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Selective orbicularis neuromyectomy for postparetic periocular synkinesis[☆]

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KEYWORDS

Synkinesis;
Facial paralysis;
Neuromyectomy;
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Summary *Background:* Facial synkinesis is a distressing consequence of incomplete recovery from facial paralysis. The author presents selective orbicularis neuromyectomy as an alternative surgical treatment for periocular synkinesis.

Methods: Eleven patients (eight women and three men; mean age: 67 years; range: 50–77 years) with postparetic facial synkinesis underwent selective orbicularis neuromyectomy at our hospital between March 2010 and December 2013. All 11 patients exhibited ocular hypertonicity and synkinetic eye closure during voluntary oral movements. The causes of the subjects' facial palsy were as follows: Bell's palsy, seven cases; Hunt's syndrome, two cases; and brain tumor resection, two cases. The patients' preoperative and postoperative facial function levels were evaluated using the Sunnybrook scale.

Results: The mean duration of the follow-up period was 37 months (range: 12–57 months). During follow-up, all 11 patients showed decreasing ocular hypertonicity and less marked synkinetic ocular movements. The subjects' mean synkinesis score fell by 4.5 points (48%). One patient demonstrated lower lid ectropion at 1 postoperative month, which was repaired secondarily. No other postoperative complications occurred.

Conclusions: Selective orbicularis neuromyectomy is simple and effective for patients who exhibit periocular synkinesis after facial paralysis, and it should be considered as an alternative treatment for periocular synkinesis.

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Introduction

Facial synkinesis is one of the most troubling sequelae of facial nerve paralysis. The most common synkinetic pattern involves the involuntary contraction of the elevators of the corners of the mouth (lifting the corners of the mouth) at the same time as the voluntary contraction of the orbicularis oculi (closing the eye), and vice versa.^{1,2} Although there is no consensus regarding the best treatment for facial synkinesis, the most commonly used therapeutic modalities include botulinum toxin type A (BTX-A) injections for selective chemodenervation of the affected muscle groups and facial neuromuscular retraining.^{1,3–5} However, the effects of BTX-A are temporary, and neuromuscular retraining generally takes a long time, and it does not guarantee good outcomes.

However, several surgical treatments have been demonstrated to be effective for facial synkinesis.^{6–10} This article describes the satisfactory results obtained in 11 cases in which selective orbicularis neuromyectomy was used to treat periocular synkinesis. This technique could become an alternative treatment for postparetic facial synkinesis.

Patients and methods

Between March 2010 and December 2014, 11 patients (eight women and three men; mean age: 67 years; range: 50–77 years) who were suffering from ocular hypertonicity and synkinetic eye closure during voluntary oral movement after facial paralysis underwent selective orbicularis neuromyectomy at Tominaga Hospital. All of the patients displayed high lower eyelid margins due to ocular hypertonicity. The patients' facial synkinesis was caused by Bell's palsy (seven patients), Hunt's syndrome (two patients), and brain tumor surgery (two patients). Three patients who had a history of previous surgical blepharoplasty or brow lifting were referred to our hospital because their symptoms had not been resolved. One patient was referred to our hospital due to refractory facial synkinesis after repeated botulinum toxin chemodenervation at another hospital. Upper eyelid blepharoplasty and/or brow lifting was performed at ≥ 6 postoperative months if necessary. The interval between the onset of facial paralysis and surgical treatment ranged from 12 months to 27 years (mean interval: 6 years). The patients' preoperative and postoperative facial functions were evaluated using the Sunnybrook scale.

Surgical technique

Under general anesthesia, a subciliary incision is made in the affected lower eyelid, and a skin–muscle flap is elevated. The tissue between the orbicularis oculi muscle and the orbital septum is dissected, and the dissection continues beyond the peripheral margin of the muscle. Using a nerve stimulator, the branches innervating the muscle are identified as accurately as possible. Then, a peripheral strip (1 cm wide) of the lower orbicularis muscle extending from the lateral canthal level to the medial side is resected together with the innervating

facial nerve branches. The most medial part of the muscle is preserved to avoid injuring the angular artery and vein. The upper orbicularis oculi muscle and the nerves innervating it are left intact. After meticulous hemostasis, the lower lid skin–muscle flap is retracted superolaterally, and any excess tissue is removed. Then, the flap is fixed to the periosteum of the lateral orbital rim using absorbable sutures to prevent early postoperative ectropion. A pressure dressing is applied after wound closure to prevent subcutaneous hematomas. The procedure takes approximately 90 min (Figure 1(a,b)).

Results

The results of this study are summarized in Table 1. Secondary blepharoplasty and/or brow lifting was necessary in six patients. In one patient who had undergone excessive brow lifting at another hospital, temporal branch neurectomy to lower the patient's eyebrows was performed at the same time as the selective orbicularis neuromyectomy because the patient's eye did not close during gentle eye closure (Case 5). The mean duration of the postoperative follow-up period was 37 months (range: 12–57 months). After surgery, lower lid motion and periocular synkinesis tended to recur within 6 months; however, the patients' periocular movements became stable within 12 months. Although the periocular synkinesis persisted, all 11 patients experienced marked improvements in their symptoms (Figs. 2–4) (Videos 1–4). One patient suffered lower lid ectropion due to loosening of the fixation suture at 1 postoperative month, which was repaired secondarily. No other postoperative complications occurred. The subjects' postoperative facial functions were evaluated using video and the Sunnybrook scale at 12 postoperative months. The mean preoperative Sunnybrook score was 50.7, and it increased to 55.4 postoperatively. Regarding the patients' mean synkinesis score, it decreased by 4.5 points (pre: 7.9, post: 3.4), that is, by 48%, after the operation.

Supplementary video related to this article can be found at <http://dx.doi.org/10.1016/j.bjps.2015.06.015>.

Discussion

Although surgical treatment has never played a substantial role in the treatment of facial synkinesis, there are several surgical procedures that are potentially useful, including selective neurectomy, myectomy, and cross-facial nerve grafting with or without BTX-A injections.^{6–10}

Selective neurectomy involves dividing the peripheral facial nerve branches to decrease the number of nerve impulses being delivered to the affected muscle. However, it can be difficult to achieve consistent results with this procedure because of the extensive anastomosis between the facial nerve branches. However, the selective neurectomy technique proposed by Hohman et al.⁸ is a possible solution to this problem because its effectiveness can be predicted by getting the patient to smile during the procedure. Myectomy involves the partial resection of the

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