Medtronic

Inferior Turbinate Reduction

DISCUSSION AND SURGICAL TECHNIQUE

INFERIOR TURBINATE REDUCTION

Chronic inferior turbinate hypertrophy is a common cause of nasal obstruction that can have significant effects on quality of life.[1] As the role and importance of the inferior turbinate (IT) has become more evident through research, so has the evolution of minimally invasive treatment strategies and technologies to address turbinate hypertrophy.

Thermal technologies, such as laser and radiofrequency (RF), have gained popularity in recent years. With the advent of RF techniques, thermal technologies represent 41% of all published studies regarding IT reduction over the past decade.[2]

This brochure will present a snapshot of studies related to minimally invasive treatment strategies. However, it does not represent the entire body of work related to IT reduction techniques or past and present technologies currently in use.

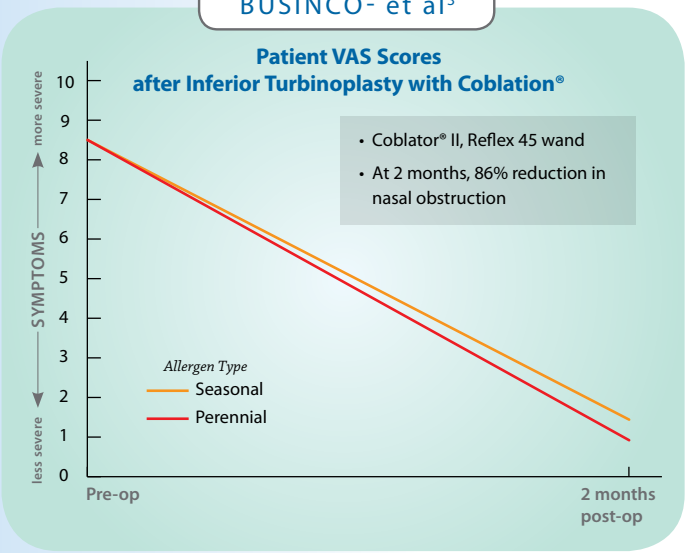
Assessing the Effectiveness of Inferior Turbinate Reduction

There are a variety of ways to evaluate surgical results, but the most direct method is to ask patients how they feel. The **Visual Analog Scale (VAS)** is a subjective measurement tool that evaluates the patient's perception of his or her nasal health. This evaluation usually includes rating the severity of symptoms such as rhinorrhea, snoring, sneezing, and, most importantly, nasal obstruction. Answers usually range from 0 (no symptoms) to 10 (the most severe symptoms).

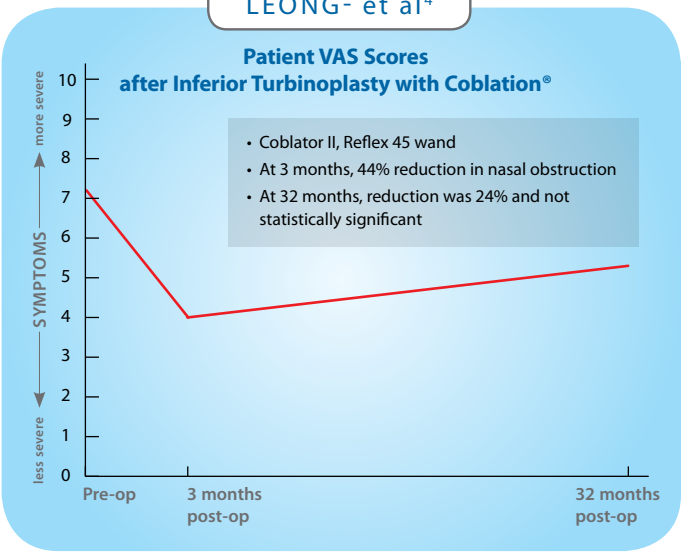
The charts that follow represent VAS scores for nasal obstruction from several different studies using various methods and technologies. Surgeons should weigh the reduction in symptoms, duration of relief, and potential risks when discussing treatment options with their patients.

THERMAL TECHNIQUES AND NASAL OBSTRUCTION SCORES

BUSINCO- et al[3]



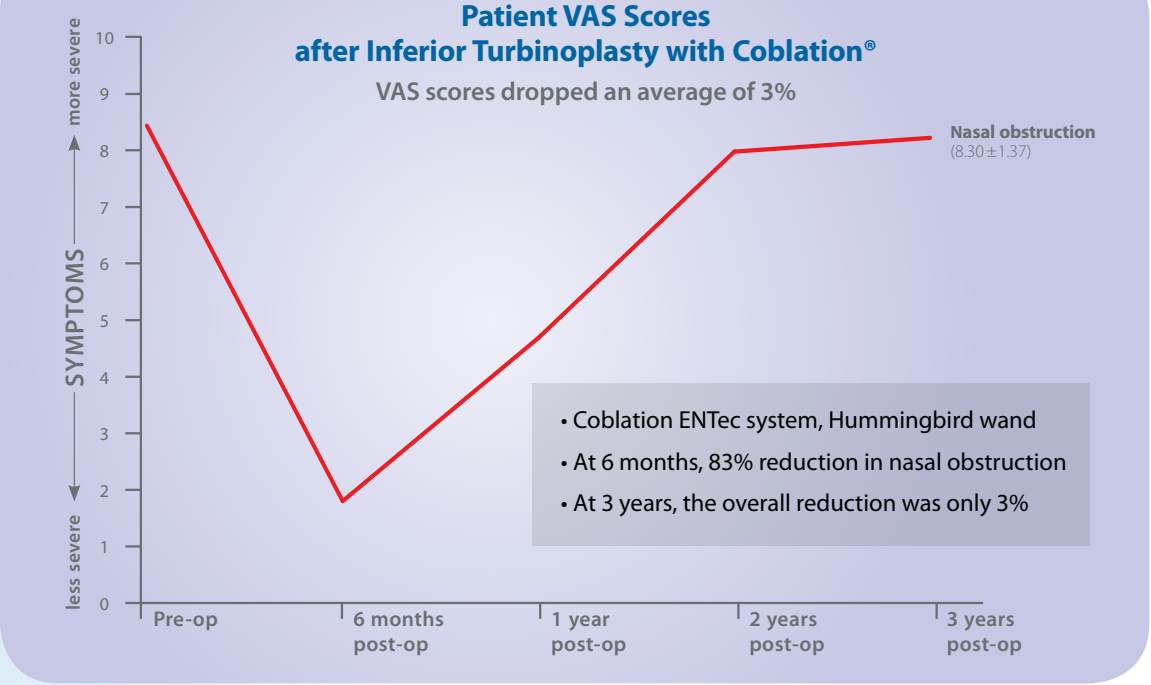
LEONG- et al[4]



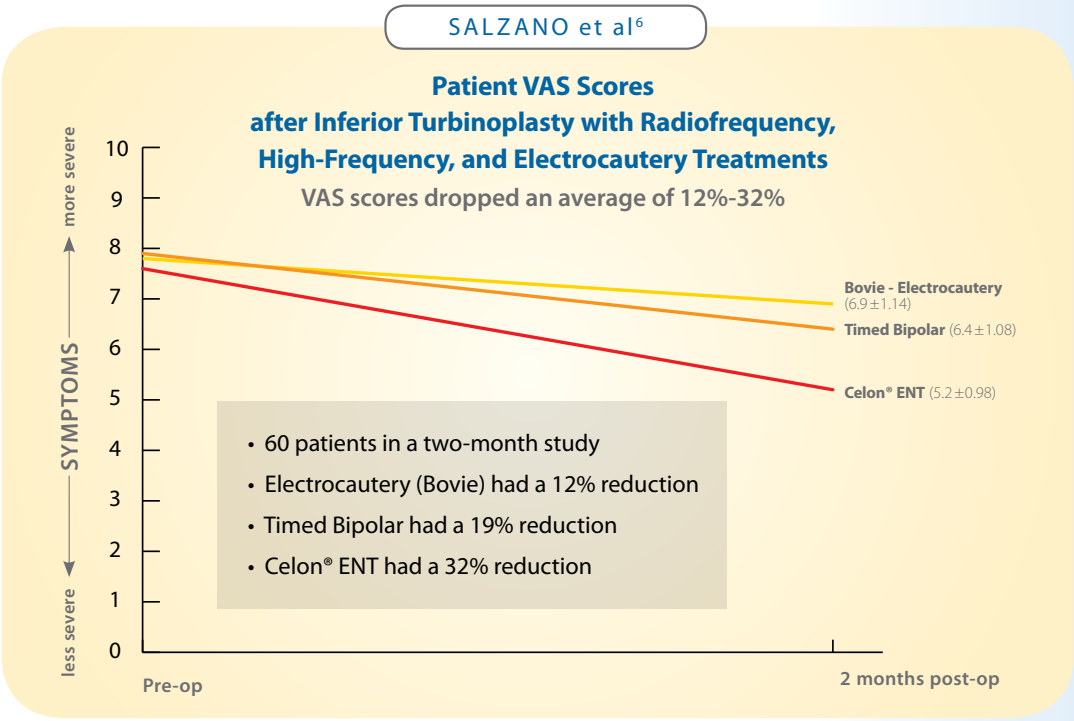
Summary

In one study using the Coblator® II and Reflex 45 wand, Businco et al[3] found that this treatment decreased nasal obstruction by 86% after two months of follow-up. Using the same generation technology, Leong et al[4] found a 44% reduction in nasal obstruction scores at 3 months; however, at 32 months, the reduction in nasal obstruction was only 24% and not statistically significant. In another study with an older generation system and wand, Liu et al[5] found significant reduction (83%) at 6 months post treatment, however, at 3 years, the reduction in nasal obstruction declined to 3%.

LIU- et al[5]



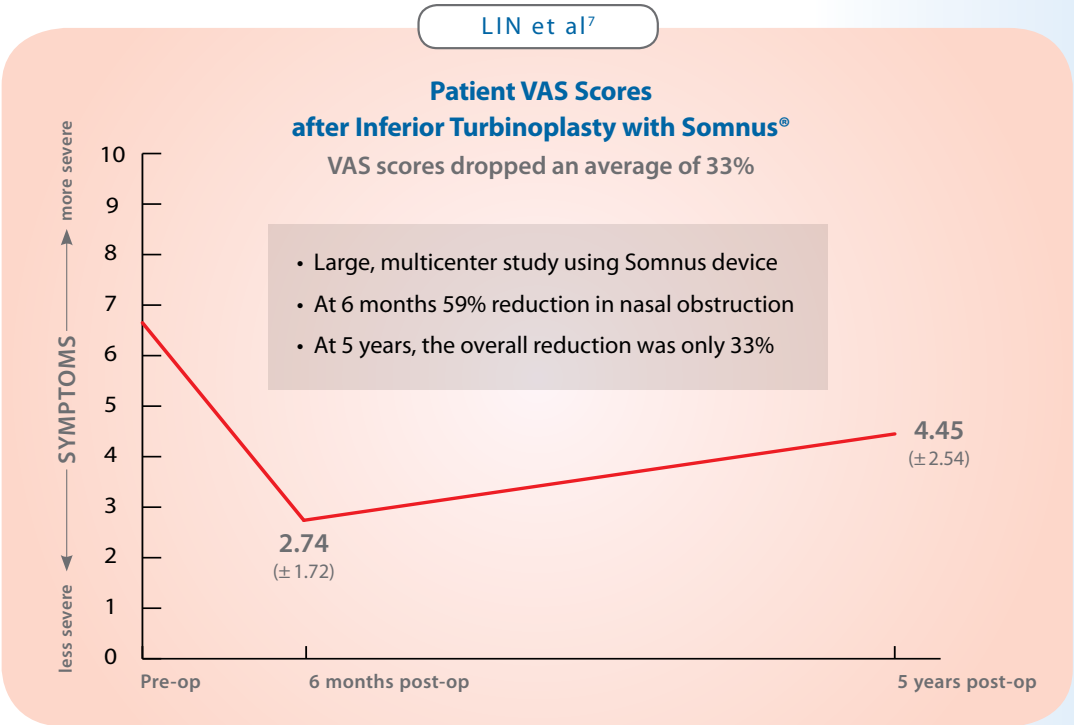
SALZANO et al[6]



Summary

Salzano et al[6] reported moderate to slight reduction in nasal obstruction scores in 60 patients in which various other thermal devices were used. In a large, multicenter study using the Somnus device for turbinate reduction, Lin et al[7] noted a 59% reduction of nasal obstruction at 6 months. However, at five years, the relief was reduced to 33%.

LIN et al[7]



The Visual Analog Scale (VAS) is a subjective patient questionnaire that evaluates the patient's perception of his or her health. Answers usually range from zero (no symptoms) to 10 (the most severe symptoms).

THERMAL TECHNIQUES AND NASAL MUCOSA

Functional mucosa with ciliated epithelium is an important component of good nasal health. The studies presented below illustrate potential effects of thermal treatments on nasal mucosa.

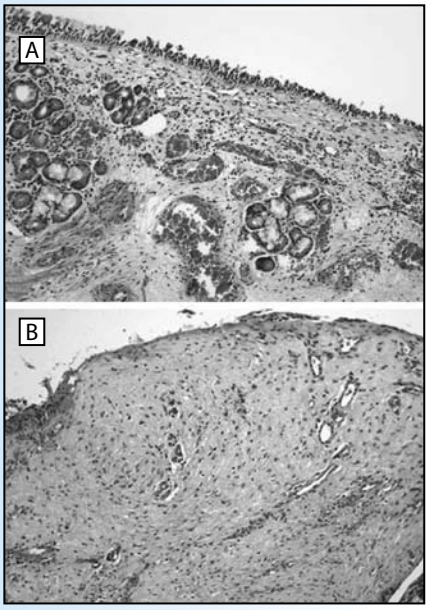


Figure 1. Comparison of histological features of control (A) and Coblation-treated (B) inferior turbinate sections shows a predominance of intact respiratory epithelium, subepithelial inflammatory cell infiltration, submucosal mucous (clear) and serous (dark) glands, and large-caliber venous sinusoids in the section from the control group. The section from the Coblation-treated group shows denuded epithelium, abundant connective tissue, a few excretory glandular ducts, and small-caliber venules (hematoxylin-eosin, original magnification 100).

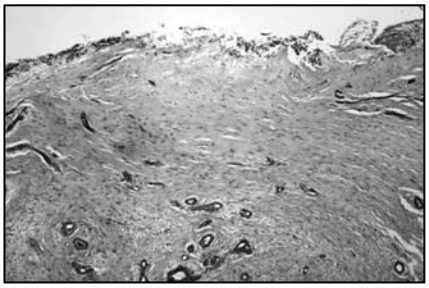


Figure 2. A section from an inferior turbinate specimen in the Coblation-treated group shows extensive fibrosis of the lamina propria (Masson trichrome, original magnification 40).

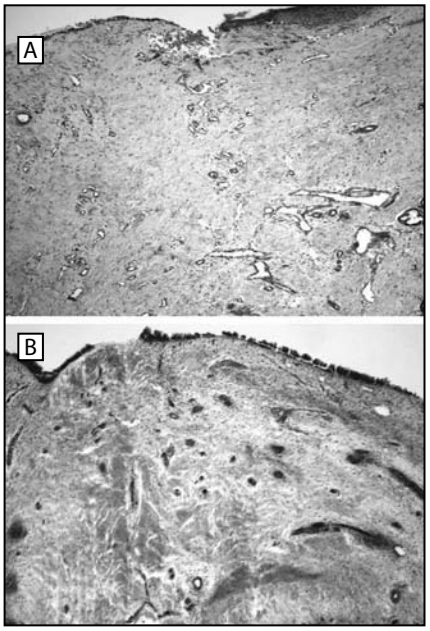
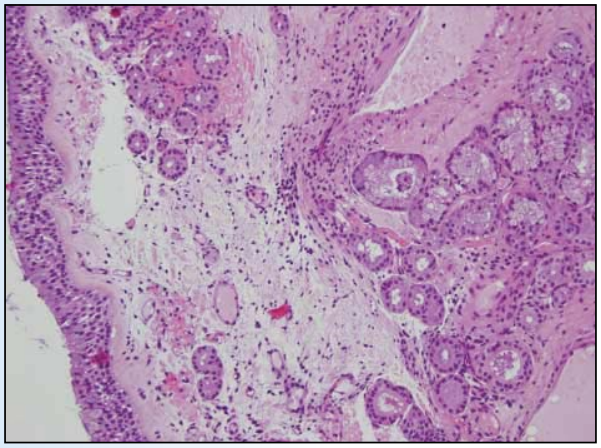
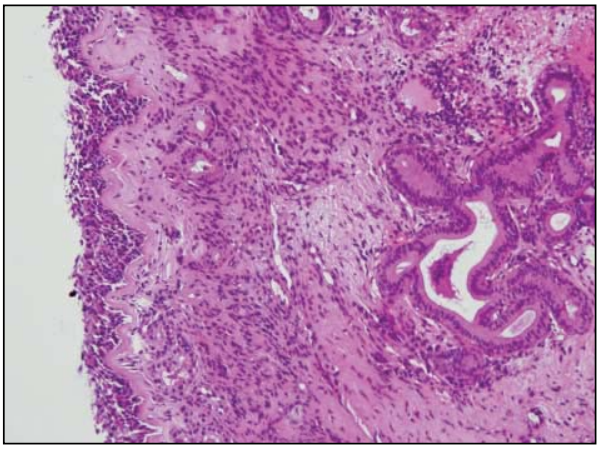


Figure 3. A resemblance between Coblation-treated (A) and laser-treated (B) areas was observed and in both sections shows marked fibrosis with few glandular structures and venous sinusoids (B, processed from the existing collection of inferior turbinate preparations of the Ear, Nose, and Throat Histopathologic Research Laboratory, Meir Medical Center, Kfar Saba, Israel) (hematoxylin-eosin, original magnification 40).

Berger- et al[8] showed:

- Significant fibrosis, glandular and sinusoid depletion, partial epithelial shedding of the cilia
- Technology used: Coblation® System with Reflex Ultra 45 Wand





Salzano- et al[6] reported:

- Submucosal damage and necrosis
- Too much heat can damage the turbinate and cause it to be chronically inflamed
- Technology used: Electrocautery, bipolar, Celon® ENT

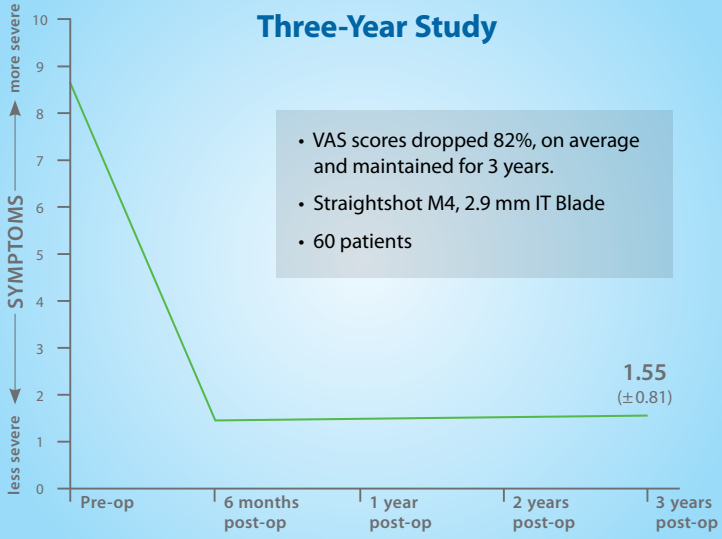
ANOTHER ALTERNATIVE

The Inferior Turbinate Blade

Powered inferior turbinoplasty with the Straightshot® M4 and Inferior Turbinate Blade offers significant and long-term results with one treatment. The IT blade has a patented elevator tip to facilitate insertion into the inferior turbinate and the creation of a submucosal pocket for bulk reduction. This helps protect the nasal mucosa and prevent the damage that can be caused by RF devices. Side effects with the microdebrider are similar to those reported with thermal techniques, as reported in the three studies below.

LIU- et al[5]

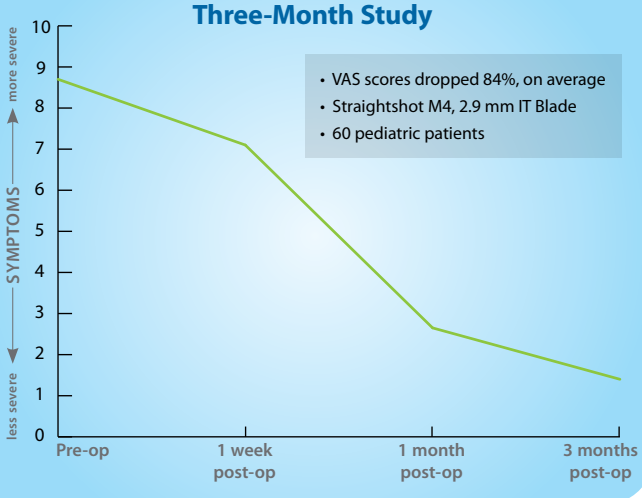
Three-Year Study



- VAS scores dropped 82%, on average and maintained for 3 years.
- Straightshot M4, 2.9 mm IT Blade
- 60 patients

CHEN- et al[9]

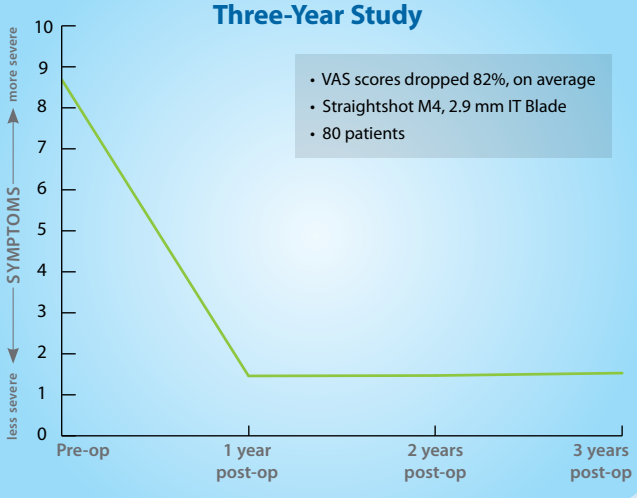
Three-Month Study



- VAS scores dropped 84%, on average
- Straightshot M4, 2.9 mm IT Blade
- 60 pediatric patients

CHEN- et al[10]

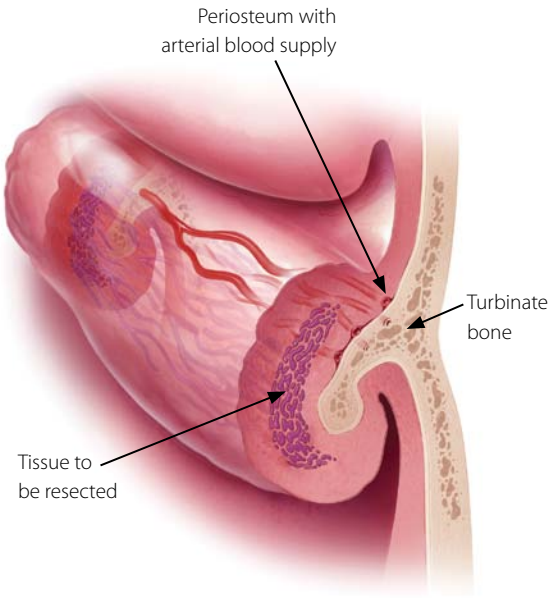
Three-Year Study



- VAS scores dropped 82%, on average
- Straightshot M4, 2.9 mm IT Blade
- 80 patients

Powered Inferior Turbinoplasty Surgical Technique

Figure 1



Philosophy

The primary goal of turbinate surgery is volumetric reduction of the submucosal vascular stromal tissue with preservation of the overlying respiratory epithelium **(Figure 1)**. This respiratory mucosa is essential to the proper physiologic functions of the turbinate, such as warming and humidification of inspired air and mucociliary clearance. The following technique elaborates on previously published results using the 2.9 mm Inferior Turbinate Blade. It provides a method for achieving the goals of volumetric reduction with mucosal preservation and with minimal risk of complications.

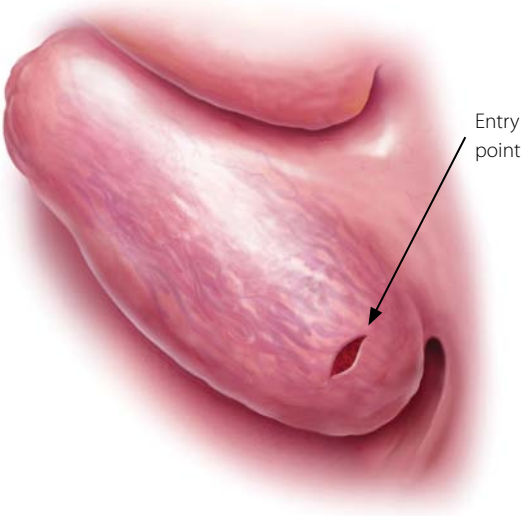
Technique

Local anesthesia is accomplished with 2% lidocaine with 1: 100,000 epinephrine into the anterior aspect of the inferior turbinate. In areas where the mucosa may be more tightly adherent to the bone, the local injection may be infiltrated to hydro-dissect or "plump up" the turbinate tissue.

The turbinate blade is inserted into the anterior face of the inferior turbinate, just medial to the muco-cutaneous junction under direct visualization or endoscopic assistance **(Figure 2)**.

The blade is firmly pushed towards the turbinate bone until it pierces the mucosa. No power is applied at this point.

Figure 2



Nota Bene: The technique description herein and the use of instructions for the related procedures are made available by Medtronic ENT to the healthcare professional to illustrate the author's suggested treatment for the uncomplicated patient. In the final analysis, the preferred treatment is that which, in the healthcare professional's judgment, addresses the needs of the individual patient.

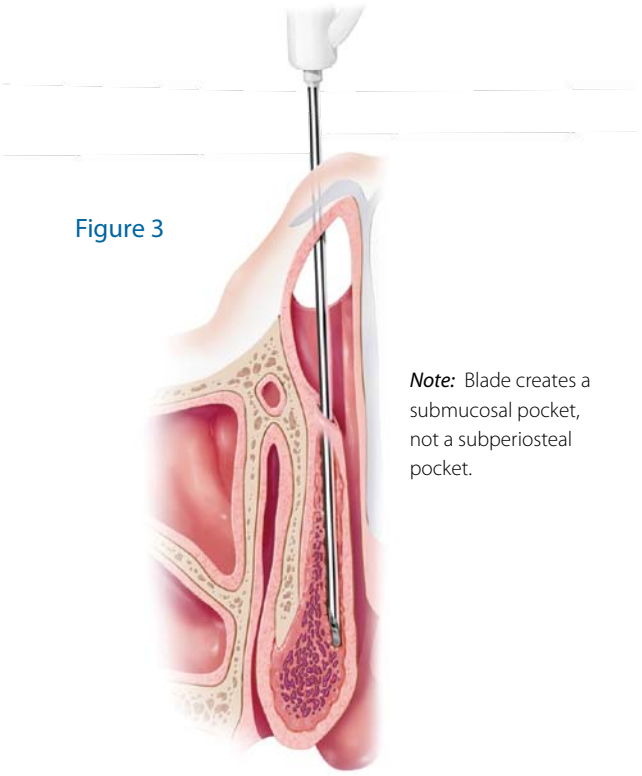


Figure 3

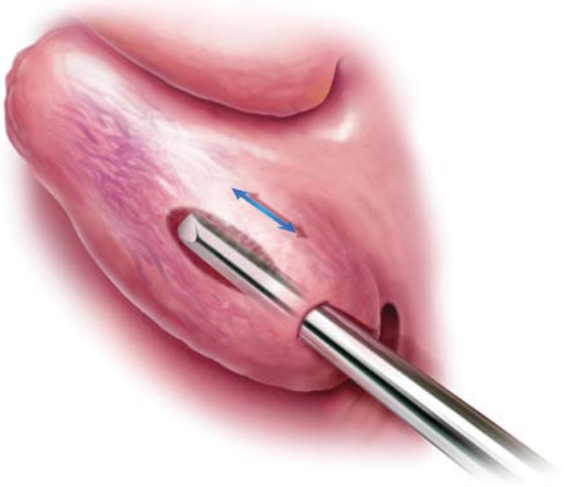
Note: Blade creates a submucosal pocket, not a subperiosteal pocket.

A submucosal pocket is dissected by tunneling the elevator tip in an anterior to posterior and superior to inferior sweeping motion **(Figures 3–5)**. The correct plane of dissection is submucosal and not subperiosteal.

Once an adequate pocket has been created, resection of stromal tissue is begun with the IPC® system set at 3,000 RPM using suction irrigation.

The blade is positioned with its cutting edge facing laterally and is moved back and forth in a sweeping fashion in a manner analogous to liposuction. The intact mucosal layer will collapse toward the blade and the process is continued until adequate volume reduction has been achieved.

Figure 4



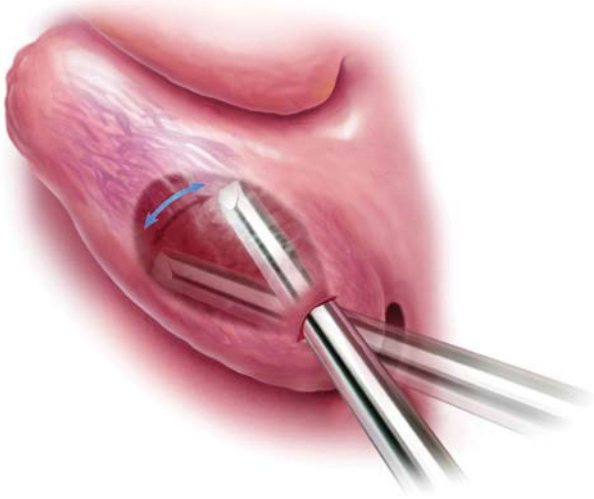
More aggressive resection may be accomplished by turning the cutting edge towards the mucosal surface, but care must be taken to minimize perforation of the mucosa.

The length of the blade is adequate to reach the posterior aspect of the turbinate in order to treat the "Mulberry Tip." Alternatively, a second, more posterior entry point may be created to better access the posterior area.

Once turbinoplasty has been completed, the turbinate can be outfractured using standard techniques. However, none of the patients in the three studies received an outfracture, and these patients experienced excellent long-term results.[7,9,10]

At the surgeon's discretion, Merocel® packing may be used for the first 24 hours. Studies suggest its value in eliminating postoperative bleeding, including the Liu and Chen studies on page 5.[5,9,10]

Figure 5



ORDERING INFORMATION

Inferior Turbinate Blade

Product #	Description	Qty
18-82040HR	Inferior Turbinate Blade, M4 Rotatable, 2.0 mm*	5
18-82940HR	Inferior Turbinate Blade, M4 Rotatable, 2.9 mm*	5
18-82040	Inferior Turbinate Blade, 2.0 mm*	5
18-82940	Inferior Turbinate Blade, 2.9 mm*	5

* Packaged with irrigation tubing

IPC® and Endo-Scrub® 2 System

Kit* includes:

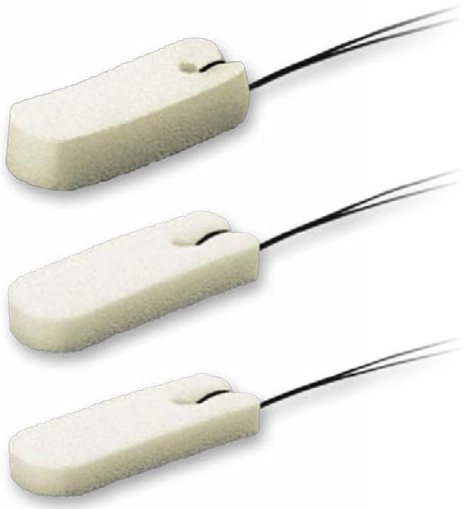
1898001	IPC® Console
1897821	Power Cord, 6 Meter, IEC 320, 115V
1898430	IPC Multi-Function Footpedal
1898851	IPC Manual
1897510	Basket
1852000	Endo-Scrub® 2 Footswitch
1991015	Endo-Scrub 2 Fingerswitch

IPCES2SYSKIT*	IPC and Endo-Scrub® 2 System

* This kit is only available in the US. If you are not in the US, please order the above items individually.

Merocel® Kennedy Sinus-Pak

- High density Merocel sponge with small pore size deters tissue in-growth
- Helps prevent lateralization of the middle turbinate during critical postoperative period
- Safe, biocompatible material
- Will not shred when trimmed; compressed for easy insertion



Product #	Description	Qty
400422	Kennedy Sinus-Pak 3.5 cm x 1.2 cm x 1.2 cm	10/box
400426	Kennedy Slim-Profile Sinus-Pak 3.5 cm long x 0.9 cm wide x 1.2 cm high	10/box
400530	Kennedy Ultra-Slim Sinus-Pak 3.5 cm long x 0.6 cm wide x 1.2 cm high	10/box

References

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10. Chen Y-L, Tan C-T, Huang H-M. Long-term efficacy of microdebrider-assisted inferior turbinoplasty with lateralization for hypertrophic inferior turbinates in patients with perennial allergic rhinitis. *Laryngoscope* 2008; 118: 1270-1274.

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