Power And Coordination For Facial Reanimation - Dual Innervation of Free Gracilis Transfer Using Masseteric Nerve And Cross-Facial Nerve Graft

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Background

Restoration of spontaneous, synchronous and powerful facial movement is the main aim of facial reanimation surgery. The gold standard surgical treatment for long-standing unilateral facial paralysis is a 2-stage reconstruction with cross-facial nerve graft (CFNG) followed by free muscle transfer[1]. Although spontaneity and synchronicity is achieved with this technique, the power of contraction may be weaker than desired. This study aims to examine the effect of the simultaneous use of CFNG (to provide coordination) and masseteric nerve (to provide powerful contraction) for dual innervation of free gracilis transfer.

Methods

Between August 2012 and February 2014, 8 patients [6 females and 2 males; mean age 35 (range 30-46)] with long-standing unilateral facial paralysis underwent 2-stage facial reanimation. The first stage involved CFNG, using the sural nerve. The second stage involved free gracilis muscle transfer innervated by both CFNG and ipsilateral masseteric nerve. The mean duration of facial palsy was 46 moths (range 38 – 85 months).

Postoperative clinical examinations were performed at 3, 6 and 12 months. EMG was used to assess the reinnervation. Clinical outcomes were evaluated using Terzis' Functional and Aesthetic Grading System.

Results

Improvement in the resting tone was noted at 2 months postoperatively in all patients. Voluntary contraction in response to masseteric nerve activation was observed at 3 months (approximately 4 months earlier than with CFNG alone). All patients underwent post-operative rehabilitation and spontaneous contraction was achieved in 10 – 11 months. No major complications occurred. No weakness in the healthy facial nerve or in the masseter muscle was detected.

Conclusion

Facial reanimation using CFNG results in spontaneity and synchronicity with the healthy side. Additional simultaneous masseteric coaptation allows for fast and powerful reinnervation. This dual innervation technique combines the benefits, resulting in powerful and coordinated facial movements.

References

1. Frey M, Giovanoli P. The three-stage concept to optimize the results of microsurgical reanimation of the paralyzed face. Clin Plast Surg 2002;29: 461–482.

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