



EMPTY NOSE SYNDROME

INTRODUCTION

Empty nose syndrome (ENS) is an uncommon side effect of nasal surgery. Described in 1994 by Dr. Eugene Kern, it often results from removal of lower turbinate tissue. Turbinates are structures in the nose that filter and humidify air. They are important in sensing the movement of air through the nasal passages. Turbinates enlarge due to conditions like allergic rhinitis and overuse of decongestant sprays. This can result in nasal obstruction. If it does not improve with medical treatment, surgery is an option. Surgery changes the size and position of the turbinates. This results in improved nasal airflow. Surgery reduces reliance on medications and improves quality of life. Turbinate surgery may be complicated by nasal dryness and crusting. Patients may sense nasal obstruction despite open nasal passages. Aggressive removal of tissue and injury to the nerves and blood vessels contribute to ENS. Altered airflow patterns through the nose may also contribute to symptoms in ENS.

Surgeons have learned the causes of ENS and are now more conservative during surgery. Complete turbinate removal has a 20% risk of developing ENS. Modern techniques for surgery reduce the risk. Techniques include submucous resection and radiofrequency ablation. The exact incidence of ENS is currently unknown. There are still thousands of patients experiencing ENS. Treatments are available that can improve symptoms and quality of life.

WHAT ARE THE SYMPTOMS OF EMPTY NOSE SYNDROME?

The most common complaint in ENS is the sensation of decreased nasal airflow. In these patients, the nasal passages are open. However, a lack of nasal resistance, makes the nose feel too open. Other symptoms include nasal and throat dryness, nasal burning and crusting. Patients may experience a sense of suffocation. Most ENS patients experience anxiety, depression, and poor sleep quality. The psychological impacts reduce effectiveness, both at work and in daily life.

WHAT CAUSES THESE SYMPTOMS IN EMPTY NOSE SYNDROME?

Nasal turbinates consist of a thin bone surrounded by mucosal lining. They have high blood flow in order to warm and humidify air in the nose. This improves the absorption of oxygen in the lungs. They also contain erectile tissue, which swells intermittently. This creates a pattern of nasal resistance through alternating sides of the nose. This nasal cycle may help to prevent pressure ulcers while sleeping. Their exact function is unknown. The nasal lining has nerves that sense changes in temperature and pressure. These nerves are important in sensing air movement through the nose. They regulate warmth and humidity as air is inhaled through the nostrils.

Removal of large portions of the turbinates may eliminate many of these sensors. This causes a lack of sensation in the nose. This prevents the normal regulation of warmth and humidity in the nose. This cooler, dry air contributes to nasal dryness and crusting. Unhealthy bacteria may colonize a crusty nose and worsen nasal symptoms. Altered airflow may also reduce sense of smell. Last, there is an increased volume of air moving through the nose with less resistance. The reduction in nasal resistance may cause shallow breathing. This can collapse lung alveoli and reduce oxygen exchange in the lungs. This may contribute to the sensation of suffocation in ENS.

HOW IS EMPTY NOSE SYNDROME DIAGNOSED?

Patients with suspected ENS and previous turbinate surgery often complete a screening questionnaire. The Empty Nose Syndrome 6-item Questionnaire (ENS6Q) is disease-specific quality of life questionnaire. It helps quantify the severity of ENS. It also grades the response to therapy over time. Nasal endoscopy may be used to assess ENS and degree of mucosal atrophy. Endoscopy ensures any other nasal conditions are addressed. Computed tomography scans provide information for areas that are not seen on endoscopy. The Cotton Test can be used to assess ENS. It involves placing saline-soaked cotton within the nose at the suspected tissue deficit. A positive test is where patients experience improved breathing. The Cotton Test helps ENT surgeons determine if nasal enhancement procedures may improve symptoms.

WHAT TREATMENTS ARE AVAILABLE FOR EMPTY NOSE SYNDROME?

Conservative therapy involves nasal hygiene and moisturization. This can be accomplished with saline sprays, saline gels, oils, and large volume nasal saline irrigations. Humidification in the home can be useful. Adding menthol to topical therapies may enhance nasal airflow sensation. These therapies may provide short-term relief from dryness and nasal irritation. However, they may need to be used repeatedly throughout the day for recurring symptoms. Prolonged use may disrupt the natural mucosal protection from the mucous barrier within the nose. When overgrowth of bacteria (like *Klebsiella ozena*) occurs, rinses with topical antibiotics may prove useful. Topical steroid therapy may improve nasal inflammation. Estrogen creams and phosphodiesterase inhibitors cause growth of nasal/turbinate mucosa and may be prescribed. Wearing a mask in cold, dry climates and dusty environments may reduce their impact on ENS symptoms. Unfortunately, none of these therapies consistently improve nasal symptoms in ENS. Severe cases may necessitate living in a warm and humid coastal climate for prevention of nasal dryness and associated complications.

CAN SURGERY IMPROVE EMPTY NOSE SYNDROME?

Procedures for ENS should be delayed for potential recovery following nasal turbinate surgery. Trials of topical treatments must have failed to relieve symptoms. ENS procedures involve augmenting the size of remaining turbinate tissue. Materials can be implanted in the septum, nasal floor, nasal sidewall or any remaining turbinate tissue. This creates nasal resistance and normal turbulent airflow. Implanting remaining turbinate tissue is the most effective, followed by the lateral nasal wall. These surgeries do not restore the humidification or immune protection of normal turbinate mucosa. An increase in ENS6Q (quality of life) scores of 7 or more points

during a Cotton Test suggests surgery may be beneficial. Injection of temporary materials such as hyaluronic acid may last several months. They help determine if a more permanent nasal implant will provide adequate relief. Many permanent implant materials are used, including synthetics (Gore Tex) and acellular dermis (skin). Hydroxyapatite and cartilage from an ear, nasal septum, or rib have been used. The majority of ENS-specific and psychological symptoms improve with implantation procedures. Reported complications were infrequent (less than 10%). Complications included failure to improve symptoms, eye tearing, and extrusion of implant material. The development of chronic rhinosinusitis has also been reported. A few centers of expertise treating ENS offer regenerative therapies of unknown efficacy. They include platelet-rich-plasma, fat grafts, adipose derived stem cells and more. In general, these therapies restore less volume to nasal tissues than permanent implants. They may prove less effective in patients with minimal residual turbinate tissue.

HOW CAN I MANAGE THE PSYCHOLOGICAL IMPACT OF THE DISEASE?

ENS causes moderate to severe anxiety and depression in the majority of patients. Insurance often does not cover ENS treatments. In severe cases, patients may struggle to maintain relationships, employment, and daily activities. Their focus is centered on their nasal and suffocation symptoms. Cognitive behavioral therapy or counseling may be helpful for anxiety and depression. Medications can also be useful.

WHERE CAN I FIND FURTHER INFORMATION?

The ARS recommends contacting a specialist in rhinology. You can find a local rhinologist at <https://www.american-rhinologic.org/>.

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