Combined Nerve to Masseter and Mini-Hypoglossal Nerve Transfers in the Oncologic Patient with Proximal Facial Nerve Sacrifice: Maximizing Reliability and Minimizing Synkinesis in the Primary Setting

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**Background:** Proximal facial nerve sacrifice during tumor extirpation poses a challenge in restoring dynamic facial expression. Primary nerve grafting is an option, but nerve grafts may require a long time to reinnervation with the likelihood of significant synkinesis and variable outcomes. Additionally, a proximal facial nerve stump may not be available in advanced cases. In the oncologic setting where life expectancy may be limited, rapid and reliable dynamic reconstruction is ideal. This study describes a new approach using combined nerve to masseter and mini-hypoglossal nerve transfers to the separate distal facial nerve target branches in order to achieve rapid reanimation while minimizing synkinesis.

**Methods:** A retrospective study was performed on all patients who underwent oncologic resection with proximal facial nerve sacrifice between November 2010 and March 2012. Outcomes evaluated included: time to reinnervation, speech, oral competence, tongue atrophy, mastication, and surgical complications. All patients underwent nerve-to-masseter transfer to the upper division of the facial nerve (smile and lower eyelid tone) and mini-hypoglossal transfer to the marginal mandibular nerve (lower lip animation) at the time of oncologic resection (Figure 1). Primary placement of an eyelid weight was used in all patients, and a static sling was placed in select cases to provide symmetry at rest during the period of reinnervation. Cross face nerve grafting was included in select cases.

![Figure 1. Nerve to Masseter and Mini-Hypoglossal Nerve Transfers](image-url)
**Results:** A total of 8 patients were identified. 7 out of 8 patients underwent adjuvant radiotherapy following tumor resection and reconstruction. All patients had evidence of dynamic recovery of smile and lower eyelid function at 3–5 months postoperatively. All patients had oral competence, intelligible speech, no evidence of hemi-tongue atrophy, and no difficulty in mastication or deglutition. All patients had the ability to close their eyes with active lower eyelid motion and no evidence of scleral show or ectropion. Separating the targets of the combined nerve transfers resulted in minimal synkinesis (Figure 2).

![Late post-operative result after combined nerve to masseter and mini-hypoglossal nerve transfers](image)

**Conclusion:** The combined use of targeted nerve to masseter and mini-hypoglossal nerve transfers provides rapid and reliable dynamic facial reanimation. Static procedures may be performed at the same setting to provide symmetry at rest during the 3–5 month reinnervation period. Including a cross-face nerve graft preserves the possibility for a spontaneous facial reanimation in the future.