



# Permanent but reversible tracheostomy for severe symptomatic obstructive sleep apnea



Robert H. Maisel, MD, FACS, Robert Z. Yang, MD

*From the Hennepin County Medical Center, University of Minnesota, Minneapolis, Minnesota*

## KEYWORDS

flap tracheostomy;  
 severe OSA (obstructive  
 sleep apnea);  
 CPAP (continuous  
 positive airway  
 pressure)

Permanent tracheostomy, described first in the 1960s as a treatment for obstructive sleep apnea (OSA), was one of the earliest methods used in the treatment of OSA before the popularization of positive pressure methods in the 1980s. It was reported that tracheostomy in patients with OSA resulted in complete resolution of the systemic and pulmonary hypertension as well as hypersomnia. Studies have shown that tracheostomy remains the only consistently effective method for relieving OSA in treating patients with body mass index  $>40$  kg/m<sup>2</sup>. However, given the quality-of-life changes associated with a tracheostomy, it has remained a surgical option of last resort. In this article, we discuss the indications and techniques of permanent tracheostomy.

© 2015 Elsevier Inc. All rights reserved.

## Introduction

Long-term tracheostomy as a treatment for obstructive sleep apnea (OSA) was first described in the 1960s by Valero and Alroy<sup>1</sup> and Kuhlo et al.<sup>2</sup> Later, Lugaresi et al.<sup>3</sup> described treating patients with OSA with complete resolution of hypertension, hypersomnia, and pulmonary pressures with tracheostomy. Other studies have shown the efficacy of tracheostomy in normalizing blood gas values, insulin requirements, and cardiac arrhythmia in addition to the previously measured vitals. Tracheostomy was one of the earliest methods used and studied in the treatment of OSA before the popularization of positive pressure methods in the 1980s by Sullivan et al.<sup>4</sup> Currently, surgical options include uvulopalatopharyngoplasty, hypopharyngeal surgeries, hypoglossal nerve stimulation, and maxillomandibular advancement. Studies have shown that these surgical options are less effective in treating patients with body mass index  $>40$  kg/m<sup>2</sup> and tracheostomy remains the only consistently effective method for relieving OSA.<sup>5</sup> The goal of a long-term flap tracheostomy is to create a more hygienic

stoma with a circumferential mucocutaneous junction to minimize granulation, bleeding, and infection. This stoma permits easy maintenance and tube exchange but still requires a stent, even though it does not collapse as easily or quickly if decannulated. However, given the quality-of-life changes associated with a tracheostomy, it has remained a surgical option of last resort.

## Indications

The indications for a tracheostomy in treating OSA are those with severe OSA in whom continuous positive airway pressure or other upper airway expansion surgery has failed and continue to remain severely symptomatic or have medical consequences of OSA. These patients with persistent OSA experience dangerous sleep deprivation, making them incapable of functioning at work, socially, or with family. Their severe OSA creates a danger to themselves and others when driving. These patients are candidates for either traditional tracheostomy or flap tracheostomy. Often, a patient undergoing maxillary-mandibular surgery or other aggressive upper airway reconstruction would have a temporary traditional tracheostomy but refuse to have a permanent tracheostomy. The decision to have a permanent tracheostomy is one that requires a careful and thorough

**Address reprint requests and correspondence:** Robert Maisel, MD, Department of Otolaryngology—Head and Neck Surgery, Hennepin County Medical Center, 701 Park Ave, Minneapolis, MN 55415.  
 E-mail address: maisel001@umn.edu.

<http://dx.doi.org/10.1016/j.otot.2015.08.005>

1043-1810/© 2015 Elsevier Inc. All rights reserved.

discussion with patients and their family who would be taking care of them. A stable home environment or supervised living situation is necessary to ensure that the patient has the necessary suction and cleaning required. As the tracheostomy is covered 12-16 hours daily, the patient may not need humidity at night. The patient and caregivers should be educated on the physiological changes associated with a tracheostomy and maintenance of the device until they understand its function and their responsibility in cleaning and maintaining the airway to ensure safety. Continued education is crucial to the success of the operation and must be continued postoperatively in the hospital and through clinic visits after discharge. The preoperative discussion is often focused on the physiology of a tracheostomy first, and the patient should understand that it is obstructed during the day to allow for normal upper airway breathing and voicing and is opened at night to bypass the high resistance of the upper airway and fully treat OSA. The appearance of the tracheostomy is an important consideration for the patient, and with the use of different tracheostomy tubes, it can easily be camouflaged with high-collar shirts or jewelry (Figure 1).

### Preoperative considerations

The preoperative evaluation can be very extensive, as these patients are often extremely obese with significant cardiac and pulmonary comorbidities. Occasionally, a formal anesthesia consult may be required, and the airway plan should be discussed preoperatively. As with traditional tracheostomy, the plan for perioperative anticoagulation should be discussed and ideally avoided up to two weeks before surgery.

### Surgical technique

Planned permanent airway bypass tracheostomy is performed in the operating room as with traditional open tracheostomy with similar surgical setup. The surgical and anesthesia teams

should have an agreed-upon<sup>6-8</sup> stepwise plan to establish and manage the airway before the case. A temporary tracheostomy should be performed in the standard fashion with a transverse incision and anterior tracheal window or vertical incision through the trachea. When anticipating a permanent tracheostomy, we use a modification of the previously described technique. The patient's neck should not be over-extended for anticipating how the skin flaps would approximate the tracheal flaps postoperatively. The skin incision is traditionally drawn in the pattern of a horizontal H pattern with a trapezoidal flap superiorly and inferiorly based (Figure 2). Although several variations of this technique exist, we presently use a single curvilinear transverse incision with an omega-shaped skin flap placed midway between the cricoid and the sternal notch, laterally extending to the lateral aspect of the sternocleidomastoid muscles, allowing for better cosmesis, minimal dead space, and lower risk of seroma formation. The tip of the omega skin flap should be at the level of the cricoid cartilage with the patient's neck in minimal extension. The size of the flap is typically gauged with the thumb measuring roughly 1.5 cm at the base and 3-4 cm in length (Figure 3). As the flaps are eventually sutured to the tracheal rings, it is important to elevate the subplatysmal skin flaps adequately, which can extend laterally beyond the sternocleidomastoid muscle and inferiorly onto the sternum. The flaps should also be thinned to be mobilized without too much bulk, while taking care to preserve their blood supply. In addition, a submental lipectomy may be required to prevent obstruction of the tracheostomy when sleeping supine, allow the skin flaps to lie in better opposition, and make the stoma easier to manage. This may be performed through the same incision or transcutaneous liposuction techniques. The anterior trachea is then exposed fully by retracting the strap muscle, and then dividing the thyroid with suture ligation and cautery of the free edges. The pretracheal fascia is then dissected away from the cartilage with either sharp or blunt dissection, taking care not to extend too laterally into the tracheoesophageal groove to avoid injury to the recurrent laryngeal nerves.



**Figure 1** Permanent tracheostomy. (Color version of figure is available online.)

Download English Version:

<https://daneshyari.com/en/article/4122442>

Download Persian Version:

<https://daneshyari.com/article/4122442>

[Daneshyari.com](https://daneshyari.com)