

Pharyngeal Reconstruction After Laryngopharyngectomy: A Historical Perspective

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Introduction

Pharyngoesophageal reconstruction represents one of the most difficult problems in head and neck surgery. Risk of infection, aspiration, malnutrition and recurrence by nature affect surgical resection of cancer in this region; restoration of speech and swallowing have presented historical challenges¹.

When Billroth performed the first total laryngectomy in 1873, the pharyngeal defect was left open to heal secondarily. Mortality was upwards of 80% in his initial series². Outcomes after laryngopharyngectomy slowly improved to about 10% mortality by the 1920s in large part due to perfection of the technique by Gluck³. By 1900 less than 200 laryngectomies had been reported, with 45% mortality and 6% three-year survival.



Figure 1: *Billroth im Hörsaal* painting by Adalbert Seligman (1890). Accessed online 7/1/2021 (www.Wikipedia.com)

The advent of first antibiotics in the 1930s allowed for improved wound healing and survival in clean contaminated cases. In 1948 Wookey's description of tubed cervical skin flaps to reconnect the pharyngostome and esophagostome was the first example of a staged reconstruction⁴. A review of local cervical flap reconstruction by Biller et al⁵ (9 studies, 148 patients [1942-1980]) found a mortality rate of 7%, with an average interval to swallowing of 8 weeks and hospitalization of 6-16 weeks.

Pedicle Flap Reconstruction

In the 1940's several options for reconstructions of the pharynx were developed. Reconstruction with pedicled abdominal viscera began with use of jejunum by Yudin in 1944, followed by reversed gastric tube by Mes in 1948⁶. Colonic interposition was described in 1954 by Goligher. In 1959 Seidenberg described the first vascularized transfer of a segment of jejunum, however the patient did not survive. Ong and Lee transposed the entire stomach in 1960. Subsequent introduction of the medially-based deltopectoral flap by Bakamjian in 1965 was a major advance in staged pharyngeal reconstruction⁷. It was clear that vascularized reconstruction was necessary to prevent necrosis and fistulae, especially in radiated tissue. The introduction of the pectoralis major myocutaneous flap in 1979⁸ allowed a generation of head and neck surgeons to become very comfortable with single stage reconstruction of pharyngeal defects at the time of ablative surgery. Gastric transposition for circumferential pharyngoesophageal reconstruction was advocated in the 1980s at MSKCC; Spiro in 1991⁹ reported a large series with a mortality of 11%. A recent meta-analysis showed mortality with gastric pull-up to be 8.9%, often from distal necrosis at the anastomosis.

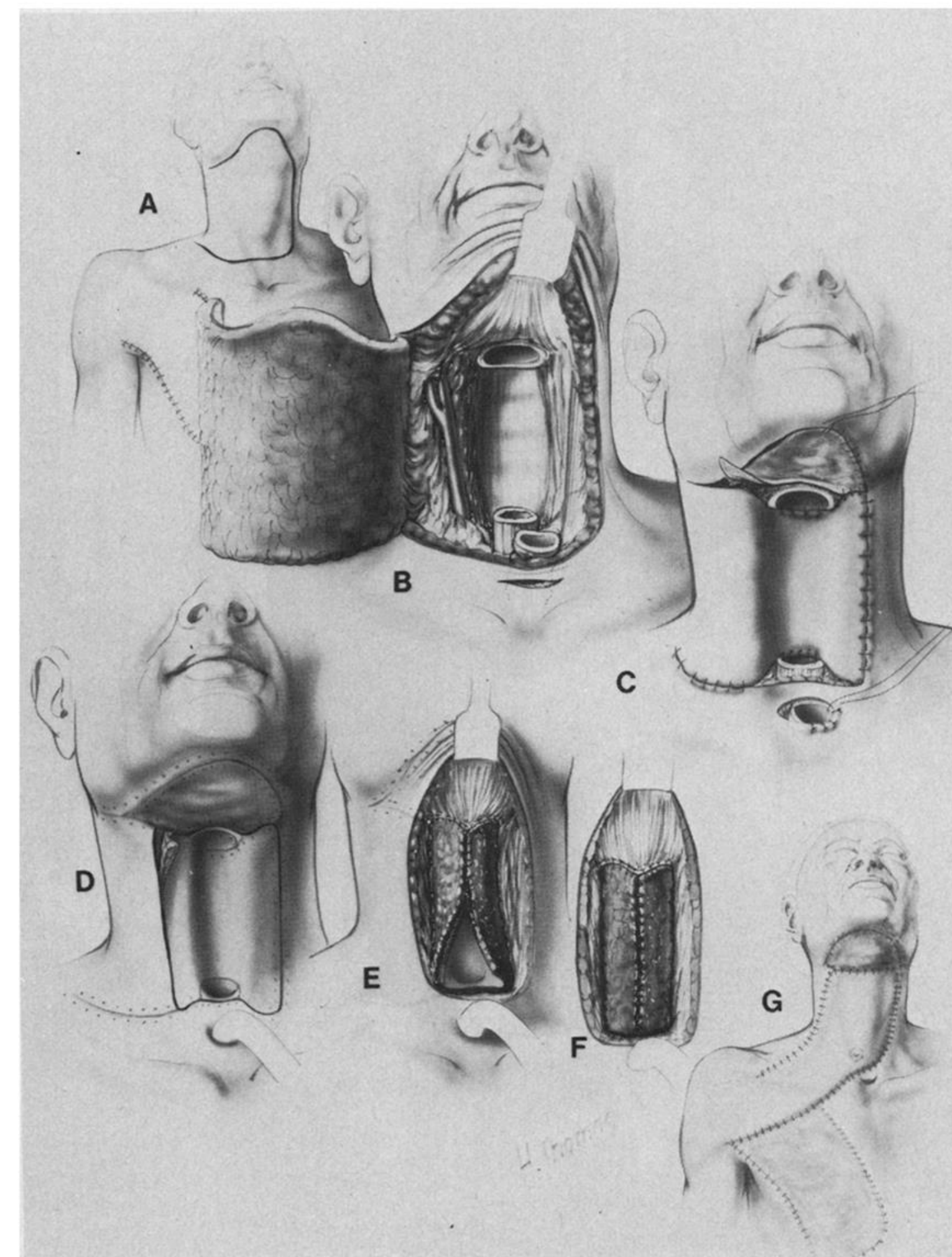
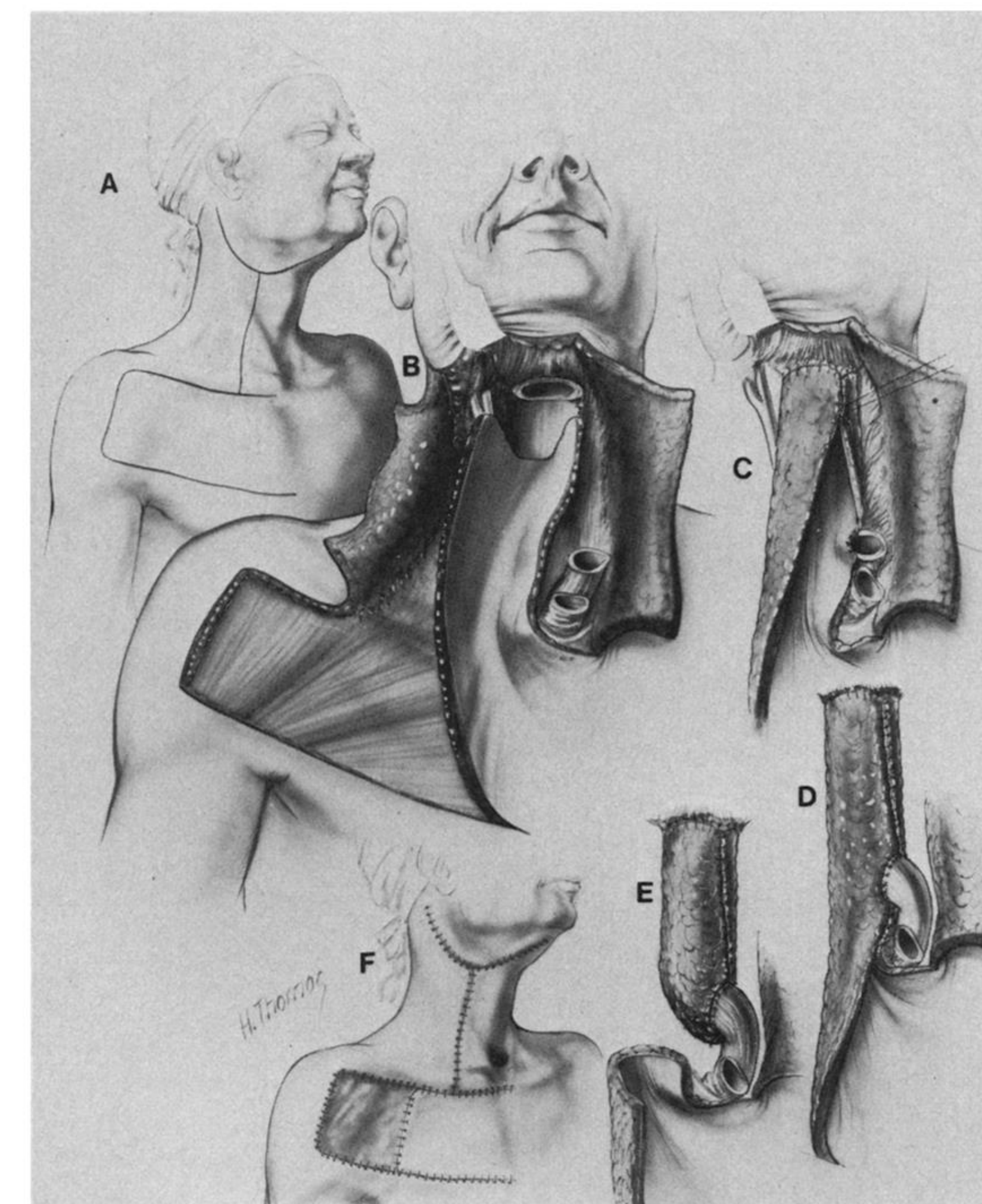


Figure 2 (LEFT): From Silver CE¹¹—A. cervical flap; B. TLP resection; C. 1st stage skin over prevertebral fascia; D-F. 2nd stage tubed flap; G. thoracoacromial skin flap to cover neck soft tissues

Figure 3 (RIGHT): From Silver CE¹¹—A. outline medially-based flap from chest; B. connect to oropharynx and esophageal stump; c. spit fistula; D-E. 2nd stage division and closure; F. skin graft chest/deltoid, return remaining chest flap



Microvascular Free Flap Reconstruction

Subsequently, Hayden¹⁰ and others began perfecting free tissue techniques for head and neck surgery in the mid-1980s. Today, multiple options exist for restoring pharyngo-esophageal continuity; mortality using free flaps and pedicle flaps is now less than 1%. Reconstruction requiring abdominal surgery is more morbid by nature and reserved for advanced cases. While various algorithms have been described for determining reconstructive technique, there is consensus that patient-specific factors should be considered, and options for salvage reconstruction should be available. Review of this historical experience is vital to informing current and future surgeons as we continue to work towards decreasing complications of pharyngeal reconstruction and develop new approaches, with attention to improving functional outcomes.

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