

Lower Lip Suspension Using Bilateral Temporalis Muscle Flaps and Fascia Lata Grafts

Rodney K. Chan, M.D.
Branko Bojovic, M.D.
Simon G. Talbot, M.D.
Denton Weiss, M.D.
Julian J. Pribaz, M.D.

Fort Sam Houston, Texas; Boston, Mass.; and Virginia Beach, Va.



Summary: Oral incompetence following composite reconstruction of total and subtotal lower lip defects without any functioning lower lip muscle is a difficult problem for reconstructive surgeons. The authors retrospectively reviewed the use of a novel bilateral temporalis suspension technique for oral incompetence following lower lip reconstruction over a 10-year period. The timing of the reconstruction, cause of the defect, period of follow-up, and any complications were noted. Three cases of lower lip resuspension using bilateral temporalis flaps and fascia lata grafts were performed from 2000 to 2010. Two cases were secondary to burn trauma and one was from ballistic trauma. All patients underwent traditional means of reconstruction using free microvascular composite tissue transfer with and without fascial slings. All three patients presented with persistent lower lip incompetence. The average interval between the initial reconstructive operations and the resuspension operations was 1.6 years. All patients achieved dynamic oral competence at the first postoperative visit. At a mean follow-up of 3.6 years, all patients had maintained lower lip function. Dynamic lower lip resuspension with bilateral temporalis flaps and fascia lata grafts is an option for refractory lower lip drooping following total and subtotal loss, especially after conventional static reconstruction and without any functional orbicularis muscle. (*Plast. Reconstr. Surg.* 129: 119, 2012.)

CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, V.

Oral incompetence following composite reconstruction of total and subtotal lower lip defects without any functioning lower lip muscle is a difficult problem for reconstructive surgeons. Traditional methods of reconstruction include placement of a fascial sling at the free border of the reconstructed lip, suspended as a hammock onto the modiolus or the zygomatic arch bilaterally.¹ Both palmaris longus tendons and fascia lata strips have been described for this purpose either as free grafts or as part of a vascularized composite radial forearm flap or antero-lateral thigh flap.² Although a variation of this static sling is used in most cases of lower lip reconstruction, it is far from perfect, and many patients

suffer from recurrent lower lip drooping, manifested as drooling, dribbling, and speech problems, and it is a cause of much social embarrassment.

The ideal lip reconstruction is sensate, dynamic, and aesthetic, and contains an adequate sulcus. This is best accomplished using local lip tissue but almost impossible if the defect is more than 40 percent of the total circumference of the combined lips or more than 80 percent of the lower lip alone.³ In cases of total or subtotal loss, use of nonnative tissue is universally needed, and the incidence of long-term oral incompetence is overwhelming without a functional orbicularis muscle.

The temporalis muscle is a locally adjacent, functional unit which, when used bilaterally, can be an adjunct to a dynamic, voluntary, and synergistic lower lip reconstruction. We report the use of this muscle as a novel technique in lower lip resuspension following conventional static reconstruction.

From the Division of Plastic Surgery, Brigham and Women's Hospital, and the Clinical Division and Burn Center, Brooke Army Medical Center.

Received for publication December 31, 2010; accepted April 12, 2011.

The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or as reflecting the views of the Department of the Army or the Department of Defense.

Copyright ©2011 by the American Society of Plastic Surgeons

DOI: 10.1097/PRS.0b013e31823620b0

Disclosure: *The authors have no financial interest to declare in relation to the content of this article.*

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 01 JAN 2012		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Lower Lip Suspension Using Bilateral Temporalis Muscle Flaps and Fascia Lata Grafts				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S) Chan R. K., Bojovic B., Talbot S. G., Weiss D., Pribaz J. J.,				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Army Institute of Surgical Research, JBSA Fort Sam Houston, TX				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT UU	18. NUMBER OF PAGES 4	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

TECHNIQUE

A preauricular incision extending up into the hairline is made. Anterior and posterior scalp flaps are raised deep to the superficial temporal fascia. The deep temporal fascia cephalad to the zygomatic arch is incised and an inch-wide strip of fascia is dissected and hinged onto the superiormost aspect of the temporalis muscle, as in a Gillies-type temporalis flap for facial reanimation (Figs. 1 and 2). A strip of muscle measuring 5 cm wide is then raised from superior to inferior, down to the zygomatic arch. With the fascial attachment, this musculofascial flap is draped over the zygomatic arch and can reach approximately halfway between the arch and the oral commissure. The junction between the deep temporal fascia and the temporalis muscle is further reinforced using a running Ethibond (Ethicon, Inc., Somerville, N.J.) suture. The zygomatic arch acts as a pulley to

convert the vector of pull from vertical to horizontal (Fig. 3).

A tunnel is made in the subcutaneous plane of each cheek connecting to the oral commissures on each side. Additional dissection is performed in the subcutaneous face-lift plane to properly situate the flap (Fig. 1, *above, right*). An additional tunnel is made just under the free margin of the lip reconstruction (usually in the form of a folded radial forearm or anterolateral thigh flap). A half-inch Penrose drain is tunneled first into this space to facilitate placement of a preharvested segment of fascia lata (approximately 20 cm) (Fig. 1, *below, right*). Finally, the redundant ends of the fascia lata graft are joined to the hanging ends of the temporalis musculofascial flap on each side. The tension is adjusted to simulate the lower lip in repose, erring on the tight side with the expectation that some laxity will result postoperatively (Fig. 2).

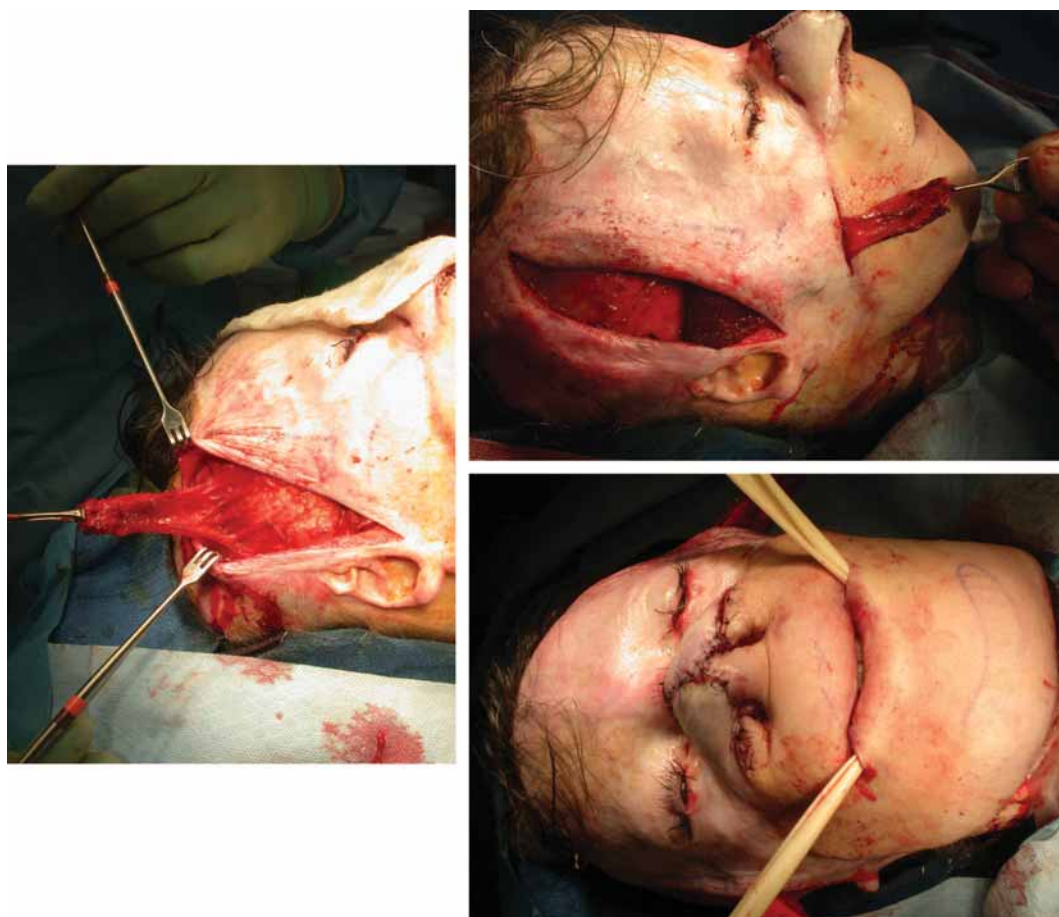


Fig. 1. A preauricular incision extending up into the hairline is made. An inch-wide strip of deep temporal fascia cephalad to the zygomatic arch is incised, dissected, and hinged onto the superiormost aspect of the temporalis muscle (*left*). The temporalis fascia and muscle composite is tunneled in the subcutaneous face-lift plane under the cheek (*above, right*). A half-inch Penrose drain is tunneled under the free margin of the lip reconstruction (*below, right*).



Fig. 2. The tension of the fascia lata strips is adjusted to simulate the lower lip in repose, erring on the tight side with the expectation that some laxity will result postoperatively.

At the first postoperative visit, patients are instructed on the active use of the temporalis muscle, which activates with biting to achieve lower lip elevation. We have performed this procedure in three patients over a 10-year period. Any residual functioning lip muscle usually provides enough strength to achieve adequate mouth closure. For this reason, this is not a more commonly performed procedure.

DISCUSSION

The temporalis muscle is a robust flap, and its transfer has long had a place in the history of facial reanimation. However, no one has explored its potential in resuspension of the lower lip following total or subtotal reconstruction. Gillies first described temporalis turndown flaps for dynamic lower lip reanimation in 1934.⁴ McLaughlin described disinsertion of the muscle from the coronoid through a transoral approach.⁵ Labbé and Huault evolved the technique into a transcutaneous approach and supplemented fascia lata to elongate the temporalis muscle into the commissure.⁶ However, even in the age of microvascular free functional



Fig. 3. A 16-year-old girl sustained severe facial burns caused by a hot oil spill that occurred during infancy. She underwent initial reconstruction with a staged tube pedicle flap from her groin for nose and chin reconstruction which, unfortunately, was totally inadequate. Among her multiple deformities, she had full-thickness upper and lower lip loss and consequent lack of oral competence and frequent oral caries (*left*). To correct her upper and lower lip deficiencies, additional tissue and lining were needed. A radial forearm free flap with palmaris tendon and a bilateral facial artery musculomucosal flap were performed to supplement the needed tissue for lower lip reconstruction. A prefabricated neck flap was performed for upper lip reconstruction. At 3 months postoperatively, however, she had lower lip sagging (*center*). Bilateral dynamic temporalis muscle slings were designed to support her lower face and lips. The mouth closes when she bites down. A satisfactory outcome is seen 2 years after initial presentation with maintained oral competence (*right*).

CODING PERSPECTIVE

This information prepared by Dr. Raymond Janevicius is intended to provide coding guidance.

15732	Temporalis muscle flap, right
15732-51	Temporalis muscle flap, left
20922-51	Fascia lata graft

- The temporalis flap is a muscle flap reported with code 15732.
- Each temporalis flap is reported separately, so code 15732 is listed twice.
- Although this is a bilateral procedure, the bilateral modifier, -50, is not used. Modifier 50 is only recognized with certain CPT codes (see the American Medical Association publication *Medicare RBRVS: The Physician's Guide*). The multiple procedure modifier, -51, is used when more than one muscle flap is performed.
- The fascia lata graft is not considered part of the muscle flap code, 15732, and is reported separately using code 20922.
- Some payers will not reimburse for more than one listing of the same CPT code unless modifier 59 (distinct procedure) is appended:

15732	Temporalis muscle flap, right
15732-59	Temporalis muscle flap, left
20922-51	Fascia lata graft

- Other reconstructive procedures, such as local flaps or free flaps, are reported separately.

muscle transfer, the temporalis flap still holds a place in the reconstruction of the paralyzed face, especially outside the pediatric age group.

Reported experience for lower lip reconstruction using anterolateral thigh flap with fascia lata showed that, among 15 patients with combined upper and lower lip defects, seven showed some degree of oral incompetence and needed additional operations to maintain this.² To our knowledge, the temporalis muscle has never been reported for dynamic lower lip resuspension. In our small series, these flaps are used in refractory cases

where a primary sling has already failed. Plication, shortening, and tightening of the fascial slings represent other possible revisions in addition to performing a bilateral temporalis muscle transfer. Another inherent advantage to the bilateral temporalis sling is that symmetry is often easier to accomplish. Risks to the temporalis transfer include skin slough, alopecia, facial nerve injury, and an unsightly bulge at the pivot point over the zygomatic arch. Temporal hollowing is another possible side effect but was not observed in our small series. Because only a central slip is taken, the origin and insertion of the other fibers were preserved and their neuromuscular junctions left undisturbed. The benefit of the procedure in our opinion much outweighs the risks, as the final result is a more functional, durable, and aesthetic lower lip.

CONCLUSION

Dynamic lower lip resuspension with bilateral temporalis flaps and fascia lata grafts is an option for refractory lower lip drooping following total and subtotal loss, especially after conventional static reconstruction and without any functional orbicularis muscle.

Julian J. Pribaz, M.D.

Division of Plastic Surgery
Department of Surgery
Brigham and Women's Hospital
75 Francis Street
Boston, Mass. 02115

PATIENT CONSENT

Patients provided written consent of the use of their images.

REFERENCES

1. Rose EH. Autogenous fascia lata grafts: Clinical applications in reanimation of the totally or partially paralyzed face. *Plast Reconstr Surg*. 2005;116:20-32; discussion 33-35.
2. Jeng SF, Kuo YR, Wei FC, Su CY, Chien CY. Total lower lip reconstruction with a composite radial forearm-palmaris longus tendon flap: A clinical series. *Plast Reconstr Surg*. 2004;113:19-23.
3. Lehman JA Jr. The dynamic Abbe flap. *Ann Plast Surg*. 1979;3:401-405.
4. Gillies H. Experiences with fascia lata grafts in the operative treatment of facial paralysis: (Section of Otology and Section of Laryngology). *Proc R Soc Med*. 1934;27:1372-1382.
5. McLaughlin CR. Surgical support in permanent facial paralysis. *Plast Reconstr Surg* (1946) 1953;11:302-314.
6. Labbé D, Huault M. Lengthening temporalis myoplasty and lip reanimation. *Plast Reconstr Surg*. 2000;105:1289-1297; discussion 1298.