

CASE REPORT

The First Report on Masseteric–Facial Nerve Anastomosis in Thailand

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ABSTRACT

Aim: To demonstrate the first report on Masseteric–facial nerve reanimation in Thailand.

Background: Facial nerve paralysis is devastating for patients. Most of the patients suffer from stigma and social phobia. There are many options for treating the facial nerve paralysis including dynamic and static procedures dependent on the patient situation. Masseteric–facial nerve reanimation is a dynamic procedure suitable for the patient in the absence of a proximal facial nerve stump, with low donor site deformity and being easy to train in the postreanimation phase. We applied the first facial reanimation by masseteric–facial nerve anastomosis to a Thai patient.

Review result: The patient had right facial nerve paralysis from the right temporal bone fracture in a motorcycle accident. The patient developed delayed onset of complete paralysis. After exploration, operative findings showed a torn right facial nerve at the tympanic segment of the geniculate ganglion and second genu. Masseteric–facial nerve anastomosis was applied for this patient. The right greater auricular nerve was used for the nerve graft to connect between the proximal stump of the masseteric nerve and the distal stump of the main trunk facial nerve. There were no postoperative complications. After 3 months, the postoperative facial muscle tone returned and after 4 months, when the patient tried chewing using the masseter muscle, some movement of the facial muscle was detected.

Conclusion: Masseteric–facial nerve reanimation is the treatment of choice for dynamic facial nerve reanimation in facial nerve paralysis patients where the proximal nerve stump is absent or in the cases of intratemporal injury to the facial nerves.

Keywords: Dynamic facial reanimation, Facial palsy, Facial reanimation, Masseteric nerve, Masseteric to facial reanimation, Nerve anastomosis, Nerve graft, V-VII anastomosis.

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BACKGROUND

Facial nerve paralysis is particularly devastating for patients. With facial nerve paralysis, patients look like they have a stigma and may suffer social phobia. Because of the complexity and delicate work required for the facial muscles, it is very challenging to do facial nerve reanimation, especially for patients who need to sacrifice their facial nerves from a malignant tumor of the parotid gland or patients who did not have the proximal stump for anastomosis. We report the first case report in Thailand that used techniques of masseteric–facial nerve anastomosis for a dynamic facial nerve reanimation.

CASE DESCRIPTION

The patient, a Thai male aged 25 years, had a motorcycle accident 6 months before the dynamic facial nerve reanimation surgery. He was not wearing a helmet and suffered a subdural hematoma, epidural hematoma, and fracture of the temporal bone with otic disruption. He received conservative treatment at another hospital and 5 months prior to the surgery he experienced delayed onset of complete paralysis of the right facial nerve. He was referred to King Chulalongkorn Memorial Hospital for further treatment. At the King Chulalongkorn Memorial Hospital, he underwent an electromyography, which revealed right facial nerve degeneration of all branches without signs of regeneration. Three months before the surgery, he received an operation for facial nerve decompression with ossicular chain reconstruction. Operative findings showed a torn right facial nerve at the tympanic segment of the geniculate ganglion and second genu with cerebrospinal fluid leakage at the

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tegmen tympani. After the decompression surgery, he still had right facial nerve paralysis grade VI (House–Brackmann grading) and was sent to the facial plastic and reconstructive surgery clinic for facial nerve reanimation.

Patient Evaluation and Assessment

In facial nerve reanimation, we divide the motor nerve functions into three factors like an electrical motor: firstly, the nerve impulse is like an electrical current; secondly, the nerve fiber is like an electrical wire; and thirdly, the neuromuscular junction serves as a motor. If we lose one part of the three, there is no motor function. With regard to the nerve fibers, if there is a gap, the important thing is that the proximal and distal stumps can still be identified. If both

proximal and distal stumps remain, the nerve graft is applied. If the proximal stump is absent as with this patient, nerve transposition or cross facial nerve is applied for paralysis. If the proximal stump is present but the distal stump is absent, direct muscular neurotization may be applied.¹

This patient’s condition showed that the proximal stump was absent due to the temporal bone fracture after waiting for uncertain facial nerve continuity. There was no recovery of the right facial nerve paralysis. The site of injury was the intratemporal bone so it was difficult to identify the exact site of injury. This patient was suitable for the treatment of the absent proximal stump condition using the nerve transposition technique. We discussed with the patient about dynamic facial nerve reanimation using masseteric–facial nerve anastomosis technique to provide informed consent about the operation and possible complications.

Surgical Technique

The patient was operated using general anesthesia. In the supine position, a face-lift incision was applied. The right greater auricular nerve was identified and harvested for a nerve graft, after which the right parotid gland and the main trunk of the right facial nerve were identified. Then, the facial nerve was cut 1 cm distal to the stylomastoid foramen to ligate the proximal stump. The masseteric nerve was identified by the landmarks of 1 cm inferior to the zygomatic arch, 1 cm posterior to the anterior border of the masseter muscle, and 1–1.5 cm deep from the masseter muscle (as in Fig. 1). The first anastomosis site was done at the distal stump of the main trunk facial nerve with a greater auricular nerve graft. The second anastomosis was done from the proximal nerve graft with the masseteric nerve (Fig. 1). Bleeding was checked and stopped. A vacuum drain was placed away from the nerve. The subcutaneous tissues and skin were closed layer by layer.²

Postoperative Course

The patient was admitted to the hospital for 4 days after the operation. The vacuum drain was removed on the second postoperative day and the skin stitches were removed 7 days after the operation. After 3 months, the postoperative facial muscle tone returned, and after 4 months, when the patient tried chewing using the masseter muscle, some movement of the facial muscle was detected (Fig. 2).

DISCUSSION

There are many techniques for facial nerve reanimation depending on the cause and timing of the facial nerve paralysis. Intraoperatively, if the facial nerve is cut and the gap is less than 1 cm, a simple neuroorrhaphy or nerve conduit is undertaken. If the gap is more than 1 cm, then the nerve graft is the treatment of choice. All the nerve grafts used for the donor nerve graft involve the sensory nerves from various donor sites, such as greater auricular, supraclavicular, and sural nerve graft. If a facial nerve paralysis occurs from the temporal bone fracture or postoperative cerebellopontine angle tumor removal, the proximal stump cannot be identified. Treatment for this condition is nerve transposition from other motor nerves. Hypoglossal nerve transposition (CN XII–CN VII) is the traditional technique using the motor nerve that supplies tongue movement for facial muscle movement. The disadvantage of this technique, however, is tongue atrophy. It creates problems for the patient with swallowing and speaking. Even though an end-to-side technique was applied to reduce donor site morbidities, some problems

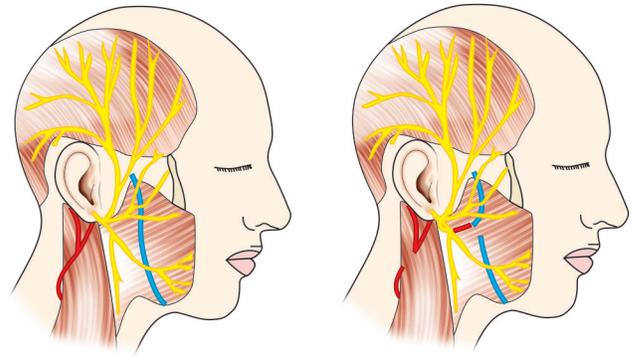
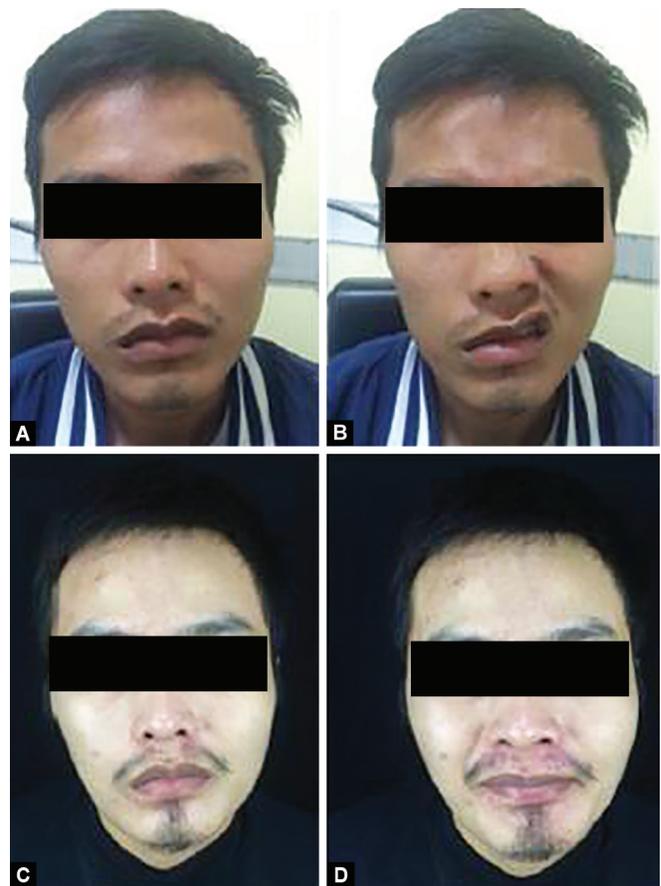


Fig. 1: Surgical anatomy of masseteric nerve. Red color: Greater auricular nerve; Blue color: Masseteric nerve; Yellow color: Facial nerve



Figs 2A to D: Preoperative and postoperative pictures. (A) Before surgery—at rest; (B) Before surgery—when stretching the masseter muscle; (C) 6 months after surgery—at rest; (D) 6 months after surgery—when stretching the masseter muscle

remain and the patient needs to undergo new reanimation to move the tongue for facial muscle movement. Spinal accessory nerve transposition (CN XII–CN VII) is not popular because of problems with the muscles that are supplied by this nerve.

Spira used masseteric–facial transposition (CNV–CNVII) for a lower division facial nerve paralysis in 1978.³ This technique used the nerve to masseter as a motor branch of the trigeminal nerve

(CN V). The advantage of this technique is that there is no obvious donor site morbidity, only masseter muscle atrophy, and patients can easily learn new facial movements because chewing to move the facial muscles is easier than moving the tongue to move the facial muscles.

We dissected two cadavers to identify the masseteric nerve before applying this technique to our patient.

The disadvantage of this technique is the masseter muscle atrophy caused by denervation. That results in the patient having a mild-to-moderate facial asymmetry in the mid and lower face.^{4–6}

CONCLUSION

Masseteric–facial nerve reanimation is the treatment of choice for a dynamic facial nerve reanimation in facial nerve paralysis patients where the proximal nerve stump is absent or in the cases of intratemporal injury to the facial nerves. This technique has low morbidity and makes voluntary training of the novel nerve innervation easy.

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