Patient-Reported Improvement in Facial Skin Appearance Following Submucosal Diathermy in Patients with Allergic Rhinitis - A Prospective Study

ABSTRACT:

Background

Allergic rhinitis (AR) is a common chronic inflammatory disorder of the upper respiratory tract characterized by symptoms such as sneezing, rhinorrhea, nasal itching and nasal obstruction. In patients with long-standing nasal allergy, particularly those with chronic nasal obstruction and mouth breathing, characteristic facial features collectively referred to as *allergic facies* may develop. These include allergic shiners, Dennie-Morgan folds, transverse nasal crease, allergic salute, open-mouth breathing, high-arched palate or dental malocclusion, and changes in the upper lip and columella.

Submucosal diathermy (SMD) is a commonly performed turbinate-reduction procedure intended primarily to improve nasal airflow. Although functional improvement following turbinate surgery has been extensively assessed, patient-perceived changes in facial appearance following improvement in nasal breathing have received relatively little attention.

Aim

To prospectively assess patient-reported improvement in facial appearance and nasal symptoms following submucosal diathermy in patients with allergic rhinitis and to explore the relationship between improvement in nasal obstruction, sleep quality and perceived facial appearance.

Methods

This prospective study included patients diagnosed with allergic rhinitis who underwent submucosal diathermy for symptomatic inferior turbinate hypertrophy. Patients were clinically assessed before surgery and during postoperative follow-up. Nasal symptoms were assessed using the Total Nasal Symptom Score (TNSS), consisting of sneezing, rhinorrhea, nasal itching and nasal obstruction, with each symptom graded from 0 to 3. Allergic facies was clinically assessed using a seven-point score, with one point assigned for each characteristic feature. Patient-reported changes in facial appearance, including periorbital darkness, facial puffiness and overall facial freshness, were documented during follow-up.

Results

Following submucosal diathermy, patients reported improvement in nasal breathing and a subjective improvement in facial appearance. The reported facial changes included reduction in the appearance of periorbital dark circles, decreased facial puffiness and a fresher facial appearance. The improvement was predominantly noticed during the period of approximately 4–12 weeks following surgery, corresponding with resolution of postoperative turbinate edema and establishment of improved nasal breathing. The perceived facial improvement appeared to be more closely associated with relief of nasal obstruction and improved sleep than with improvement in sneezing and rhinorrhea.

Conclusion

Submucosal diathermy, while primarily a functional nasal procedure, may be associated with a secondary patient-perceived improvement in facial appearance in patients with allergic rhinitis. Improved nasal airflow, reduced mouth breathing, better sleep and reduction in nasal rubbing may contribute to these changes. Facial

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appearance considered a secondary perceived benefit rather than a primary cosmetic indication for SMD. Further prospective studies using objective assessment of facial pigmentation and validated patient-reported aesthetic outcome instruments are required.

Keywords: Allergic rhinitis; allergic facies; submucosal diathermy; inferior turbinate; allergic shiners; nasal obstruction; facial appearance; patient-reported outcome.

INTRODUCTION

Allergic rhinitis is a chronic inflammatory disorder of the nasal mucosa characterized by recurrent sneezing, rhinorrhea, nasal itching and nasal obstruction. Persistent nasal obstruction may have consequences extending beyond the nose, particularly in patients with long-standing disease.

Chronic nasal allergy can produce characteristic facial changes commonly described as **allergic facies**. These features include allergic shiners, Dennie-Morgan folds, transverse nasal crease, allergic salute, open-mouth breathing, high-arched palate or dental malocclusion, and changes involving the upper lip and columella. The attached clinical framework describes a seven-point allergic facies score, with one point allocated to each feature. A score of 0–2 indicates absence of allergic facies, 3–4 indicates mild allergic facies, and 5–7 indicates severe or classical allergic facies.

The severity of nasal symptoms can be assessed using the **Total Nasal Symptom Score (TNSS)**. The score evaluates four major symptoms—sneezing, rhinorrhea, nasal itching and nasal obstruction—with each symptom graded from 0 to 3, resulting in a maximum score of 12. The supplied study framework categorizes TNSS scores of 0–3 as mild, 4–8 as moderate and 9–12 as severe allergic rhinitis.

Submucosal diathermy is performed to reduce inferior turbinate volume and improve nasal airflow in appropriately selected patients. Traditionally, the success of nasal surgery is assessed by improvement in nasal obstruction, symptom scores and quality of life. However, patients may also perceive changes in facial appearance following restoration of nasal breathing.

The supplied study rationale highlights that allergic rhinitis is associated with visible facial stigmata such as allergic shiners, Dennie-Morgan folds, allergic crease and a dull or puffy facial appearance. It also identifies a relative lack of documentation regarding patients' perception of facial aesthetic improvement following treatment of nasal obstruction.

The present prospective study was therefore designed to assess patient-reported changes in facial appearance following submucosal diathermy in patients with allergic rhinitis and to examine these changes alongside improvement in nasal symptoms.

AIM AND OBJECTIVES

Aim

To evaluate patient-reported improvement in facial appearance and nasal symptoms following submucosal diathermy in patients with allergic rhinitis.

Objectives

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1. To assess nasal symptom severity using the Total Nasal Symptom Score.
2. To clinically assess allergic facies using a seven-point clinical score.
3. To document patient-reported changes in facial appearance following SMD.
4. To assess perceived changes in periorbital dark circles and facial puffiness.
5. To assess the relationship between improvement in nasal breathing and perceived facial appearance.
6. To identify the postoperative period during which facial improvement is most commonly perceived.

MATERIALS AND METHODS

Study Design

This was designed as a **prospective observational study** conducted among patients with allergic rhinitis who underwent submucosal diathermy of the inferior turbinates for symptomatic nasal obstruction.

Study Population

Patients diagnosed clinically with allergic rhinitis and having symptomatic nasal obstruction associated with inferior turbinate hypertrophy were considered for inclusion.

The study focused on patients undergoing SMD as part of functional management of their nasal symptoms. Facial improvement was considered a secondary patient-reported outcome and not the primary indication for surgery.

Clinical Assessment

Patients were assessed clinically before surgery and during postoperative follow-up.

The baseline assessment included:

- History of sneezing
- Rhinorrhea
- Nasal itching
- Nasal obstruction
- Mouth breathing
- Sleep-related complaints
- Presence of allergic facies features
- Patient perception of facial appearance

Total Nasal Symptom Score

TNSS consisted of four symptoms:

Symptom	0	1	2	3
Sneezing	None	1–4/day	5–10/day	>10/day/bouts
Rhinorrhea	None	Occasional	Frequent, requires tissue	Continuous/dripping
Nasal itching	None	Occasional	Frequent/irritating	Constant/intolerable
Nasal block	None	Occasional mouth breathing	Frequent mouth breathing	Complete nasal obstruction

The total score ranged from **0 to 12**.

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TNSS Interpretation

TNSS	Severity
0–3	Mild allergic rhinitis
4–8	Moderate allergic rhinitis
9–12	Severe allergic rhinitis

The TNSS framework and symptom definitions were taken from the supplied study material.

ALLERGIC FACIES ASSESSMENT

A seven-point clinical allergic facies score was used. Each feature was assigned one point when clinically present.

Clinical feature	Score Absent/Present
Allergic shiners	0/1
Dennie-Morgan fold	0/1
Transverse nasal crease	0/1
Allergic salute	0/1
Open-mouth breathing	0/1
High-arched palate / dental malocclusion	0/1
Short upper lip / retracted columella	0/1
Maximum score	**7**

The supplied clinical framework defines allergic shiners as dark circles around the eyes associated with venous stasis, Dennie-Morgan folds as additional creases below the lower eyelids, and transverse nasal crease as a horizontal line over the nasal dorsum associated with the allergic salute.

Interpretation

Score	Interpretation
0–2	No allergic facies
3–4	Mild allergic facies
5–7	Severe/classical allergic facies

ASSESSMENT OF FACIAL APPEARANCE

Patient-reported facial appearance was assessed during follow-up.

Particular attention was given to:

1. Periorbital dark circles/allergic shiners.
2. Facial puffiness.

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3. Overall facial freshness.
4. Changes perceived after improvement in nasal breathing.
5. Changes associated with reduction in mouth breathing.
6. Changes in nasal rubbing/allergic salute.

The study specifically considered facial appearance as a **patient-reported secondary outcome**, rather than an indication for cosmetic surgery.

SURGICAL PROCEDURE

Patients underwent submucosal diathermy of the inferior turbinates according to the institutional surgical protocol.

The objective of the procedure was reduction of inferior turbinate volume and improvement of nasal airway resistance. Postoperative patients were followed clinically to assess nasal symptom improvement and perceived facial changes.

FOLLOW-UP

Postoperative assessment was performed during follow-up, with particular attention to the period between **4 and 12 weeks**, when postoperative turbinate edema was expected to have settled and improved nasal breathing to have become established.

The supplied study material indicates that subjective facial improvement was most commonly noticed during this period.

RESULTS

Improvement in Nasal Symptoms

Following submucosal diathermy, patients reported improvement in nasal breathing. The improvement was particularly associated with reduction in nasal obstruction.

The supplied study material indicates that perceived facial improvement correlated more closely with improvement in nasal obstruction and sleep quality than with improvement in allergic symptoms such as sneezing and rhinorrhea.

Patient-Reported Facial Changes

The principal facial changes reported following SMD included:

Patient-reported outcome	Observed change
Periorbital dark circles	Subjective reduction
Facial puffiness	Subjective reduction
Overall facial appearance	Fresher appearance
Nasal breathing	Improved
Mouth breathing	Reduced with improved nasal airflow
Sleep quality	Subjective improvement
Nasal rubbing	Reduced in some patients

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The supplied material describes a significant proportion of patients reporting subjective improvement in periorbital dark circles, reduced facial puffiness and a fresher appearance following SMD.

Timing of Improvement

The reported facial improvement was predominantly noticed between **4 and 12 weeks after surgery**, coinciding with resolution of turbinate edema and establishment of improved nasal breathing.

DISCUSSION

Allergic rhinitis is commonly regarded as a disorder primarily affecting the nasal mucosa. However, long-standing nasal obstruction and chronic mouth breathing may be associated with characteristic facial features collectively described as allergic facies.

The seven clinical features used in this study—allergic shiners, Dennie-Morgan folds, transverse nasal crease, allergic salute, open-mouth breathing, high-arched palate/dental malocclusion and short upper lip/retracted columella—provide a simple clinical framework for identifying these features.

The principal observation in the present study was that patients perceived improvement not only in nasal symptoms but also in aspects of facial appearance. The most frequently described changes included reduction in periorbital darkness, reduction in facial puffiness and a fresher overall appearance.

An important observation was that perceived facial improvement appeared to correlate more closely with improvement in nasal obstruction and sleep quality than with reduction in sneezing and rhinorrhea. This suggests that improved nasal airflow and reduction in chronic mouth breathing may play an important role in the perceived facial changes.

Possible Mechanisms

Several mechanisms may explain this observation.

1. Hemodynamic mechanism

Chronic nasal obstruction may contribute to venous congestion in the facial and periorbital circulation. The supplied study framework proposes that increased venous pressure in the pterygoid plexus may contribute to retrograde congestion of ophthalmic and angular venous pathways, clinically manifesting as allergic shiners. Reduction in turbinate volume and restoration of nasal airflow may improve this component of venous congestion.

2. Sleep and nasal breathing

Improved nasal breathing following SMD may reduce chronic mouth breathing and improve sleep quality. Better sleep and reduced morning facial edema may contribute to a fresher facial appearance and perceived improvement in skin appearance.

3. Reduction in nasal rubbing

Repeated upward rubbing of the nose, or the allergic salute, may contribute to mechanical irritation and development of the transverse nasal crease. Reduction in nasal symptoms may reduce the frequency of nasal rubbing and consequently reduce associated skin irritation.

Comparison with Existing Literature

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The supplied study material notes that allergic facies has been extensively described in allergy literature, while relatively few studies have specifically documented the reversibility of these facial features after treatment.

Similarly, studies evaluating septoplasty and turbinate surgery have traditionally focused on nasal airflow, symptom improvement, sleep and quality of life. Patient-reported facial aesthetic improvement represents an additional patient-reported outcome that may be relevant when counselling selected patients.

The present study therefore introduces a patient-reported dimension to functional nasal surgery. It does not suggest that SMD is a cosmetic procedure; rather, any perceived improvement in facial appearance regarded as a possible secondary benefit of improved nasal function.

CLINICAL IMPLICATIONS

The findings may have implications for counselling patients with allergic rhinitis who are concerned about facial appearance, particularly patients who report concerns regarding allergic shiners or facial puffiness.

Patients should, however, be clearly informed that:

- The primary purpose of SMD is improvement of nasal airflow.
- Facial improvement is a potential secondary benefit.
- SMD should not be presented as a cosmetic procedure.
- Facial appearance may be influenced by several factors unrelated to nasal obstruction.

The supplied material specifically emphasizes the distinction between functional nasal surgery and cosmetic treatment.

LIMITATIONS

The study has several limitations.

First, assessment of facial appearance was primarily subjective and dependent on patient perception.

Second, no objective colorimetric or spectrophotometric measurement was used to quantify periorbital pigmentation.

Third, standardized preoperative and postoperative photographs using identical lighting, camera distance and positioning were not available.

Fourth, potentially confounding factors such as use of anti-allergic medications, skincare practices and sleep hygiene were not completely controlled.

Finally, the study was conducted at a single centre, which may limit generalizability. These limitations are also identified in the supplied study material.

FUTURE DIRECTIONS

Future prospective studies could improve objective assessment by incorporating:

1. Objective measurement of skin pigmentation using a luxameter or similar device.
2. Standardized preoperative and postoperative facial photography.
3. A validated aesthetic patient-reported outcome questionnaire such as FACE-Q.

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4. Comparison between SMD and medical therapy alone.
5. Longer follow-up at 6 months and 1 year.
6. Correlation of changes in TNSS with changes in allergic facies score.

These approaches may help determine whether the perceived improvement in facial appearance represents a reproducible consequence of improved nasal function.

ETHICAL CONSIDERATIONS

The study conducted after obtaining approval from the appropriate Institutional Ethics Committee.

Written informed consent obtained from all participants before enrolment.

If facial photographs are used for academic publication, specific written consent for publication of the photographs obtained. The supplied material recommends documenting that patient consent for the use of facial photographs for academic purposes has been obtained.

Because facial photographs may permit identification of a patient even when other identifiers are removed, appropriate consent is particularly important in studies evaluating facial appearance.

CONCLUSION

Submucosal diathermy is primarily performed to improve nasal airflow in patients with symptomatic inferior turbinate hypertrophy associated with allergic rhinitis. In addition to improvement in nasal symptoms, the present study suggests that patients may perceive a secondary improvement in facial appearance following restoration of nasal breathing.

The reported changes included reduction in the perception of periorbital dark circles, reduced facial puffiness and a fresher overall appearance. These changes appeared to be associated more closely with improved nasal obstruction and sleep quality than with improvement in sneezing and rhinorrhea.

Possible mechanisms include improvement in facial venous congestion, reduction in mouth breathing and morning facial edema, improved sleep, and reduction in repetitive nasal rubbing.

Nevertheless, these findings interpreted as a **patient-reported secondary benefit rather than a cosmetic indication for SMD**. Objective assessment using standardized photography, pigmentation measurement and validated aesthetic outcome instruments is required in future studies.

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