

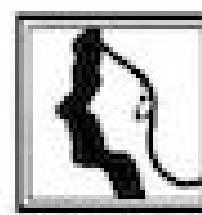
Clinical Outcomes and Cost-Effectiveness of Bipolar Radiofrequency Transmural Ablation Using a Bipolar Submucosal RF Probe for Inferior Turbinate Hypertrophy: A Retrospective Chart Review



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INTRODUCTION

- Inferior Turbinate Hypertrophy (ITH) is a major contributor to nasal obstruction for pediatric and adult patients.¹
- While conservative management remains the first line treatment, there are surgical procedures that have evolved to treat refractory ITH.^{1,2}
- Microdebrider-assisted Turbinoplasty (MAIT) and Radiofrequency Ablation (RFA) are the dominant techniques used.³
- There remains a lack of consensus on optimal technique between the two.
- There is limited data on specific devices, technique consistency, long-term revision rates, and complication rates in larger cohorts.

OBJECTIVES

- Evaluate the clinical outcomes, safety profile, and durability of inferior turbinate reduction using bipolar radiofrequency transmural ablation with the bipolar submucosal RF probe in a real-world patient cohort
- Assess postoperative symptom improvement, complication rates—including bleeding, crusting, infection, and mucosal injury—and the need for revision procedures over time.
- We hypothesize the transmural bipolar RFA provides effective and sustained relief of nasal obstruction, supporting its role as a reliable, mucosa-sparing technique.



Bipolar Submucosal Radio Frequency Turbinate Probe

METHODS

- Retrospective chart review from December 2004 to July 2025
- Inclusion criteria: 18 years or older who had a diagnosis of ITH refractory to medical management and underwent reduction using the bipolar submucosal RFA probe, a 4 & 2.8 MHz dual frequency radio frequency generator unit, and had adequate postoperative follow-up documentation
- Data Collection: demographics; relevant comorbidities; pre-op symptoms; operative variables; early, intermediate, and late post-operative outcomes; self-described symptom changes
- Analysis: data was collected and coded using a predefined codebook, analyzed using Wilcoxon signed-rank test and Fisher's Exact test.

RESULTS

Patient & Operative Characteristics

- 155 patients, mean age 39 years, 62.5% male
- Allergic rhinitis was the most common relevant comorbidity (n=81, 52.3%);
- 147 patients (94.8%) underwent ≥1 concurrent procedure

Symptomatic Improvement

- Patient-reported symptomatic improvement increased from 59.8% at early follow-up to 79.8% at intermediate follow-up and remained durable at long-term follow-up (**72.7%**).
- Improvement from early to intermediate follow-up was **statistically significant (p<0.001)**.

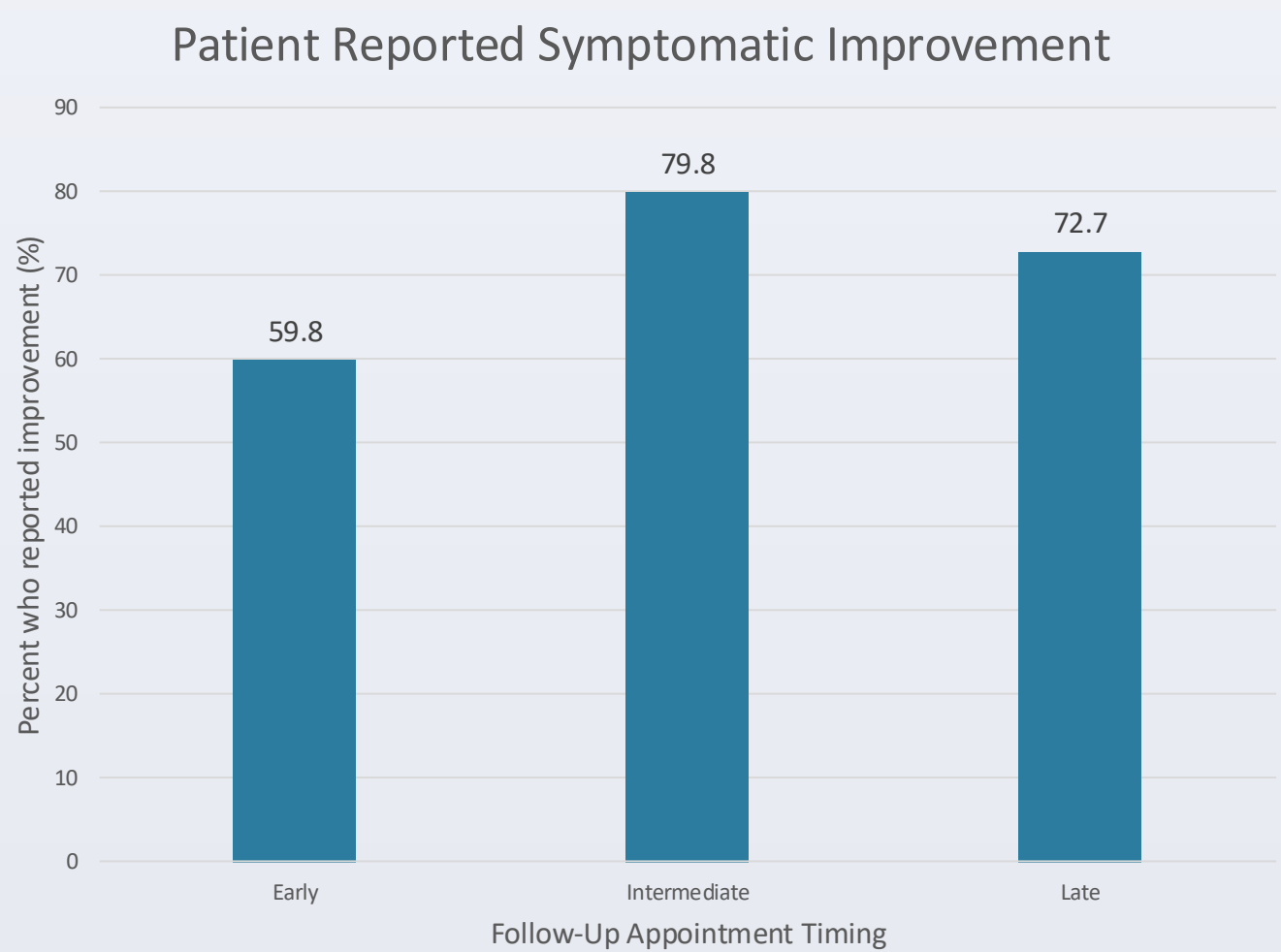


Figure 1. Patient-Reported Symptomatic Improvement Over Time

Presence of Postoperative Crusting

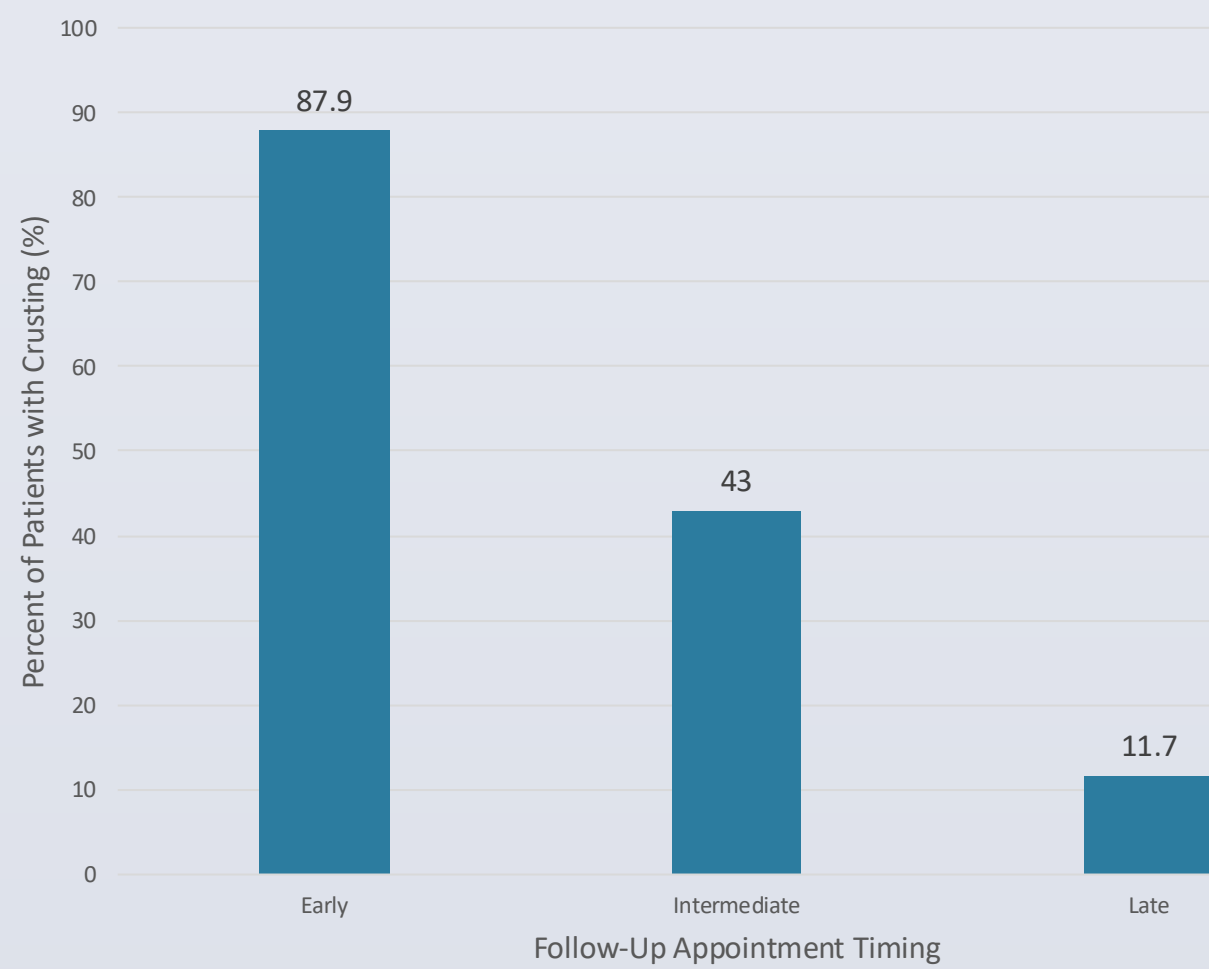


Figure 2. Postoperative Crusting Over Time

Postoperative Crusting & Mucosal Healing

- Postoperative crusting **decreased significantly over time (p<0.001)**.
- The proportion of patients with no crusting increased from 12.1% at early follow-up to 57.0% at intermediate and 88.3% at long-term follow-up.
- Moderate-to-severe crusting was uncommon beyond the early postoperative period, with no severe crusting observed at intermediate or long-term follow-up.

Association Between Crusting & Symptom Improvement

- At intermediate follow-up, patients without crusting were significantly more likely to report symptomatic improvement than patients with persistent crusting.
- Symptomatic improvement was reported by 90.3% of patients without crusting compared with 64.3% of patients with persistent crusting (**p=0.002**).

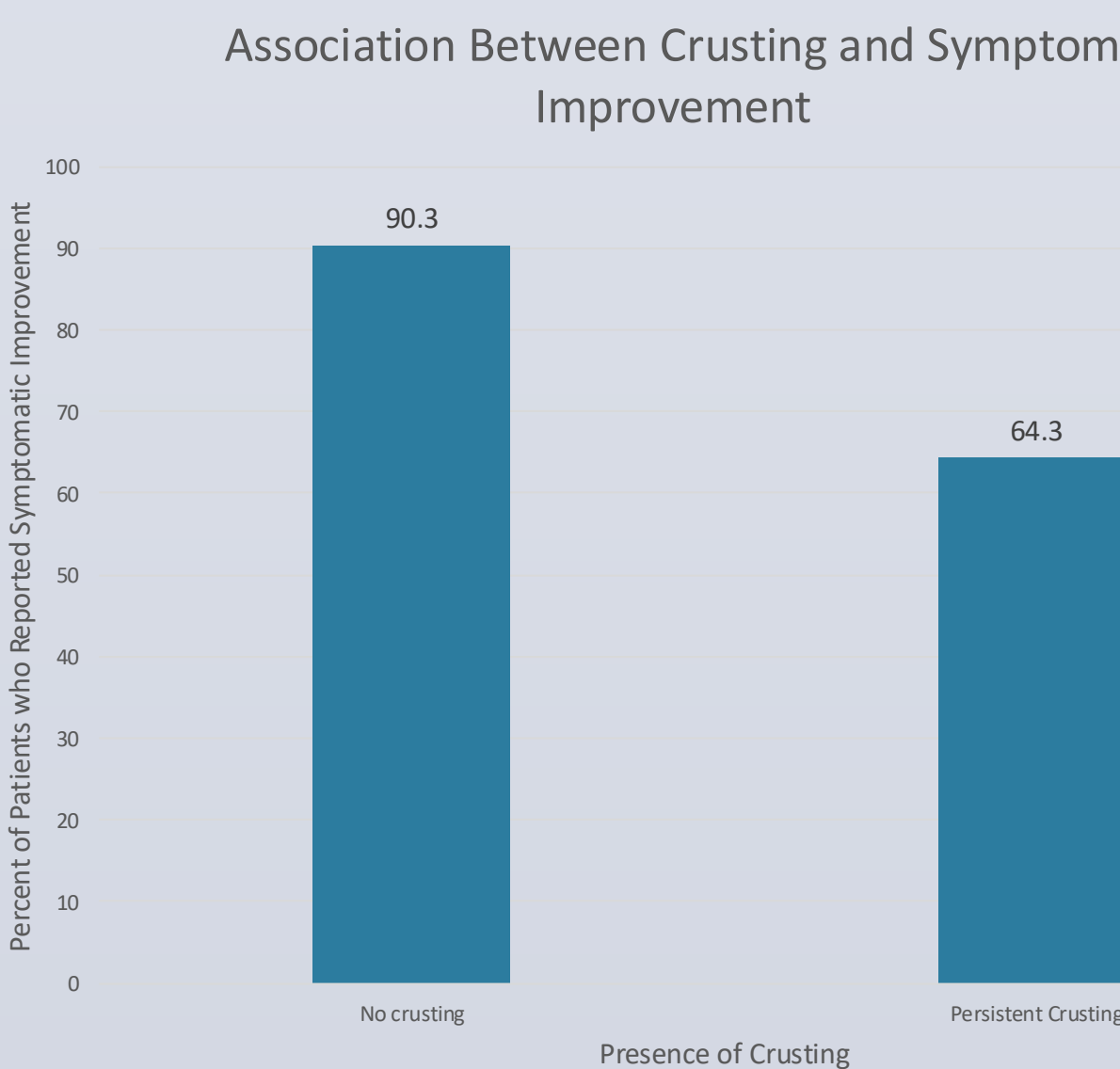


Figure 3. Symptomatic Improvement by Crusting Status

Safety & Complications

- 1 patient (0.6%) immediate post-surgical epistaxis
- 28 patients (18.1%) required immediate postoperative packing/cautery, and 15 (9.7%) contacted the office for postoperative pain.
- Surgical site infections were uncommon
- No surgery-related infections were identified at long-term follow-up
- Minimal mucosal injury and a low rate of procedure-related complications.

DISCUSSION

Key Findings

- Crusting continues to be a clinically important factor contributing to patient outcomes.
- Patients experiencing less crusting will yield improved symptomatic relief overtime.
- The submucosal bipolar RF probe demonstrates durable symptomatic improvement, preserved mucosal integrity, and minimal complications, creating an optimal alternative to invasive tissue removal techniques that prioritize efficiency, bleeding control, and patient recovery.
- Possible cost-effective procedure

Limitations

- Retrospective study.
- Assessment of postoperative symptom improvement was subjective.
- Attrition rates of follow-up visits.
- Patients undergoing multiple procedures at once.

FUTURE DIRECTIONS

- Conduct prospective study with a better standardized approach.
- Continued investigations into additional variables that contribute to mucosal healing outcomes.
- Future studies directly comparing different inferior turbinate hypertrophy reduction techniques.
- Multi-institutional studies with variable patient populations to increase generalizability and validity

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- 3.) Smith DH, Daines BS, Cazzaniga J, Bhandarkar ND. Surgical Management of Inferior Turbinate Hypertrophy in the Era of Widespread Communicable Disease. *Cureus*. 2023;15(1):e34280. doi:10.7759/cureus.34280