

Intraoral Masseter Muscle Transposition

Use With Reconstruction of Regional Facial Paralysis

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• The treatment of regional facial paralysis of the lips and commissure by masseter muscle transposition is well accepted and usually accomplished by an external approach. The intraoral transfer demonstrates distinct advantages for the rehabilitation of midfacial regional paresis. The procedure is performed totally introrally, which exposes the masseter muscle before transposing the anterior portion in a subcutaneous tunnel to the upper and lower lips. The effects of this transposition are direct support and immediate contraction, with eventual myoneurotization of the surrounding perioral musculature. The indications, operative considerations, and results in 22 cases are reported. This technique considerably advances the procedural approaches of the reconstructive modalities or as a primary procedure in selected cases. (Arch Otolaryngol 1982;108:397-400)

When regional facial paralysis of the circumoral region manifests itself and when direct nerve reanastomosis, autogenous nerve grafting, or cranial nerve crossover are inapplicable, various other rehabilitative techniques can be used. One of the most reliable is the masseter muscle transposition, which usually is performed through an external approach.

The intraoral technique adds immeasurably to the favorability of choosing this particular method of reconstruction and can be used in conjunction with other ancillary reanimation techniques or as a primary procedure.

The concept of dynamic rehabilitation with intraoral regional muscle transposition is highlighted by many advantages, including lack of external scarring, an immediate effect of perioral support, and simulated contraction, which is complemented by a continued longterm improvement secondary to peripheral myoneurotization and CNS accommodation.

HISTORY

The treatment of regional facial paralysis by muscle transposition begins with Lexer, in 1867, who is credited by Adams¹ as being the first to transfer the masseter muscle intraorally. Lexer continued to make important contributions in this area both intraorally and extraorally, although obtaining poor results secondary to a lack of appreciation for the exacting neurovascular supply of the muscle. De Castro Correia and Zani² noted that Lexer's technique routinely severed the nerve supply to the masseter muscle, re-

sulting in eventual atrophy, lack of coordinated motion, and excessive mass movement with mastication.

Brunner,³⁻⁵ in 1926, repopularized the intraoral approach and wrote extensively on its discrete advantages over the external route. His results were reported as "fair" because he sutured the masseter muscle to the mucosa of the buccal region, which eventually stretched and led to limited support. He also failed to appreciate the concept of myoneurotization and, thus, by suturing to mucosa did not allow the transposed masseter muscle to interact with the circumoral musculature.

Further modifications of masseter muscle transfer were reported by Jianu,⁶ Morestin,⁷ Hastings,⁸ Pickerill,⁹ Owens,¹⁰ and Conley and Gullane.¹¹

TECHNIQUE

The degree and distribution of facial paralysis are meticulously outlined preoperatively with special attention paid to the exact location of the melolabial line, which is appropriately marked to match symmetrically the opposite side. The two external incisions, each measuring 1 cm, are placed in the lateroinferior lip on the vermilion border and half the distance between the proposed melolabial line and the upper lip vermilion border.

Intraoperative distortion of the field is minimized by securely suturing the endotracheal tube to the lateral circumoral area and releasing tension on the anesthetic equipment. An umbrella of prophylactic antibiotic coverage is maintained by intravenous cephalosporin therapy in the immediate perioperative period.

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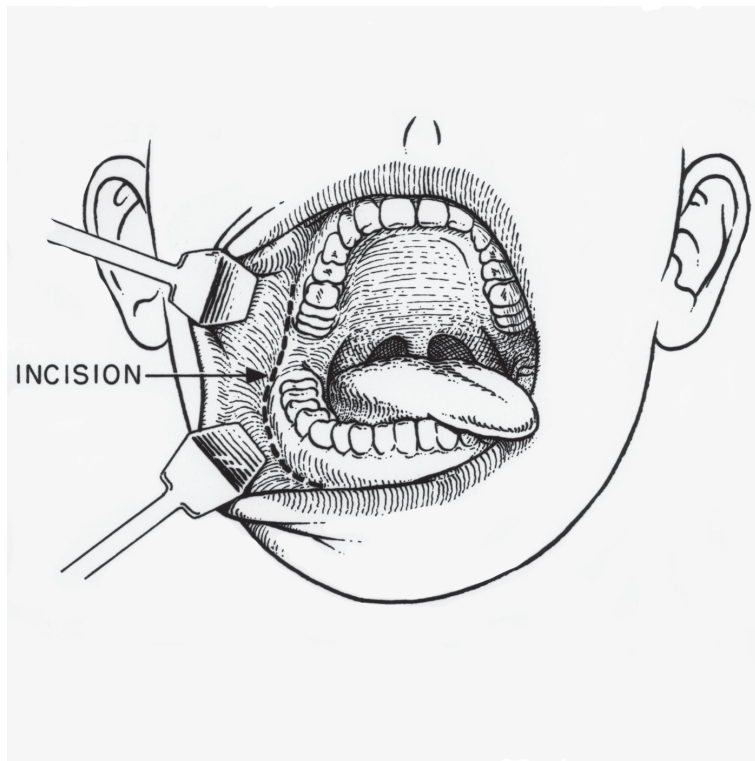


Figure 1. Incision line.

Adequate exposure for this intricate procedure necessitates the use of a fully opened side mouth gag placed on the contralateral side, while an assistant retracts the cheek laterally and the tongue medially (Fig 1). The incision is made on the anterolateral face of the mandible from the area of the ascending ramus to a point just posterior to the mental foramen (Fig 2). The masseter muscle is first freed medially by raising the muscle off the mandible with the large, broad-tipped periosteal elevator, sweeping the dissection to the level of the coronoid process superiorly and to the edge of the mandible inferiorly. The anterior and medial portion of the masseter muscle is thus exposed and is then stabilized with a forceps, while a lateral tunnel is

sharply and bluntly raised with a scissors in a plane just above the masseteric fascia and medial to the soft tissues of the face (Fig 3). Having freed the muscle medially and laterally, it now must be detached from its insertion at the inferolateral edge of the mandible. A curved right-angled scissors is invaluable for this maneuver in which first the muscle is cut inferiorly and then an appropriate amount of the anterior portion (usually half) is split from the remaining posterior segment (Fig 4). This anterior half is then split again, fashioning two slips of muscle that ultimately will be tunneled to the external incisions previously mapped (Fig 5)

The vertical incision in the muscle must not be extended too far superiorly or the

delicate nerve supply to the masseter muscle could be jeopardized. A general guide is to cut only half the distance of the entire muscle. A more sensitive physiologic test that has been described is the "pinch technique," which accurately and immediately senses nerve function during the process of cutting.¹²

Considerable bleeding can occur during this part of the procedure secondary to inadvertent lysis of a usually tortuous facial artery. It is, therefore, advised to clamp the inferior edge of the muscle before incising.

A common tunnel is constructed in a retrograde fashion through the cheek, lateral to the buccinator and inferior to the parotid duct, with extension into the upper and lower lips (Fig 6). As the tunnel

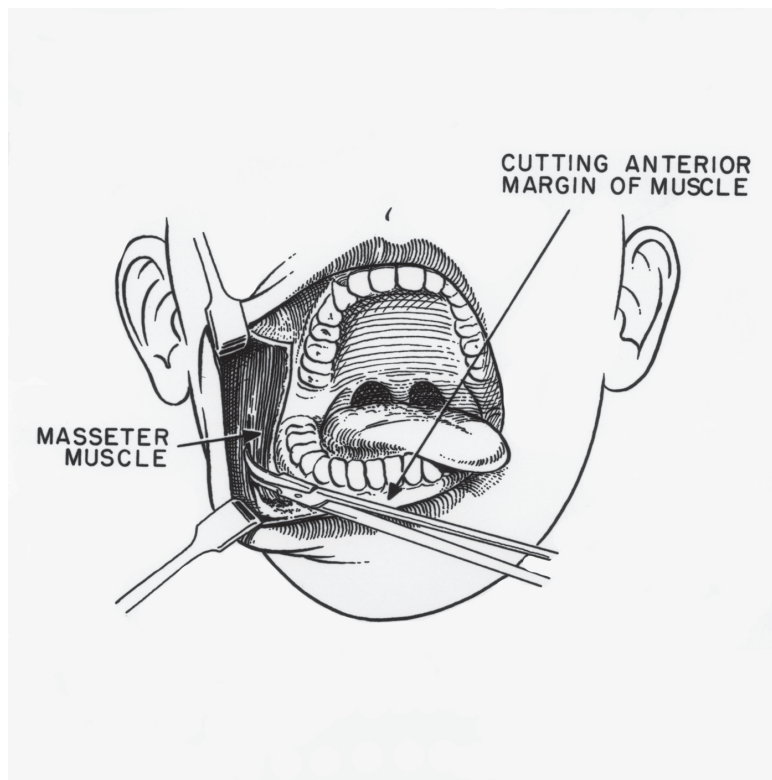


Figure 2. Preparation of anterior segment of masseter muscle.

nears the orbicularis oris, this muscle is purposely savaged to facilitate the process of myoneurotization. Two clamps are then passed through the lip incisions to the intraoral area grasping the slips of the masseter muscle and guiding them into place (Fig 7). Skin hooks are used to notably overcorrect the lips and commissure by pulling upward and laterally while the muscle is fixed in place with two to three stitches of 4-0 white silk (Fig 8). These sutures are placed through the strong fascial segment of the inferior masseter muscle slip and then into the deep dermal layers of the skin. If placed in the soft subcutaneous tissues, the repair will eventually relax and be ineffective. Additional augmentation of the lips can be accomplished by tunneling

the terminal portion of the masseter muscle slip into the lip overlying the atrophic portion of orbicularis oris.

The face is then cleaned and taped with lateral upward traction to reinforce and stabilize their construction. The patient is fed nothing by mouth for five days and can be fed through nasogastric tube or peripheral IV alimentation. The notable over correction always relaxes in one to two weeks and has never had to be released or stretched.

COMMENT

The intraoral masseter muscle transposition has several distinct advantages. It is ideal in the treatment of regional paresis about the upper lip and commissure. Its

lack of external scarring is particularly desirable. It is precise, dependable and offers excellent immediate and long-term results. It does not interfere with the seventh nerve function and, thus, allows the potential for spontaneous regeneration of facial function. It has the capacity to augment atrophic perioral areas and can be combined easily with other facial nerve reconstructive techniques.

The theoretic disadvantages of this intraoral procedure are a lack of exposure and an increased risk of bleeding and infection. When properly performed, however, these factors are negligible.

By its inherent nature, the masseter muscle transposition forces the patient to use a masticatory nerve in the act of smiling. This setting requires intense

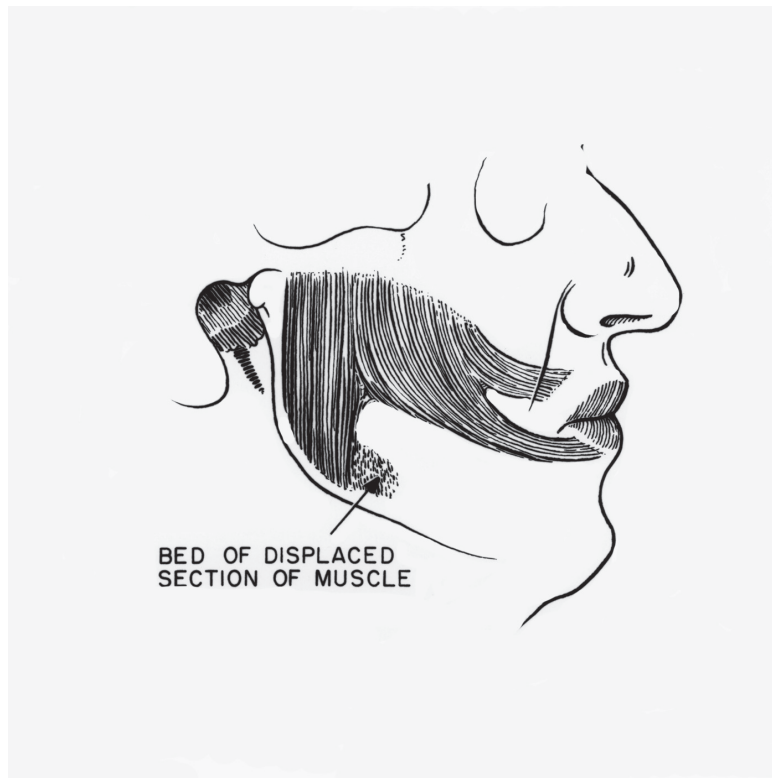


Figure 3. Position of inferior and superior slips of masseter muscle.

self-training and concentration but eventually becomes remarkably effective. The patient gradually learns to bite down while smiling. Children, however, have a tendency to crossover the functions of the two cranial nerves at a high subcortical level and can actually smile without biting down by just concentrating on this particular act. When this smile is constantly reinforced by practicing in front of a mirror, the expected results are exciting and fantastically satisfying for the patient (Figs 9 and 10).

The masseter muscle can never duplicate natural expression. It is used to immediately support the lips and perioral area and to create a fair degree of dynamic movement on conscious mastication. Its long term results, however, offer the patient a realistic degree of facial tone at rest, with notable capabilities to simulate a natural smile on intention. The prime force behind this process is the neurotization of the paralyzed mimetic musculature by the transposed living masseter muscle. The myoneurotization

will continue if the mimetic muscles are alive but will not reinervate atrophic musculature. This intriguing and, as yet, incompletely understood process will be discussed in a forthcoming article.

REFERENCES

1. Adams W: The use of the masseter temporalis and frontalis muscles in the correction of facial paralysis. *Plast Reconstr Surg* 1947;1:216-228
2. De Castro Correia P, Zani R: Masseter muscle rotation in the treatment of inferior facial paralysis. *Plast Reconstr Surg* 1973;52:370-373
3. Brunner H: Plastic operations for paralysis of facial nerve. *Arch Klin Chir* 1926;140:85-100
4. Brunner H: Surgical treatment of facial paralysis. *Arch Otorhinolaryngol* 1926;15:379-382.
5. Brunner H: Endoral plastic correction of results of paralysis of facial nerve. *Wien Klin Wochenschr* 1928;41:876-877.
6. Jianu A: The surgical treatment of facial paralysis. *Dtsch Z Chir* 1909;102:377-379.
7. Morestin H: Section of the facial lingual and superior maxillary nerves by the same projectile: Tentative improvement of the facial paralysis by muscular anastomoses. *Bull Mem Soc Chir Paris* 1915;41:1370-1375.
8. Hastings S: Transplantation of anterior half of masseter muscle for facial paralysis. *Proc R Soc Med* 1920;13:64-65
9. Pickerill P: Facial paralysis, palatal repair and some other plastic operations. *Med J Aust* 1928;1:543-548.
10. Owens N: Surgical correction of facial paralysis. *Plast Reconstr Surg* 1947;2:25-28.
11. Conley J, Gullane P: The masseter muscle flap. *Laryngoscope* 1978;88:605-608.
12. Sachs M, Conley J: The pinch scissors technique. *Laryngoscope* 1981;91:822-825