

Hypoglossal-facial nerve anastomosis for reinnervation of the paralyzed face

Thesis presented by

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Submitted for partial fulfillment of M.D. degree
in Otorhinolaryngology

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2006

جامعة القاهرة / كلية الطب
الدراسات العليا

محضر

إجتماع لجنة الحكم على الرسالة المقدمة من
الطبيب / احمد حسين عبد الجواد
توطئة للحصول على درجة الدكتوراه
في الأذن والأنف والحنجرة

عنوان باللغة الانجليزية:-

Hypoglossal facial nerve anastomosis for reinnervation of the
paralyzed face

اللغة العربية : توصيل عصب تحت اللسان بعصب الوجه لاعادة الوظيفة العصبية

للوجه المصاب بالشلل

بناء على موافقة الجامعة بتاريخ ٢٦ / ٣ / ٢٠٠٦ تم تشكيل لجنة الفحص والمناقشة
للرسالة المذكورة أعلاه على النحو التالي :

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بعد فحص الرسالة بواسطة كل عضو منفردا وكتابة تقارير منفردة لكل منهم انعقدت اللجنة
مجتمعة في يوم الثلاثاء بتاريخ ٤ / ٧ / ٢٠٠٦ الساعة ١١ صباحا مدرج العيادة الخارجية
بكلية الطب - جامعة القاهرة وذلك لمناقشة الطالب في جلسة علنية في موضوع الرسالة
والنتائج التي توصل اليها وكذلك الأسس العلمية التي قام عليها البحث .

قرار اللجنة : قبول الرسالة

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Abstract

Hypoglossal-facial nerve anastomosis had been recommended for patients with loss of the proximal stump of the facial nerve secondary to removal of skull base tumours. This study was conducted on 15 patients with facial paralysis. Patients were grouped into 2 groups operated by modified and classical techniques of hypoglossal-facial nerve anastomosis respectively. It was concluded from our study that the modified techniques of hypoglossal-facial nerve anastomosis are valuable techniques for reinnervation of the paralyzed face without tongue affection.

Key words:

- **Facial nerve**
- **Hypoglossal nerve**
- **Paralyzed face**

Dedication

To my mother, my wife and my lovely daughter (Laila).

Acknowledgements

First and foremost, thanks to God to whom; I relate any success or achievement in my life.

I would like to express my deepest appreciation to prof. Dr. Sherif Adly professor of Otorhinolaryngology, Faculty of Medicine, Cairo University for his kind supervision, precious advice and continuous guidance throughout this study.

I am greatly thankful to prof. Dr. Ahmed Zohdi, professor of neurosurgery, Faculty of Medicine, Cairo University for his sincere help, great comments and close supervision throughout this work.

I am extremely grateful to prof. Dr. Louay El-Sharkawy professor of Otorhinolaryngology, Faculty of Medicine, Cairo University for his generous encouragement and support advocating much of his time and effort for the supervision of this work.

My sincere gratitude is addressed to prof. Dr. Ismail Zohdi professor of Otorhinolaryngology and Dr. Mohamed Mosleh Lecturer of Otorhinolaryngology, Faculty of Medicine, Cairo University for their sincere help throughout this work.

Many thanks to all Otorhinolaryngology and neurosurgery doctors who have shared in bringing this presentation to light.

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Introduction

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Aim of work

Introduction

Paralysis of the facial nerve has variable consequences due to multiple functions under its domain (Hammerschlag, 1999).

Preservation of facial nerve function is a major challenge to the surgeon involved in temporal bone and cerebellopontine angle surgery. Despite advances in intraoperative facial nerve monitoring, damage to the facial nerve still occurs (Manni et al., 2001).

While facial reanimation surgery is designed to restore facial movement, reconstruction of appropriate emotional facial expression is particularly elusive. Facial expression is a vital form of non verbal communication whose absence accentuates feelings of isolation (Hammerschlag, 1999).

Numerous options are available for rehabilitation of prolonged facial paralysis. The rehabilitation procedures can be divided into dynamic and non dynamic procedures. Dynamic procedures include interpositional nerve grafts, crossover reinnervation procedures (hypoglossal or cross facial), regional muscle transfer and free flaps. Non dynamic procedures include static slings, ocular protective procedures and adjunctive cosmetic procedures (Shindo, 2001).

The fundamental idea behind a hypoglossal-facial nerve anastomosis is to improve a devastating neurologic deficit at the expense of an iatrogenically created deficit of lesser consequence (May, 2000).

Hypoglossal-facial nerve anastomosis has been advocated for patients with loss of the proximal stump of the facial nerve who consequently are not candidates for primary end to end anastomosis or interpositional graft (Hammerschlag, 1999). It is frequently performed secondary to surgery for removal of cerebellopontine angle or skull base tumours (May, 2000).

Due to distal hemilingual denervation, concerns were raised about dysfunctional intraoral manipulation of food, swallowing and speech, especially in patients with glossopharyngeal and vagus nerves deficits (Hammerschlag, 1999). To avoid or reduce this hemiglossal dysfunction some modified techniques have recently been developed (Sawamura and Abe, 1997).

Pitty and Tattor (1992) recommended anastomosis of the hypoglossal nerve to the distal segment of the facial nerve and the descendens hypoglossi nerve branch to the distal segment of the hypoglossal nerve.

Aran et al. (1995) reported a technique to anastomose a split hypoglossal nerve to the facial nerve.

Hypoglossal-facial nerve interposition jump grafts techniques were used successfully by (Atlas and Lowinger, 1997) and (Asaoka et al., 1999).

Published results of hypoglossal-facial nerve anastomosis have been variable, ranging from poor to good and there are still many questions about indications, timing and operative techniques for these procedures (Sood et al., 2000).

Aim of the work

Aim of this study is to assess the extent of functional recovery, to analyze the factors affecting the outcome after hypoglossal-facial nerve anastomosis and to compare the outcome between different techniques of hypoglossal-facial nerve anastomosis.

Review of literature

Anatomy of the facial nerve

The facial nerve is directly and indirectly involved in numerous pathological conditions affecting the temporal bone, so a solid understanding of its complex anatomy is crucial for the physician's ability to diagnose and treat disorders of the facial nerve (Lusting, 2003)

Embryology and development

Normal and abnormal presentations of the facial nerve can be best understood through an awareness of its embryonic development (Gasser, 1967)

Intratemporal development:

The facial nerve begins its development near the end of the first month of gestation, when the acousticofacial primordium giving rise to both the facial and the acoustic nerves (Vidic, 1978). The geniculate ganglion, which arises from the second branchial arch, develops early in the second month of gestation (Vidic, 1978). The acousticofacial primordium differentiates into caudal and rostral trunks: The caudal trunk progresses into mesenchyme of the second branchial arch, becoming the main trunk of the facial nerve (Gasser and May, 1987). The rostral branch becomes associated with the first arch, eventually developing into the chorda tympani nerve; this explains the chorda tympani's complex course within the temporal bone (Gasser and May, 1987).

During the sixth week of gestation, the motor division of the facial nerve establishes its position in the middle ear between the membranous