



Variant Anterior Digastric Muscle Transfer for Marginal Mandibular Branch of Facial Nerve Palsy

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Summary: Marginal mandibular branch of facial nerve (MMBFN) palsy is a common consequence of head and neck surgeries. MMBFN palsy results in paralysis of muscles which depress the inferior lip. Current management of MMBFN palsy involves ruination of normal neuromuscular anatomy and physiology to restore symmetry to the mouth. The article outlines the possibility to transfer variant anterior digastric musculature to accomplish reanimation of the mouth without adversely affecting normal nonvariant anatomy. The procedure may have the additional cosmetic benefit of correcting asymmetrical muscular bulk in the submental region. (*Plast Reconstr Surg Glob Open* 2014;2:e110; doi: 10.1097/GOX.0000000000000059; Published online 18 February 2014.)

MARGINAL MANDIBULAR BRANCH OF THE FACIAL NERVE PALSY

Paralysis of the marginal mandibular branch of the facial nerve (MMBFN) is the most common form of nerve damage occurring during parotidectomy.¹ Palsy incidence has been reported as 26.08% as a result of superficial parotidectomy and 71.42% as a result of total conservative parotidectomy, respectively.² Other iatrogenic causes of MMBFN palsy include carotid endarterectomy,³⁻⁵ submandibular gland excision,^{6,7} rhytidectomy/liposuction,⁸ mandibular osteotomies,⁹ and deep dissection of the neck.¹⁰ MMBFN palsy may also occur as a result of intentional sacrifice during ablative resections.¹¹

The MMBFN supplies depressor muscles of the inferior lip including depressor anguli oris and depressor labii inferioris.¹² Palsy of the MMBFN results in an inability to move the lower lip inferiorly

and laterally and evert the vermillion border.¹³ As a consequence of palsy, there is evident deformity when opening the mouth or smiling. MMBFN palsy management strategies have included chemodeneration with botulinum toxin injections to normal contralateral musculature,¹⁴ muscular transfer of the free extensor digitorum brevis,^{15,16} minihypoglossal nerve transfer to the cervicofacial branch of the facial nerve or direct neurotization of the depressor muscle,^{17,18} resection of the normal contralateral depressor labii inferioris,^{14,19} transfer of the posterior portion of the mylohyoid muscle with a tensor fascia lata graft,²⁰ or muscular transfer of the anterior belly of the digastric muscle.^{11,20,21}

VARIANT ANTERIOR DIGASTRIC MUSCULATURE

Although the posterior digastric muscle belly is innervated by a branch of the facial nerve, namely, the digastric (preparotid) branch of the main branch of the facial nerve, the anterior belly is innervated by the nerve to mylohyoid, a branch from the inferior alveolar nerve of the mandibular division of the trigeminal nerve (V₃).²² Anterior digastric variants have been documented to occur unilaterally, bilaterally, symmetrically, and asymmetrically and insert both ipsilateral and contralateral to the origin

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of the muscle.^{23,24} Variant anterior bellies have been reported to occur at a frequency ranging from 2.7% to 69.6%, respectively.^{25,26}

HYPOTHESIS

If an individual is suffering from MMBFN palsy which remains unresolved while simultaneously possessing a common anatomical variant of the anterior belly of the digastric muscle, then transfer of the variant anterior belly may be a viable option in the management of the palsy. Muscle transfer of variant bellies may be accomplished in a method similar to procedures already utilized in muscle transfer of a nonvariant anterior belly of the digastric muscle.^{11,20,21}

Additional benefit may include cosmetic resolution of a bulky or asymmetrical submental triangle and aesthetic improvement of the cervicomental angle. Partial resection of the anterior digastric musculature contributing to an objectionable cervicomental angle has been performed with good result.²⁷ Therefore, utilizing variant musculature for reanimation of the lower lip may resolve both functional and cosmetic problems with one procedure.

Currently, surgical management of MMBFN palsy involves ruination of normal anatomical structures or physiology. Utilizing aberrant anterior digastric musculature would allow for “normal” anatomy to remain intact.

EVALUATION OF THE HYPOTHESIS

The ideal candidate for the procedure would have MMBFN palsy independent of absence or damage to suprahyoid musculature as may occur in congenital facial hypoplastic syndromes or previous extensive surgery in the digastric triangle, respectively.¹⁶ Additionally, the individual would possess adequate variant anterior digastric anatomy. It is important to note that a great diversity of variant types exists, and the surgeon would need to utilize a variant muscle belly with a length as long as that required of a normal nonvariant anterior belly transfer. Many variants meeting these criteria have been described, including additional muscle bellies spanning from the digastric fossa to the ipsilateral intermediate tendon/hyoid and additional muscle bellies spanning from the digastric fossa to the contralateral tendon/hyoid.^{23,24} Anterior belly of digastric muscle variants have been identified via computed tomography and magnetic resonance imaging^{25,28}; therefore, screening for adequate variant musculature may be accomplished with advanced imaging techniques. Screening the submental region is also important in differentiating variant anterior digastric anat-

omy from submental lymph nodes, space occupying lesions, and muscular asymmetries due to trigeminal nerve lesion.^{25,28–31}

Additional cosmetic benefit may be experienced by an individual with asymmetrical submental bulk due to excessive unilateral muscle tissue. The cervicomental angle of the youthful neck has been reported to be between 105 and 120 degrees.³² With regard to aesthetics, the ideal candidate for the procedure would, therefore, have a cervicomental angle greater than 120 degrees.

Successful outcomes would be characterized by a viable muscle transfer, resolution of facial asymmetry, restoration of facial movement, and symmetry of the suprahyoid region.

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