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ORIGINAL ARTICLE

Outcome of different facial nerve reconstruction techniques☆

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KEYWORDS
Facial nerve;
Hypoglossal nerve;
Nerve reconstruction;
End-to-side anastomosis;
Acoustic neuroma

Abstract
Introduction: There is no technique of facial nerve reconstruction that guarantees facial function recovery up to grade III.
Objective: To evaluate the efficacy and safety of different facial nerve reconstruction techniques.
Methods: Facial nerve reconstruction was performed in 22 patients (facial nerve interpositional graft in 11 patients and hypoglossal-facial nerve transfer in another 11 patients). All patients had facial function House-Brackmann (HB) grade VI, either caused by trauma or after resection of a tumor. All patients were submitted to a primary nerve reconstruction except 7 patients, where late reconstruction was performed two weeks to four months after the initial surgery. The follow-up period was at least two years.
Results: For facial nerve interpositional graft technique, we achieved facial function HB grade III in eight patients and grade IV in three patients. Synkinesis was found in eight patients, and facial contracture with synkinesis was found in two patients. In regards to hypoglossal-facial nerve transfer using different modifications, we achieved facial function HB grade III in nine patients and grade IV in two patients. Facial contracture, synkinesis and tongue atrophy were found in three patients, and synkinesis was found in five patients. However, those who had primary direct facial-hypoglossal end-to-side anastomosis showed the best result without any neurological deficit.
Conclusion: Among various reanimation techniques, when indicated, direct end-to-side facial-hypoglossal anastomosis through epineural suturing is the most effective technique with excellent outcomes for facial reanimation and preservation of tongue movement, particularly when performed as a primary technique.

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PALAVRAS-CHAVE
Nervo facial;
Nervo hipoglosso;
Reconstrução de nervos;
Anastomose término-lateral;
Neuroma acústico

Resultados de diferentes técnicas de reconstrução do nervo facial

Resumo
Introdução: Não existe uma técnica de reconstrução do nervo facial que garanta a recuperação da função facial até o grau III.
Objetivo: Avaliar a eficácia e segurança de diferentes técnicas de reconstrução do nervo facial.
Método: Ao todo, 22 pacientes foram submetidos a reconstrução do nervo facial (enxerto com interposição do nervo facial em 11 pacientes e com transferência do nervo hipoglosso facial em 11 pacientes). Todos os pacientes apresentavam função facial de grau VI (de acordo com a classificação de House-Brackmann – HB) causada por trauma ou pela ressecção de um tumor. A reconstrução do nervo principal foi efetuada, exceto em sete pacientes, nos quais a reconstrução foi realizada entre duas semanas a quatro meses após a cirurgia inicial. O período de acompanhamento foi de, no mínimo, dois anos.
Resultados: Para a técnica de enxerto com interposição de nervo facial, o grau de função facial obtido foi HB III em oito pacientes e HB IV em três pacientes. Sincinesia foi observada em oito pacientes e contratura facial com sincinesia em dois pacientes. Em relação à transferência do nervo hipoglosso facial com o uso de diferentes modificações, obtivemos função facial HB grau III em nove pacientes e HB grau IV em dois pacientes. Contratura facial, sincinesia e atrofia lingual foram observadas em três pacientes e sincinesia observada em cinco pacientes. No entanto, aqueles submetidos a anastomose primária direta hipoglosso-facial término-lateral apresentaram o melhor resultado, sem qualquer déficit neurológico.
Conclusão: Entre as várias técnicas de reanimação, sempre que possível, a anastomose direta término-lateral hopoglosso-facial por meio de sutura epineural é a técnica mais eficaz, com excelentes resultados para reanimação facial e preservação do movimento da língua, especialmente quando realizada como técnica primária.

Introduction

There are different surgical techniques for facial nerve reconstruction. Ideal repair consists of direct nerve repair, but sometimes a cable nerve graft is needed if a tension-free anastomosis cannot be achieved without a nerve graft. If this is not feasible, other techniques should be used, such as cross-facial nerve grafting, nerve muscle transposition, and cross-over motor cranial nerve substitution.[1] In 1901, Körte described the anastomosis of the facial nerve (VII nerve) to the side of the hypoglossal nerve (XII nerve).[2] In 1979, Conley et al. described the first end-to-end VII–XII suture. Several modifications have since been reported, including ''split'' XII–VII transfer, in which 30% of the hypoglossal nerve is divided and secured to the lower division of the facial nerve.[3] In 1991, May et al. described the VII–XII jump graft. This involves end-to-side neurorrhaphy using a donor cable graft.[4] In 1997, Atlas and Lowinger described a new modification in which the facial nerve was mobilized from the second genu and reflected inferiorly for direct anastomosis to the hypoglossal nerve.[5] We present our results of facial function in a group of patients who developed facial paralysis due to different causes, along with their long term outcomes, using different techniques of nerve reconstruction, including the latest end-side facial hypoglossal nerve anastomosis.

Methods

We reviewed the medical records of 22 patients operated for facial nerve paralysis at our institution between 1991 and 2013. The average age was 53.5 years (18–81 years) (Fig. 1A). Facial paralysis was due to different reasons (Fig. 1B). The clinical assessment of facial function was grade VI in all patients according to House-Brackmann grading system, because the facial nerve was either severed intra-operatively by trauma or facial paralysis developed in spite of the maintenance of the integrity of the facial nerve. All data regarding age and sex of the patients, and etiology or duration of the paralysis and long term results (at least two years follow-up) were obtained (Tables 1 and 2). All patients were evaluated regarding the facial nerve function, facial contracture, synkinesis and tongue atrophy. All patients signed an informed written consent.

Operative techniques

We have used different techniques for facial nerve reconstruction. In eleven cases, we have performed facial nerve interpositional graft where a cable graft (great auricular nerve or cervical cutaneous nerves) was employed to span the distance between the proximal and distal