



Increasing Airflow:

The Process of Inferior Turbinate Reduction

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Inferior turbinate reduction is a procedure utilized to decrease the size of the inferior turbinate in order to increase airflow through the nasal passageway. The primary diagnosis facilitating the need for turbinate reduction is turbinate hypertrophy, an enlargement of the turbinates, which may cause partial to complete nasal obstruction. The primary symptom of turbinate hypertrophy is congested breathing, which is usually more prevalent at night. Additional symptoms may include epistaxis (nosebleed), chronic infection, snoring and headache. Development of turbinate hypertrophy can be attributed to frequent or chronic upper respiratory infections, rhinitis (allergic or vasomotor) and repeated exposure to environmental irritants.¹ It also can be caused by a compensatory response to a deviated septum, in which case a septoplasty may be indicated in conjunction with the turbinate reduction procedure in order to correct both afflictions.²

LEARNING OBJECTIVES

- ▲ Identify the primary diagnosis facilitating the need for turbinate reduction
- ▲ Define what turbinates are and where they are located
- ▲ Review the equipment necessary to perform an inferior turbinate reduction
- ▲ Examine the role of the surgical technologist in this type of procedure
- ▲ Access the post-operative process and learn about the complications associated with an inferior turbinate reduction

The turbinates (conchae) are located on the lateral walls of the nasal passageway. There are typically three turbinates on each side. Turbinates are long, narrow, spongy bone shelves that protrude into the nasal cavity bilaterally. Several types of cells compose the mucous membrane that lines the nasal cavity and covers the turbinate. The two main types of cells that pertain to the area of the nose that contains the turbinates are columnar epithelial cells, which are ciliated, and the goblet cells that secrete mucous. Interspersed between the goblet cells are nerve and lymphatic cells which are capable of responding to climatic conditions, anatomical differences and adapting to physiological needs. The superior turbinate, the smallest in size, serves to protect the olfactory bulb. The middle turbinate is larger and acts as a buffer to protect the sinuses from direct nasal airflow. The inferior turbinate is the largest of the three. The majority of nasal airflow is filtered, heated and humidified via this turbinate. It is enriched with receptors that relay airflow pressure information and temperature status via the trigeminal nerve. The medial aspect of the nasal passageway is created by the nasal septum.³ The turbinates are vascular structures; therefore, the primary contraindication for turbinate reduction surgery is a coagulopathy. Patients should discuss changes in anticoagulation therapy prior to the procedure with their treating primary care physician. A 72-hour cessation of anticoagulant medications prior to the procedure

is necessary. If radio frequency turbinate reduction is the surgeon's preferred methodology, contraindications for patients with pacemakers should be noted.⁴

TURBINATE ADVANCES

Turbineotomy procedures date back to the late 1890s and into the early 1900s. These procedures fell out of favor due to gross complications.⁵ Poor aseptic technique leading to infection, as well as an unfavorable condition now known as empty nose syndrome, left patients with a poor prognosis for symptom relief. As technology advanced, more surgeons began to perform reduction procedures, leaving an adequate amount of turbinate tissue rather than radical turbineotomies, in which all of the turbinate tissue is removed. Several advances, including nasal endoscopy, microdebridement and radio frequency coblation, have been implemented throughout the last 40 years making inferior turbinate reduction more effective.

PREPARATION

When setting up for a turbinate reduction, the surgical technologist should always be prepared with the proper instrumentation, equipment and supplies necessary to facilitate a septoplasty procedure since these two procedures often are performed in conjunction with each other. A nasal tray consisting of a Cottle elevator, freer elevator, Boies elevator,

Joseph scissor, Jansen Middleton septum forceps, #3 knife handle, Cottle septum knife, Ferris Smith forceps, bayonet forceps, Gorney turbinate scissor, Cottle osteotome, Cottle mallet, Blakesley sinus forceps, Tru-cut endoscopic biters and various sizes of nasal speculums may be necessary for any approach. A manufacturer's prepared ENT pack will provide most of the necessary supplies such as surgical towels, X-ray detectable sponges, X-ray detectable cottonoid sponges, ENT split sheet drape, head turban drape, Mayo stand cover, 10mL syringes, surgical gowns, suction tubing, medication cups and marking pen with labels.



Mayo stand set up preoperatively

The equipment and supplies utilized will vary depending on the surgeon's methodology and preference.

The patient is brought to the operating room on a gurney, then transferred to the operating table using proper body mechanics and positioned onto the operating table in the supine position with arms tucked bilaterally, utilizing padding to protect all pressure points particularly the ulnar nerve. A pillow is positioned under the patient's knees to alleviate stress to the lower back. A safety strap is placed 2 inches proximal to the patient's knees. After induction of general anesthesia and intubation, the table may be rotated 90 degrees in order to facilitate room for the surgeon, who stands laterally on the patient's right side. A premedication table is set up for the surgeon. It consists of a 10mL syringe containing 1% lidocaine with a 1:100,000 concentration

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of epinephrine, a 25-gauge needle, a medication cup containing ½-inch x 3-inch cottonoid sponges soaking in 4:1 mixture of oxymetazoline hydrochloride and 4% cocaine, a nasal speculum, bayonet forceps, a pair of Joseph scissors and two X-ray-detectable 4" x 4" sponges. All medications are clearly labeled and all items are included in the initial count. The surgeon will use the nasal speculum for visualization. The scissors are used to trim excessive nasal hair away from the surgical site. The surgeon will proceed by injecting the 1% lidocaine with epinephrine into the turbinate. The cocaine and oxymetazoline hydrochloride soaked cottonoids are then placed into the nasal passageway using bayonet forceps to facilitate anesthesia and vasoconstriction. The surgeon may advise the anesthesia provider to assess any adverse changes in the patient's vital signs.

The patient's face is prepped with a povidone iodine solution using caution to prevent the prep solution from entering the eyes. The patient is draped by squaring off the nasal area with four towels. A split sheet is secured to cover the patient's body. A turban or ¾ sheet may be utilized to cover the patient's head. The Mayo stand is brought into position and the suction tubing, with a 10 or 12 French Frazier suction tip attached, should be secured to the field

immediately. Depending on the methodology planned, other equipment may be needed to secure the field, such as the bipolar cord, microdebrider hand piece with irrigation and suction tubing, radio frequency wand and/or endoscopic camera with sinus lens and light cord.

The procedure can be performed under direct visualization using a nasal speculum or via a 4mm, endoscopic sinus lens with light cord attached. A camera may be attached to the lens to facilitate photo documentation of the case. An anti-fog agent should be available to the surgeon when using the endoscopic approach.

The surgeon retrieves the previously placed cottonoids using bayonet forceps. A knife, either a sickle blade or #15 blade on a #3 or #7 knife handle, is passed to make an incision into the anterior portion of the inferior turbinate. A

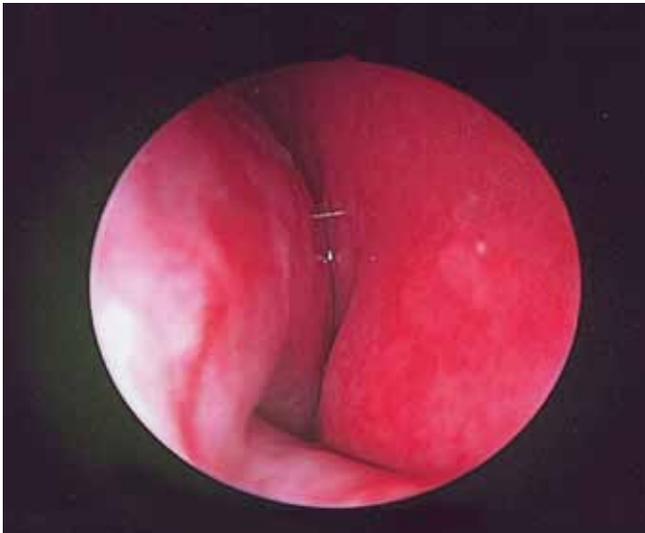
freer elevator is introduced into the incision to elevate the turbinate tissue for resection. At this point of the procedure, different methods of resection can be utilized. A surgeon performing an extramural excision will require an endoscopic biter to remove turbinate tissue. In submucous resection, the turbinate is elevated and the tissue is

resected from below the mucosal surface of the turbinate.

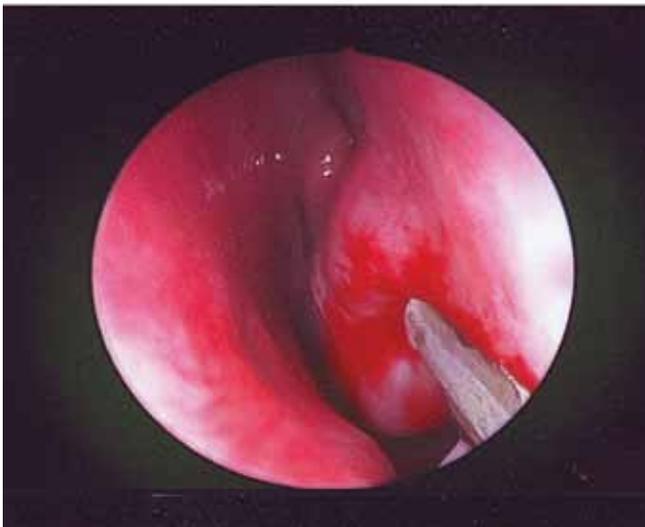
Surgeons preferring radio frequency coblation ("cold" ablation) will prime the coblation wand with a layer of saline gel. This provides a conductive solution that, combined with radiofrequency, will create a small plasma field, thus causing a molecular breakdown in the tissue.⁶ The radio frequency wand is activated via a foot pedal controlled by the surgeon. The wand is placed submucosally within the turbinate. A count of 10 seconds is performed to control the amount of tissue ablated in one area.⁷

The microdebrider may be introduced to irrigate and debride the turbinate. It consists of a corded handpiece with a 2.9mm turbinate blade attached. Suction and irrigation tubing connects to the base of the handpiece. The shaver blade resects tissue working in an oscillating fashion and is activated via foot pedal. The surgical technologist should be prepared to ream the device with a small wire brush should an occlusion occur within the shaft.

The vascularity of the turbinates will require continuous hemostatic technique throughout the procedure. Various methods of hemostasis may include injection of 1% lidocaine with a 1:100,000 concentration of epinephrine, 4% cocaine and oxymetazoline hydrochloride soaked cottonoid



Inferior turbinate hypertrophy



Injection 1% Lidocaine with epinephrine 1:100,000



Insertion of microdebrider into inferior turbinate

Intraoperative photographs courtesy of Sean B Bailey, MD, ENT Otolaryngology

sponges and bipolar electrocautery. Adequate suction will be necessary during the entire procedure.

The surgeon must be cautious not to remove too much of the receptor-rich turbinate tissue. The turbinate should not be reduced more than 25 percent to ensure it does not interfere with receptor feedback. The surgeon resects the turbinate in an anterior to posterior fashion. A Boies elevator may be utilized to reduce the septum. Once the airway is adequately improved, the surgeon will irrigate using 0.9% sodium chloride solution in a bulb syringe. The surgical technologist should be sure to observe and report the amount of irrigant used during the procedure in order to establish estimated blood loss for the patient's operative record. The surgeon may utilize bipolar electrocautery at this time to control any bleeding. Additional hemostatic agents to help control postoperative bleeding may be introduced into the nasal cavity. A powdered topical dressing or a gelatin sponge should be available. In addition, dissolvable splints or packing may be instilled in the nasal passageways to ensure lateralization of the inferior turbinates. Prior to the insertion of splints or packing, the surgical technologist will perform the final count and give a report of the amount of irrigation and medications used to the circulator. The patient's nose and face is cleaned with wet and dry sponges and a mustache dressing is secured.

POST-OP

Prior to extubation, the anesthesia provider will utilize suction to remove additional bloody drainage from the nasopharynx. The patient is transferred from the operating table to the gurney using proper body mechanics and transfer technique. The head of the gurney will be elevated to approximately 45 degrees to facilitate adequate drainage and to reduce the risk of aspiration. The patient's vital signs are monitored and intensity of pain will be monitored in the post anesthesia care unit (PACU). Analgesics will be provided according to the physician's orders. It may be necessary for the PACU staff to change the nasal drip pad upon saturation. The patient is allowed a regular diet and encouraged to have intake by mouth prior to being discharged. It will be necessary for a responsible adult to receive all postoperative instructions, provide transportation and observe the patient for 24 hours. An appropriate postoperative record of level of discomfort, oral intake and dressing assessment should be documented within the patient's record.

RECOVERY

A follow up appointment in the surgeon's office should be scheduled approximately seven to 10 days postoperatively. The patient may experience nasal drainage, swelling, dryness, and pain for approximately seven to 14 days postoperatively. Postoperative instructions may include not to blow the nose and to sneeze with the mouth open. Patients should avoid strenuous activity. The surgeon may order a daily sinus irrigation using a saline spray to alleviate dryness. The patient will be prescribed an analgesic for pain, an antibiotic to reduce the risk of infection and possibly a steroid to reduce inflammation and promote healing.

COMPLICATIONS

The most severe complication of inferior turbinate reduction is empty nose syndrome. In these cases too much of the receptor tissue is removed. The brain interprets the message that the nasal passageway is blocked, when in fact the turbinate is reduced and the passageway is open. This may lead to pain, chronic dryness and nasal infections. Patients may use saline sprays or gels to lessen the symptoms.⁸ Empty nose syndrome has a poor prognosis for recovery without further surgical intervention.

ABOUT THE AUTHOR

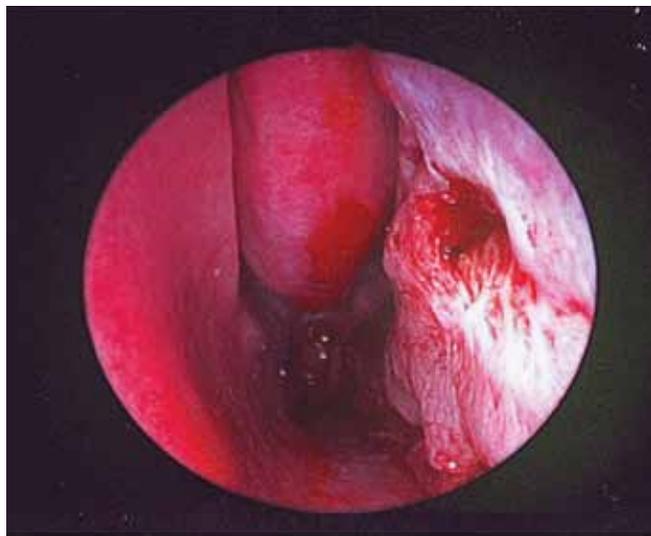


Tammy Capestro CST, EMT-B, lives in High Ridge, Missouri. She worked as an on-the-job trained surgical technologist for an orthopedic surgical center while attending the St Louis Community College surgical technology

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Reduced inferior turbinate



Dissolvable pack in place with powder hemostatic agent

The surgeon must be cautious not to remove too much of the receptor-rich turbinate tissue. The turbinate should not be reduced more than 25 percent to ensure it does not interfere with receptor feedback.

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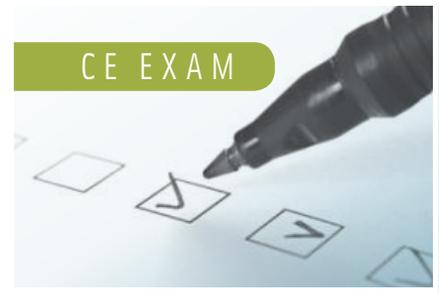
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