



Deviation of nasal septum

Participant demograph

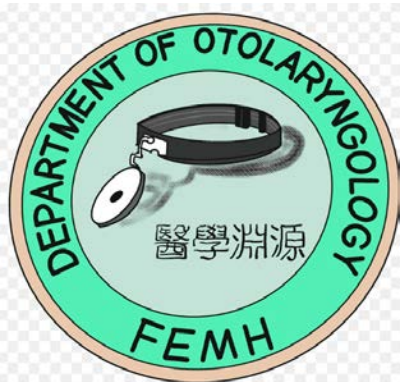
TABLE I.
Participant Demographics, Suspected NSP Etiology, and NOSE-Perf Scores.

	Number of participants	Percentage of participants
Age		
<21	1	2.5
21–50	17	42.5
51–75	20	50
>75	2	5
Gender		
Male	19	47.5
Female	21	52.5
Race		
White	39	97.5
Black	1	2.5
Ethnicity		
Hispanic or Latino	3	7.5
Not Hispanic or Latino	37	92.5

Participant demograph

Suspected NSP etiology		
Prior nasal surgery	16	40
Idiopathic	7	17.5
Digital manipulation	5	12.5
Illicit drug use	4	10
Topical medications	3	7.5
Trauma	2	5
Other	3	7.5
NOSE-Perf scores*		
1–10	4	12
11–20	10	30
21–30	14	42
31–40	5	15

*NOSE-Perf scores were collected for 33 participants.



MAYO CLINIC

Name:
Date:

NOSE-Perf Scale

Department of Otorhinolaryngology: Head and Neck Surgery

Please help us better understand the impact of septal perforation on your quality of life by **completing the following survey**. Thank you!

Over the past ONE month, how much of a problem were the following conditions for you?

Please circle the most correct response

	Not a Problem	Very Mild Problem	Moderate Problem	Fairly Bad Problem	Severe Problem
1. Nasal congestion or stuffiness	0	1	2	3	4
2. Nasal blockage or obstruction	0	1	2	3	4
3. Trouble breathing through my nose	0	1	2	3	4
4. Trouble sleeping	0	1	2	3	4
5. Unable to get enough air through my nose during exercise or exertion	0	1	2	3	4
6.Trouble with crusting in my nose	0	1	2	3	4
7. Whistling from my nose	0	1	2	3	4
8. Bleeding from my nose	0	1	2	3	4
9. Facial pain or headache	0	1	2	3	4
10. Decreased sense of smell	0	1	2	3	4
11. Foul or odd smell in my nose	0	1	2	3	4
12. Runny nose or post-nasal drip	0	1	2	3	4

Fig. 1. Nasal Obstruction Symptom Evaluation (NOSE)-Perf instrument. [Color figure can be viewed in the online issue, which is available at www.laryngoscope.com.]

Interrater reliability test

TABLE II.
Interrater Reliability Testing of the Novel Nasal Septal Perforation Scale in 40 Effective Subjects by Five Independent Raters.

Category	Time 1 Kappa (95% ci)	Time 2 Kappa (95% CI)
Scarring	0.308 (0.236–0.381)	0.286 (0.215–0.357)
Granulation	0.403 (0.337–0.468)	0.406 (0.336–0.475)
Deviation	0.487 (0.417–0.557)	0.494 (0.424–0.564)
Edema	0.253 (0.182–0.324)	0.406 (0.332–0.481)

Abbreviations: CI, confidence interval; kappa, Fleiss' kappa.

"fair-to-moderate" agreement range

Intrarater reliability test

TABLE III.
Intrarater Reliability Analysis of the Novel Nasal Septal Perforation Scale in 40 Effective Subjects by Five Independent Raters.

Category	Rater 1 Kappa (95% CI)	Rater 2 Kappa (95% CI)	Rater 3 Kappa (95% CI)	Rater 4 Kappa (95% CI)	Rater 5 Kappa (95% CI)
Crusting	0.735 (0.476–0.994)	0.569 (0.332–0.805)	0.898 (0.650–1.146)	0.723 (0.472–0.974)	0.815 (0.569–1.061)
Scarring	0.672 (0.447–0.898)	0.384 (0.149–0.620)	0.907 (0.635–1.178)	0.722 (0.457–0.986)	0.388 (0.166–0.609)
Granulation	0.564 (0.337–0.792)	0.643 (0.416–0.871)	0.877 (0.643–1.111)	0.685 (0.459–0.911)	0.758 (0.526–0.989)
Deviation	0.751 (0.510–0.991)	0.689 (0.465–0.914)	0.849 (0.629–1.069)	0.622 (0.402–0.842)	0.550 (0.330–0.769)
Edema	0.881 (0.618–1.145)	0.588 (0.356–0.820)	0.880 (0.648–1.111)	0.580 (0.355–0.806)	0.472 (0.253–0.692)

Abbreviations: CI, confidence interval; kappa, Fleiss' kappa.

"substantial" for individual items

Result

- The mean (+ SD) NOSEperf score and mean (+ SD) NSP endoscopy score were 20.5 (+ 9.1) and 5.6 (+ 2.7)
- The NSP endoscopy scores were moderately correlated with NOSE-perf scores ($r = 0.44$, $p = 0.008$)

Conclusion

- The NOSE-Perf score and NSP endoscopy may be useful tools for standardized assessment of NSP outcomes.

The Laryngoscope

Quality of Life in Symptomatic Septal Perforation

Berta Alegre Edo, MD; María Jesús Rojas-Lechuga, MD, MSc; Mireia Quer-Castells, MD;
Nesly González-Sánchez, MD; Mauricio Lopez-Chacon, MD; Claire Hopkins, MD, PhD;
Isam Alobid, MD, PhD

Introduction

- Symptomatic patients require treatment to improve quality of life (QoL)
- Sino-Nasal Outcome Test 22 (SNOT-22) is a widely used questionnaire for evaluating QoL in patients with sinonasal pathology that was developed for patients with chronic rhinosinusitis with nasal polyposis (CRSwNP).
- Few studies on QoL in patients with SP have been reported in the literature.
- The aim of this study is to investigate the impact of SP(Septal perforation) on QoL compared to the general healthy population and patients with CRSwNP using the SNOT-22 and its domains

Material and method

- Prospective study in the Rhinology and Skull Base Unit of the Hospital Clínic Barcelona
- January 2014 to March 2023 , >18 y/o
- A total of 392 patients were included in three groups: controls (n = 141), CRSwNP (n = 118), and SP (n = 133)
- Exclusion: other paranasal sinus or nasal cavity pathology as chronic rhinosinusitis, history of neoplasia, to have received radiotherapy of the head and neck or to suffer from autoimmune diseases with sinus involvement or potential involvement such as granulomatosis with polyangiitis
- Face to face: SNOT-22

1. 需要時常擤鼻涕	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
2. 鼻塞	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
3. 打噴嚏	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
4. 流鼻水	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
5. 咳嗽	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
6. 鼻涕倒流	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
7. 黏鼻涕	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
8. 耳鳴	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
9. 頭暈	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
10. 耳部疼痛	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
11. 臉部疼痛/脹痛	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重

12. 嗅覺/味覺降低	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
13. 不易入睡	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
14. 半夜醒來	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
15. 夜間睡眠品質不佳	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
16. 睡不飽	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
17. 疲累	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
18. 生產力降低	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
19. 專注力降低	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
20. 沮喪/不安/易怒	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
21. 心情沮喪	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重
22. 局促不安	○ 沒有問題	○ 很輕微	○ 輕微	○ 中度	○ 嚴重	○非常嚴重

TABLE II.
Comparison of the Mean SNOT-22 Questionnaire Score by Domains in CRSwNP and SP.

	Control ($n = 141$)	CRSwNP ($n = 118$)	Septal Perforation ($n = 133$)	p-Value
SNOT-22, mean (SD)	6.2 (8.4)	46.5 (22.0)*	42.4 (24.4)*	**$p < 0.001$**
Khan et al. Domains, mean % (SD)				
Nasal	2.4 (3.5)	49.2 (22.2)*	44.4 (20.9)*	$p = 0.092$
Ear/Facial	2.8 (8.5)	24.4 (23.8)*	25.0 (23.6)*	$p = 1.000$
Sleep	12.0 (17.2)	38.4 (32.0)*	53.2 (29.3)*	**$p < 0.001$**
Function	7.2 (14.2)	31.1 (28.5)*	44.3 (31.3)*	**$p < 0.001$**
Emotion	6.9 (15.0)	36.5 (31.8)*	43.0 (32.0)*	$p = 0.173$
DeConde et al. Domains, mean % (SD)				
Rhinologic Symptoms	2.7 (3.7)	53.0 (24.3)*	48.7 (21.0)*	$p = 0.198$
Extra-Nasal Rhinologic	0.7 (1.7)	19.7 (12.3)*	18.7 (13.3)*	$p = 1$
Ear/Facial	3.0 (6.0)	22.3 (18.7)*	22.7 (18.0)*	$p = 1$
Psychological dysfunction	33.7 (33.3)	40.3 (32.7)*	53.0 (32.0)*	**$p = 0.001$**
Sleep dysfunction	10.0 (13.3)	31.3 (25.3)*	43.7 (23.8)*	**$p < 0.001$**

CRSwNP = chronic rhinosinusitis with nasal polyposis; SD = standard deviation.

*Significant difference between control group compared to CRSwNP and SP groups. p-value <0.05: post-hoc Bonferroni comparison between CRSwNP and SP groups. Bold values indicate p ⟨0.05.

TABLE III.
Comparison of the SNOT-22 Questionnaire Score by Items Between the Three Groups Expressed as a Percentage.

Questionnaire	Control (n = 141)	CRSwNP (n = 118)	Septal Perforation (n = 133)	p-Value
SNOT-22 by items, mean % (SD)				
1. Need to blow nose	3.8 (7.9)	55.8 (33.1)*	53.7 (34.4)*	$p = 1$
2. Sneezing	6.0 (9.2)	36.1 (29.7)*	35.1 (28.8)*	$p = 1$
3. Think nasal discharge	3.0 (7.2)	50.9 (32.6)*	46.0 (32.3)*	$p = 0.818$
4. Cough	2.1 (6.2)	30.6 (32.4)*	23.0 (30.1)*	$p = 0.056$
5. Post-nasal discharge	1.1 (4.6)	46.2 (32.0)*	41.1 (35.2)*	$p = 0.420$
6. Runny nose	0.1 (1.7)	41.9 (32.7)*	48.3 (37.2)*	$p = 0.217$
7. Ear fullness	4.8 (14.5)	33.1 (29.5)*	32.6 (33.6)*	$p = 1$
8. Dizziness	4.1 (14.6)	19.8 (27.4)*	19.2 (28.6)*	$p = 1$
9. Ear pain	0.3 (2.4)	15.9 (28.8)*	17.0 (28.3)*	$p = 1$
10. Facial pain/pressure	0.3 (2.4)	28.6 (33.6)*	31.8 (32.9)*	$p = 1$
11. Difficulty falling asleep	11.4 (19.5)	33.9 (35.7)*	47.4 (35.8)*	**$p = 0.002$**

TABLE III.
Comparison of the SNOT-22 Questionnaire Score by Items Between the Three Groups Expressed as a Percentage.

Questionnaire	Control (n = 141)	CRSwNP (n = 118)	Septal Perforation (n = 133)	p-Value
12. Wake up at night	13.2 (20.4)	40.7 (34.7)*	53.7 (33.1)*	**$p = 0.002$**
13. Lack of good night's sleep	12.7 (20.2)	39.3 (36.3)*	57.0 (35.0)*	**$p < 0.001$**
14. Wake up tired	14.0 (21.6)	40.3 (35.1)*	55.6 (33.2)*	**$p < 0.001$**
15. Fatigue	8.2 (16.0)	35.3 (32.1)*	49.8 (34.4)*	**$p < 0.001$**
16. Reduced productivity	6.7 (15.6)	29.1 (32.1)*	41.4 (35.1)*	**$p = 0.002$**
17. Reduced concentration	6.7 (15.2)	29.3 (31.7)*	42.4 (34.4)*	**$p = 0.001$**
18. Frustrated/restless/irritable	7.1 (16.6)	33.4 (34.3)*	48.1 (35.7)*	**$p < 0.001$**
19. Sad	5.1 (14.2)	31.5 (35.6)*	39.4 (34.9)*	$p = 0.106$
20. Embarrassed	8.5 (18.9)	44.9 (36.6)*	41.8 (37.9)*	$p = 1$
21. Decreased sense of taste/smell	0.3 (2.4)	67.1 (34.4)*	41.7 (36.0)*	**$p < 0.001$**
22. Nasal blockage	2.9 (7.0)	67.4 (32.4)*	68.3 (39.7)*	$p = 1$

CRSwNP = chronic rhinosinusitis with nasal polyposis; SD = standard deviation.
*Significant difference between control group compared to CRSwNP and SP groups. p-value: post-hoc Bonferroni comparison between CRSwNP and SP groups. Bold values indicate p ⟨0.05.

Conclusion

- In conclusion, SP produces negative impact on QoL like CRSwNP
- Moreover, sleep, function, and psychologic domains are significantly worse in SP

Summary

- Nasal septum perforation is a multifactorial condition with significant impact on nasal function and patient quality of life.
- Early diagnosis and appropriate management are crucial.
- NSP endoscopy may be useful tools for standardized assessment of NSP outcomes.
- Sleep, function, and psychologic domains are significantly worse in SP than CPSwNP

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