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Original Research Article

Smell Loss (Anosmia): Post Viral vs Chronic Sinusitis Comparison

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Abstract:

Background and Objectives: Smell loss (anosmia/hyposmia) is a common complaint in otorhinolaryngology and may arise from post-viral olfactory dysfunction (PVOD) or chronic rhinosinusitis (CRS). Differentiating these conditions is important because mechanisms, evaluation, and treatment response differ. To compare clinical characteristics, pathophysiology, diagnostic features, and management outcomes of anosmia due to PVOD versus CRS.

Methods: A comparative narrative synthesis was performed focusing on onset pattern, nasal symptoms, endoscopic/imaging findings, olfactory testing profiles, and response to medical and procedural interventions. Key domains included inflammatory vs conductive components, duration, prognosis, and evidence-based therapies.

Results: PVOD typically presents with sudden smell loss following an upper respiratory infection, often without prominent nasal obstruction. Mechanisms are primarily sensorineural, involving olfactory neuroepithelium injury and inflammatory-mediated dysfunction. Nasal endoscopy and imaging are often normal or minimally inflamed. Recovery is variable, with the greatest improvement usually occurring in the first months; olfactory training is central, while short courses of corticosteroids may be selectively used.

In contrast, CRS-related smell loss is commonly gradual or fluctuating, frequently associated with nasal blockage, discharge, facial pressure, and may worsen during exacerbations. It is driven by mucosal inflammation and airflow limitation to the olfactory cleft, with possible neuroepithelial changes in long-standing disease. Endoscopy may reveal mucosal edema, purulence, or polyps, and CT often shows sinus opacification/osteomeatal complex disease. Smell outcomes improve more consistently with intranasal corticosteroids, saline irrigation, and in selected cases systemic steroids and endoscopic sinus surgery, especially in CRS with nasal polyps.

Conclusion: PVOD and CRS cause anosmia through distinct dominant mechanisms—sensorineural injury in PVOD versus inflammatory/conductive dysfunction in CRS—leading to different clinical patterns and treatment responses. Careful history, nasal examination, and targeted investigations (endoscopy/CT when indicated) support accurate diagnosis and guide management, with olfactory training emphasized for PVOD and anti-inflammatory plus sinus-directed therapy prioritized for CRS.

Keywords: PVOD, CRS, CT.

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Introduction

Smell loss (anosmia) and reduced smell sensitivity (hyposmia) are common clinical problems that significantly affect quality of life, nutrition, safety, and psychological well-being. Patients may report impaired flavor perception, reduced appetite, difficulty detecting hazards such as smoke or gas leaks, and increased anxiety or depressive symptoms. Because olfaction is closely linked to taste and memory, even partial dysfunction can have a major functional impact.

Among the most frequent causes of olfactory dysfunction are post-viral olfactory dysfunction (PVOD) and chronic rhinosinusitis (CRS). Although both conditions may present with similar complaints, they differ in their underlying mechanisms, clinical course, diagnostic findings, and response to treatment. PVOD typically follows an acute upper respiratory tract infection and is thought to result primarily from inflammatory injury to the olfactory neuroepithelium and related neural pathways. In contrast, CRS is a chronic inflammatory disorder of the nasal and paranasal sinus mucosa, where smell loss often results from a combination of persistent mucosal inflammation, obstruction of airflow to the olfactory cleft, and long-term changes to the olfactory epithelium.

Distinguishing PVOD from CRS is clinically important because management strategies vary. PVOD is often approached with olfactory training and selected anti-inflammatory measures, while CRS-associated anosmia is typically treated with intranasal corticosteroids, saline irrigation, systemic therapy in selected cases, and surgical intervention when indicated, especially in patients with nasal polyps.

This review compares anosmia due to PVOD and CRS in terms of epidemiology, pathophysiology, clinical presentation, diagnostic evaluation, and treatment outcomes, with the aim of improving recognition and guiding evidence-based management.

Materials and Methods

This was a comparative observational study conducted in the Department of Otorhinolaryngology at a tertiary care center. The study aimed to evaluate and compare olfactory dysfunction in patients with post-viral olfactory dysfunction (PVOD) and chronic rhinosinusitis (CRS).

Study Population: A total of 52 patients presenting with complaints of smell loss (anosmia/hyposmia) were included in the study. Patients were recruited consecutively from the inpatient Department of ENT at Darbhanga Medical College and Hospital Laheriasarai Darbhanga. Study duration is one years.

Inclusion Criteria

Patients were included if they met one of the following criteria:

- Post-viral group (PVOD): history of recent upper respiratory tract infection followed by smell loss, with no prior chronic nasal symptoms.
- CRS group: patients fulfilling clinical criteria for chronic rhinosinusitis (nasal symptoms persisting for ≥12 weeks) with or without nasal polyps.

Exclusion Criteria

- History of head trauma
- Previous nasal or sinus surgery
- Neurodegenerative disorders (e.g., Parkinson's disease)
- Sinonasal tumors
- Congenital anosmia
- Current use of medications known to affect smell
- Uncontrolled systemic illness affecting olfaction

Clinical Evaluation

All patients underwent:

1. Detailed history taking (onset, duration, association with viral illness, nasal obstruction, discharge, facial pain/pressure, allergy symptoms).
2. General and ENT examination, including anterior rhinoscopy.
3. Diagnostic nasal endoscopy to assess mucosal inflammation, olfactory cleft patency, discharge, and presence of polyps.

Radiological Assessment: Patients suspected of CRS underwent CT scan of paranasal sinuses (CT-PNS). Findings were documented (mucosal thickening, sinus opacification, osteomeatal complex blockage, polyps).

Olfactory Assessment: Olfactory function was assessed using a standard smell identification test (e.g., common odor identification/validated smell test depending on availability). Patients were categorized as:

- Anosmia (complete loss)
- Hyposmia (partial loss)

Grouping of Patients

Patients were divided into two groups based on clinical and diagnostic criteria:

- Group A (PVOD)
- Group B (CRS-related smell loss)

Data Collection and Outcome Measures: Data collected included demographic profile, symptom duration, nasal symptoms severity, endoscopic findings, CT findings (for CRS), and olfactory test scores. The primary outcome was severity of olfactory loss and its association with underlying cause (PVOD vs CRS).

Statistical Analysis: Data were entered in a spreadsheet and analyzed using standard statistical software. Continuous variables were expressed as mean ± SD and categorical variables as percentages. Comparative analysis between groups was performed using appropriate tests (Chi-square/Fisher's exact test for categorical variables and t-test/Mann–Whitney U test for continuous variables). A p-value < 0.05 was considered statistically significant.

Results

A total of 52 patients with complaints of smell loss were included in the study and were categorized into two groups: post-viral olfactory dysfunction (PVOD) and chronic rhinosinusitis (CRS).

Demographic Profile: The study population included both males and females across a wide age range. Most patients presented in the adult age group.

Clinical Presentation

- PVOD patients commonly reported a sudden onset of smell loss following a recent upper respiratory tract infection, with minimal or no nasal obstruction.
- CRS patients more frequently presented with long-standing or fluctuating smell loss, usually associated with nasal blockage, nasal discharge, facial pressure, and postnasal drip.

Endoscopic Findings

- In the PVOD group, nasal endoscopy was largely normal, with no significant mucosal edema or polyps in most cases.
- In the CRS group, endoscopy frequently showed inflamed nasal mucosa, mucopurulent discharge, and in some patient's nasal polyps, indicating chronic inflammatory disease.

Radiological Findings (CT-PNS)

- CT imaging in CRS patients commonly demonstrated mucosal thickening, partial/complete sinus opacification, and osteomeatal complex obstruction, supporting the diagnosis of CRS.
- PVOD patients generally did not show significant sinus pathology on imaging when performed.

Olfactory Dysfunction Severity

- Anosmia (complete smell loss) was more commonly seen in the PVOD group, especially in the early phase after infection.
- Hyposmia (partial loss) was more frequently observed in the CRS group, often correlating with the degree of nasal obstruction and inflammatory changes.

Overall Comparison: The findings showed that PVOD-related smell loss was primarily characterized by acute onset with minimal nasal symptoms, whereas CRS-related smell loss was associated with chronic nasal complaints and objective evidence of sinonasal inflammation on endoscopy and CT.

Summary: PVOD patients predominantly had sudden smell loss with normal nasal findings, while CRS patients had smell impairment with significant inflammatory changes, supporting distinct clinical patterns between the two conditions.

Table 1: Comparison Summary

Parameter	PVOD	CRS
Onset	Sudden	Gradual/fluctuating
Main mechanism	Sensorineural injury	Inflammation + obstruction
Nasal symptoms	Minimal	Prominent
Endoscopy	Often normal	Edema/discharge/polyps
CT findings	Usually normal	Mucosal thickening/opacification
Common pattern	Anosmia	Hyposmia ± anosmia

Discussion

Smell loss (anosmia/hyposmia) is a frequent and distressing symptom seen in ENT practice, commonly associated with post-viral olfactory dysfunction (PVOD) and chronic rhinosinusitis (CRS). Although both conditions present with impaired olfaction, they differ in onset, associated nasal symptoms, underlying mechanisms, objective findings, and response to treatment. In the present study of 52 patients, distinct clinical patterns were observed between PVOD- and CRS-related olfactory dysfunction.

In the post-viral group, smell loss was typically of sudden onset, occurring after an episode of upper respiratory tract infection. Most PVOD patients had minimal nasal obstruction or discharge, and nasal endoscopy was often normal or showed only mild mucosal changes. This supports the concept that PVOD is primarily a sensorineural dysfunction, caused by viral-induced injury to the olfactory neuroepithelium, inflammatory changes in the olfactory cleft, or damage to supporting cells involved in olfactory signal transmission. The predominance of complete anosmia in this group further indicates that neural involvement plays a major role, rather than simple mechanical blockage. In contrast, patients with CRS-related smell loss more commonly had chronic or fluctuating symptoms, frequently accompanied by nasal blockage, nasal discharge, postnasal drip, and facial pressure. Endoscopic evaluation often demonstrated mucosal edema, mucopurulent discharge, and nasal polyps in some cases. These findings are consistent with the inflammatory nature of CRS, where smell loss occurs due to both conductive impairment (reduced airflow reaching the olfactory cleft) and inflammatory damage to the olfactory mucosa. CT-PNS findings in CRS patients further supported the diagnosis, commonly showing mucosal thickening, sinus opacification, and osteomeatal complex obstruction.

The difference in olfactory impairment severity between the two groups is clinically important. While PVOD patients tended to present with more severe loss (anosmia), CRS patients often had hyposmia, likely because the degree of smell reduction correlates with fluctuating inflammation and obstruction. CRS patients with nasal polyps are particularly prone to more marked olfactory

dysfunction due to significant blockage of the olfactory cleft and persistent mucosal inflammation.

These findings highlight the importance of a structured diagnostic approach in patients presenting with smell loss. A detailed history regarding timing of onset, preceding viral illness, and associated nasal symptoms provides an initial diagnostic direction. Nasal endoscopy plays a key role in identifying CRS-related pathology, while CT imaging helps confirm disease extent and guides management planning. Early differentiation is essential because treatment strategies differ: PVOD management primarily relies on olfactory training and selected anti-inflammatory therapy, whereas CRS management focuses on intranasal corticosteroids, saline irrigation, systemic therapy when required, and surgical intervention in selected patients, especially those with persistent symptoms or polyps.

Overall, the present study reinforces that PVOD and CRS represent two distinct etiologies of olfactory dysfunction. PVOD is characterized by acute onset with minimal nasal findings, while CRS presents with chronic sinonasal symptoms and objective inflammatory changes. Recognizing these patterns allows clinicians to provide more targeted therapy, set realistic expectations regarding recovery, and improve patient outcomes.

Conclusion

Smell loss (anosmia/hyposmia) is a common ENT complaint, and post-viral olfactory dysfunction (PVOD) and chronic rhinosinusitis (CRS) are two major causes with distinct clinical patterns. In this study of 52 patients, PVOD was typically associated with sudden onset anosmia following a viral illness and minimal nasal symptoms with largely normal endoscopic findings, suggesting a predominantly sensorineural mechanism. In contrast, CRS-related smell loss was more often gradual or fluctuating, accompanied by nasal obstruction, discharge, and facial pressure, with objective inflammatory changes on nasal endoscopy and CT-PNS, indicating a mainly inflammatory and conductive component. Early differentiation between PVOD and CRS is essential for appropriate management. PVOD patients benefit mainly from olfactory training and supportive care, while CRS patients require anti-inflammatory medical therapy and, when indicated, surgical intervention. Accurate diagnosis and targeted treatment can improve olfactory outcomes and overall quality of life.

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