

Chapter 51 – Closure of Tracheoesophageal Fistula

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Speech restoration is of great significance for the social and economic welfare of patients who undergo total laryngectomy.^[1] More than 80% of patients with a tracheoesophageal voice prosthesis develop intelligible speech.^[2–4] Voice restoration with tracheoesophageal puncture (TEP) is superior in quality to esophageal speech or electrolarynx.

Discussion of the management of speech production has been focused on the methods of rehabilitation.^[5] Although most patients do well with their tracheoesophageal speech, there are certain problems associated with the valve:

- Yeast infection of the valve
- The valve dropping out or being coughed out
- Spontaneous closure of the fistula following loss of the valve
- Aspiration of the valve into the tracheobronchial tree
- Leakage of saliva and food into the tracheobronchial tree
- Aspiration pneumonia from severe leakage, which could be life-threatening in patients with preexisting chronic lung disease^[1]
- Lack of patient acceptance of the valve

PATIENT SELECTION

The absolute indication for closure of the TEP is severe leakage with aspiration. Most salivary leakage responds to conservative measures such as reduction in the size of the valve to allow shrinkage of the fistulous tract.

Cauterization of the fistula has also been used to promote shrinkage of the tract.^[6] Another indication for surgical closure of a TEP is poor voicing. This problem may be caused by spasm of the cricopharyngeus muscle or pharyngeal stenosis. Treatment for this condition includes the following:

- Botox injection
- Cricopharyngeal myotomy
- Cervical neurectomy
- Pharyngoplasty for pharyngeal stenosis

I have also encountered a few patients who have none of the above problems but simply wanted the fistula closed because they either did not like the idea of a fistula and the valve or just did not like their voice.

I have been doing primary TEPs at the time of total laryngectomy since shortly after the introduction of the Singer Blom valve.^[7] I try to carefully select out the patients who I feel would not succeed with a Singer Blom valve, such as those who have poor manual dexterity (e.g., rheumatoid arthritis), low level of motivation, chronic brain syndrome, and inability to maintain the prosthesis.

Patients who are candidates for closure of the TEP should be counseled by the speech language pathologist about the use of alternative methods of communication, such as the electrolarynx or esophageal speech. The stoma should be carefully examined. Several issues should be resolved, including the size of the stoma and the location of the TEP. Also, the stoma must be examined to determine whether it has been heavily radiated.

If the stoma is quite small, then stomaplasty should be included at the time of the closure of the TEP. I have described the techniques of stomaplasty, which include creation of a small local flap in the superior aspect of the stoma.^[8] If the size of the fistula is quite large or the TEP is located superiorly near the cutaneous junction, then stomaplasty with a flap is not feasible. Patients who have a stoma that has been heavily radiated present a unique problem. These patients do not tend to do well when stomaplasty is performed and have marked difficulty in healing.

PREOPERATIVE PLANNING

Patients whose only problem is leakage do not require any special testing. Patients who have requested closure of the TEP due to difficulty in voicing or swallowing should have an esophagram to evaluate the pharynx and esophagus, but not with barium to avoid aspiration of the barium into their lungs.

SURGICAL TECHNIQUE

The procedure^[9] may be performed under local or general anesthesia. The patient is prepared and draped in the usual manner. The area that surrounds the superior aspect of the tracheostoma is infiltrated with 1% lidocaine with epinephrine 1:100,000. An incision is made in the mucocutaneous junction of the tracheal stoma from the 9-o'clock to the 3-o'clock position (Fig. 51-1). The posterior wall of the trachea is undermined inferiorly and separated from the esophagus down to and beyond the tracheoesophageal fistula (Fig. 51-2). The tracheoesophageal tract is divided and the mucosa of the esophagus is closed with inverted interrupted sutures using 4-0 absorbable Vicryl on a P-2 (small circle) lacrimal needle (Figs. 51-3 and 51-4). A multiple-layer closure of the esophageal fistula is carried out to prevent leakage. Subsequently, the mucosa of the tracheal lumen is freshened and closed with everted sutures in a single layer with the same suture material. After the complete closure, the stomal incision is closed without a drain. The patient begins a puréed diet on the same day.

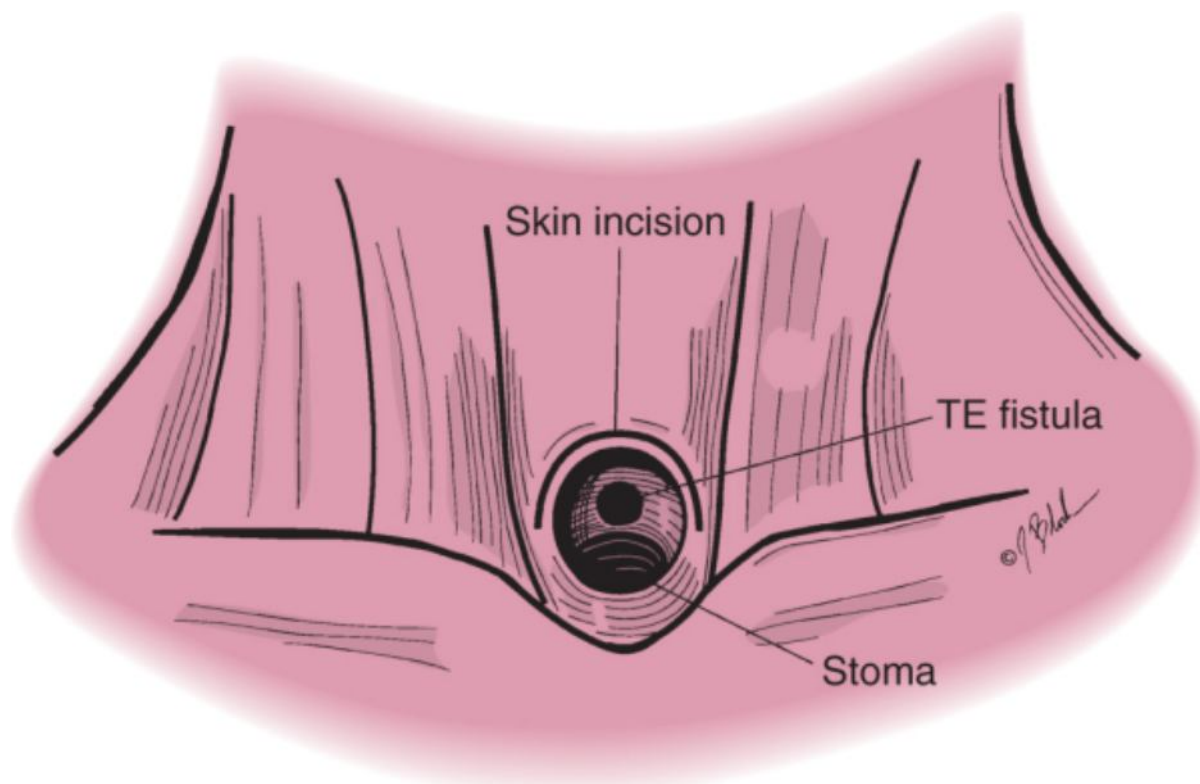


Figure 51-1 Incision from the 9-o'clock to the 3-o'clock position at the mucocutaneous junction.

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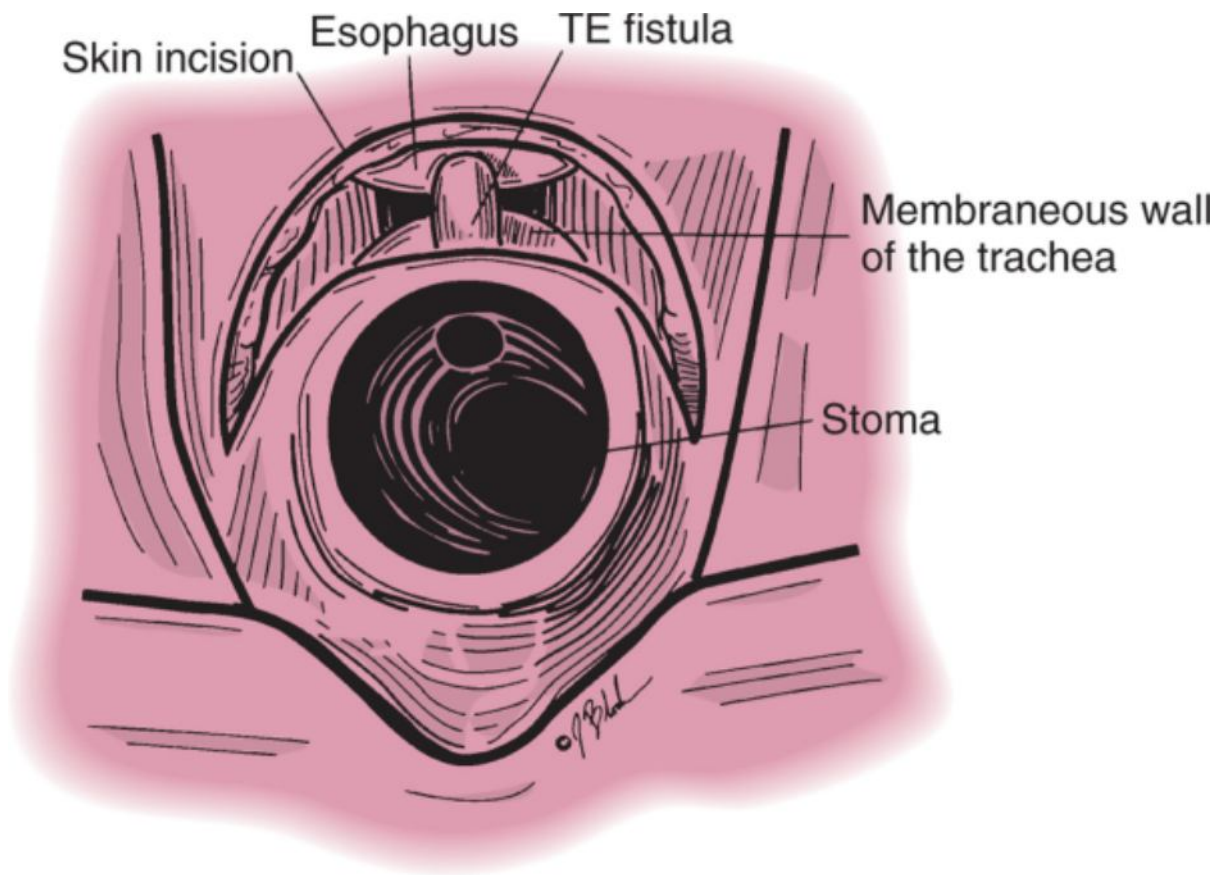


Figure 51-2 Exposure of the fistula.

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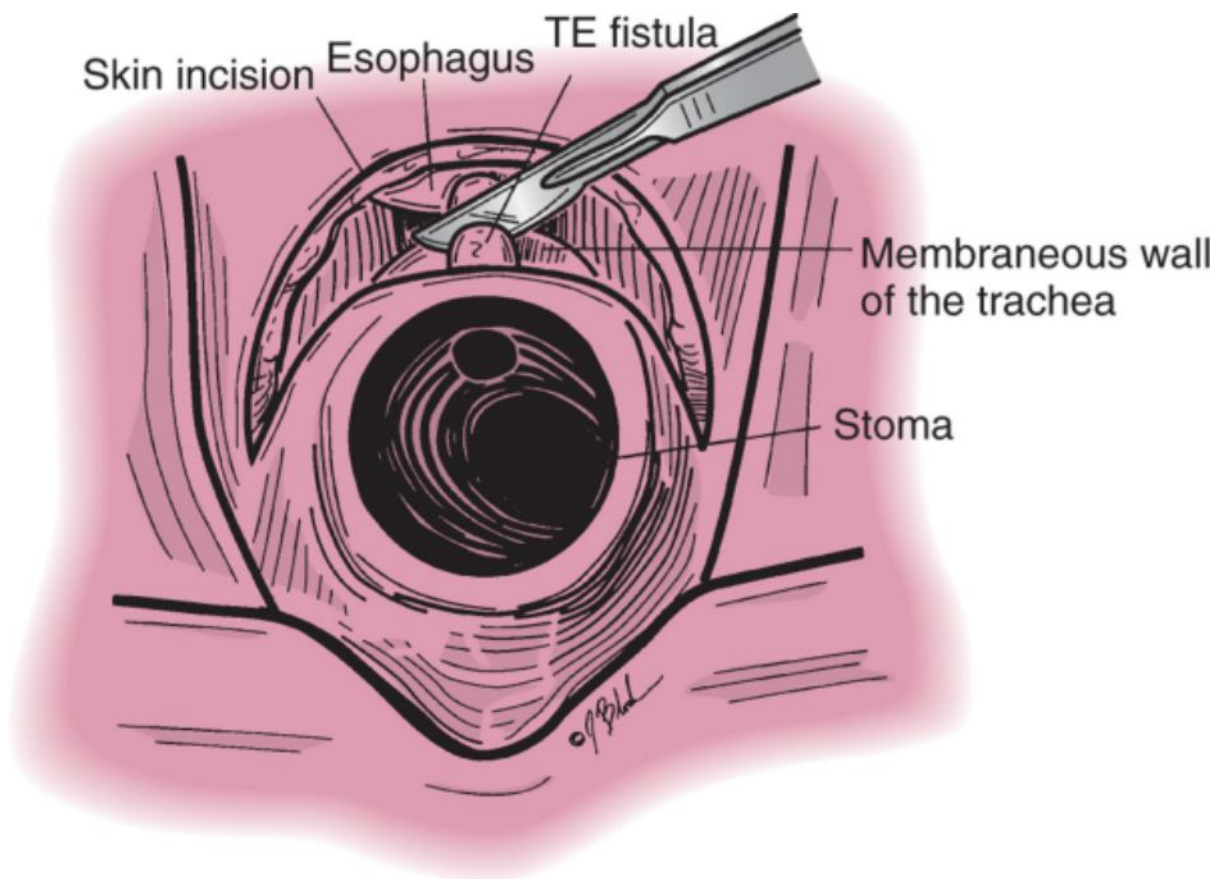
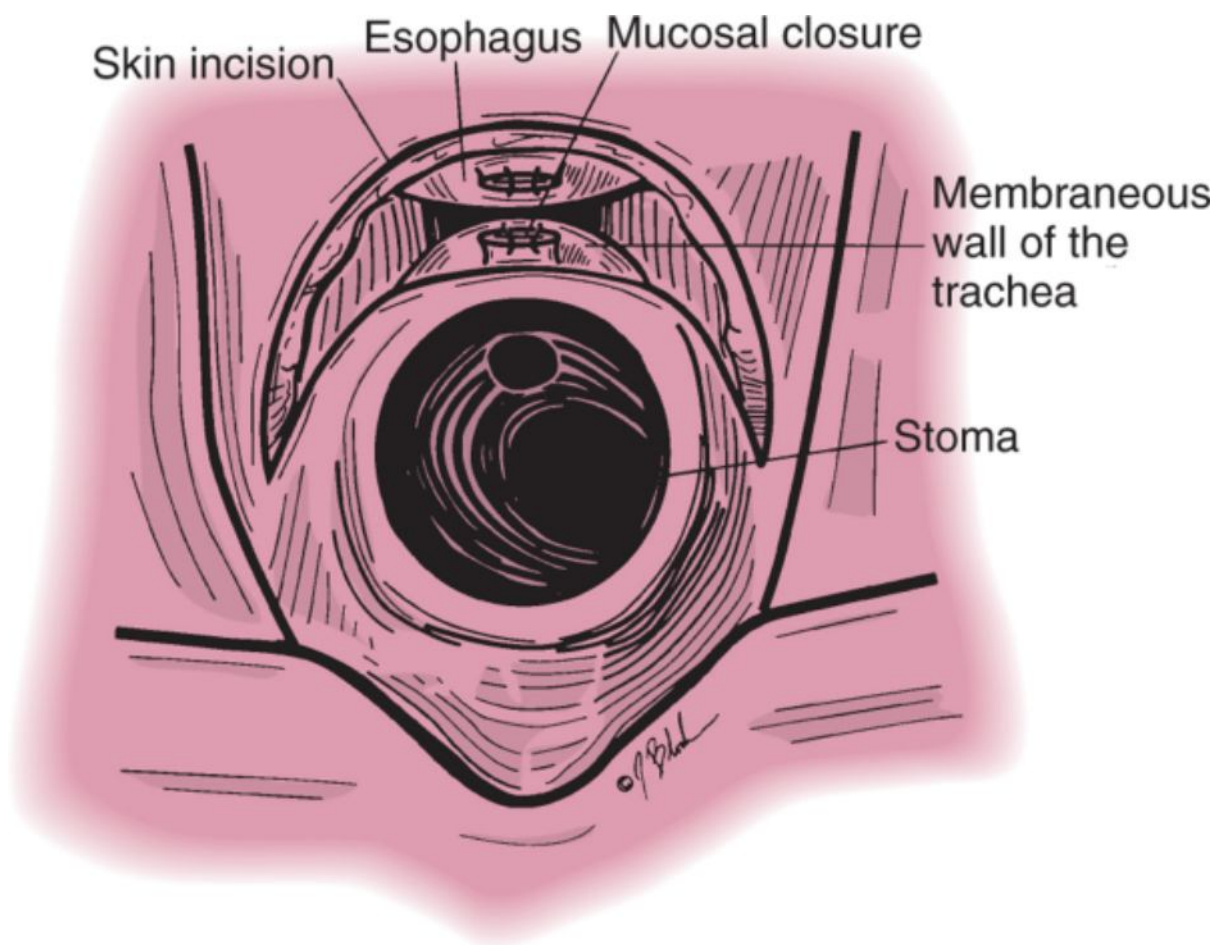


Figure 51-3 Division of the fistula.

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**Figure 51-4** Closure of the tracheal and esophageal mucosa.

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Rosen and colleagues^[1] describe a technique for closure of TEP, which is performed under general anesthesia with a small flexible endotracheal tube. A 34F dilator is introduced into the esophagus to elevate the tracheoesophageal party wall. A circumferential circular incision is made in the tracheal mucosa 2 to 3 mm lateral to the fistula. The tracheal mucosa is undermined toward the center of the fistula and then inverted into the esophageal lumen and sutured closed. A tracheal mucosal flap is created. A 3- × 3-cm thin dermis graft from the thigh is trimmed to size and sutured in to resurface the trachea.

Issing and associates^[10] followed up on 103 patients with total laryngectomy and voice rehabilitation, 3 of whom eventually required closure of the TEP because of severe leakage. The authors state that the TEP was closed with muscle skin flaps but details of the surgical technique were not described. Annyas and colleagues^[11] described a technique in which an interposition dermal graft was placed between the trachea and the esophagus with separate skin incisions just superior to the stoma.

POSTOPERATIVE MANAGEMENT

The patients are usually discharged the day of the surgery. The patient is encouraged to keep the area of the stoma clean and apply antibiotic ointment to the incision. The patient is encouraged to eat a puréed diet for 1 week and then progress to a normal diet over the next few weeks.

PEARLS

- Patients who have been heavily radiated should have the procedure described above, but muscle should be interposed between the trachea and esophagus because the radiation interferes with healing and an even larger fistula may be produced.
- Patients should maintain a puréed diet in the near term to help with healing.
- Patients need to be counseled about alternative methods of communication such as the electrolarynx and esophageal speech.
- Conservative measures of closure for salivary leakage should be tried before surgical closure.
- Efforts to improve voicing by Botox should be exhausted before closing the TEP in patients who are dissatisfied with their voice.

PITFALLS

- Patients with a mild degree of difficulty in voicing may also be dissatisfied with closure because then they will have no voice at all.
- Patients who have had heavy radiation to the stoma have a major risk of not healing and may require major reconstructive surgery if this is carried out.
- Patients should not return to a regular diet immediately because this may disrupt the wound.
- Every effort should be made to ensure proper patient selection so that the degree of satisfaction with the valve is as high as possible.

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