

RESTORATION OF FACIAL FUNCTION BY NERVE ANASTOMOSIS*

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THE FACIAL NERVE is most commonly severed in the facial canal as a complicating factor in mastoid surgery. Undoubtedly, the best surgical treatment in this situation is an end-to-end suture or a nerve graft. This procedure is a highly technical one and there are only a few surgeons sufficiently skilled in mastoid surgery and nerve suture work to obtain consistently good results. On the other hand, hypoglossal facial anastomosis is such a relatively simple surgical procedure that a surgeon may expect a good result even though called upon to operate upon only an occasional case. Neuro-surgeons commonly carry out some form of facial nerve anastomosis following the total removal of an acoustic neuroma. In this operation the intracranial portion of the facial nerve is removed with the tumor and end-to-end suture is out of the question.

Recently Dr. Alexander and I have reviewed our acoustic neuroma material and this has given us an opportunity of assessing some long-term results of hypoglossal facial and spinal accessory facial anastomosis.

HYPOGLOSSAL FACIAL ANASTOMOSIS

Thirty-three patients were examined from three and one-half months to 15 years after a hypoglossal facial anastomosis performed by several different house officers and staff members. The average results should represent those to be expected from any group of surgeons using the usual end-to-end suture with a few fine interrupted silk sutures without tension at the suture line. The key to finding the facial nerve is a dissection which enables one to palpate the styloid process and visualize the posterior aspect of the parotid gland. The course of the nerve can then be imagined from the stylomastoid foramen to its entrance into the parotid gland. Working on this line the nerve will be found buried in dense fascia just as it enters the gland.

On the whole, we have been agreeably surprised by the excellent cosmetic results. At least 75 per cent had excellent restoration of resting facial symmetry. When talking or eating, there was considerable movement of the face, giving an animated facial appearance when most needed. A quiet smile could be managed with good symmetry; with a hearty laugh there was no movement of the paralyzed side of the face. In a few there was too much movement of the face when talking or eating. On the whole, however, the

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patients and relatives were pleased with the results and we feel that we can endorse the simple surgical procedure of hypoglossal facial anastomosis.

Most patients were operated upon from two to six weeks after division of the facial nerve. It is of interest that one patient had the anastomosis performed two and a half years after section of the facial, and a good result was obtained.

SPINAL ACCESSORY FACIAL

We have seen three of our patients with a spinal accessory facial anastomosis. The cosmetic results were not nearly as good as the hypoglossal

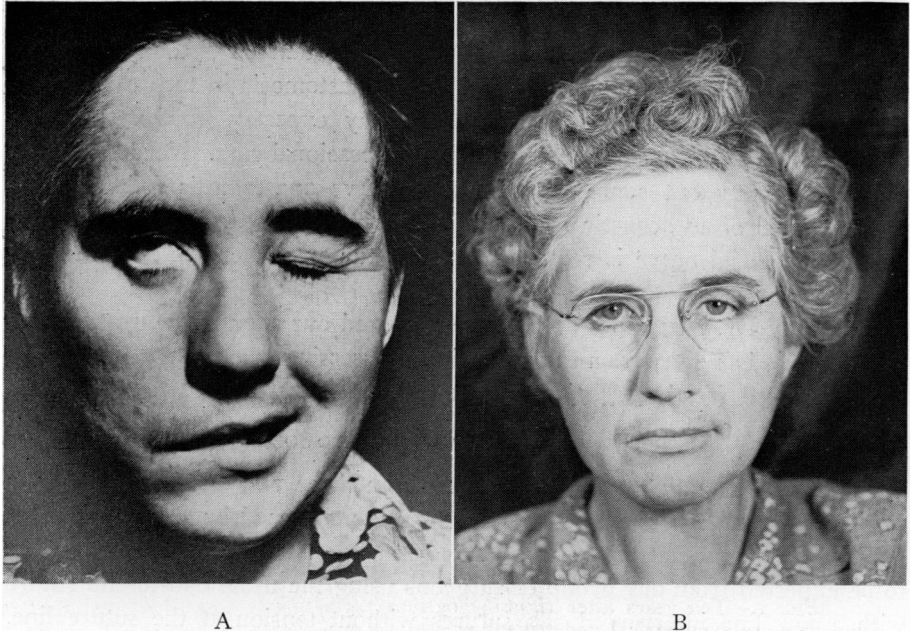


FIG. 1.—Left: photo before hypoglossal-facial anastomosis. Right: 15 years after right hypoglossal-facial anastomosis. Face almost completely symmetrical at rest.

facial. At rest facial symmetry was often good, but the lack of facial animation when talking and eating was a detriment. Over-action and mass movement of the face accompanying any vigorous shrug of the shoulder was quite marked. Atrophy and droop of the shoulder was disfiguring and a few patients complained bitterly of pain and loss of function in the shoulder. One such patient, unable to do her usual heavy farm work, had function almost completely restored by Dr. Dewar and Dr. Harris of the Toronto General Hospital Orthopaedic Service. They are reporting the details of this operation in a separate preliminary report, which will be published at the same time as this paper.

FACIAL NERVE ANASTOMOSIS

Several other patients were examined who had had the spinal accessory nerve removed, together with the sternocleidomastoid muscle in radical neck dissections for cancer. In some of these the deformity was similar to that observed in our patients. In a few instances the innervation of the lower portion of the upper half of the trapezius muscle was intact, the scapula held back and up; in most of these cases the arm could be elevated in abduction almost normally. Since a portion of the trapezius muscle is supplied by branches from the third and fourth cervical nerves, it is likely that variation



FIG. 2



FIG. 3

FIG. 2.—Ten years after right hypoglossal-facial anastomosis. Movements of the face are symmetrical and patient presents a good cosmetic appearance at all times.

FIG. 3.—Three and one-half months after left hypoglossal facial anastomosis. At this early stage the anastomosis is functioning so that while smiling the face is only moderately distorted. The outer corners of the left lids have been sutured because of an insensitive cornea.

in the innervation of the trapezius explains the variation in the disability of patients in whom the spinal accessory nerve is cut. In those who have an innervation of a significant portion of the upper half of the trapezius by the cervical nerves, there is less disability than in individuals with innervation of the upper portion of the trapezius entirely by the spinal accessory nerve. The scapula must be held medially and upward to elevate the arm and apparently the levator scapulae and rhomboids, though hypertrophied, are not adequate to this task.

DESCENDENS HYPOGLOSSI NERVE SUTURED TO FACIAL NERVE
AND THE DISTAL END OF THE HYPOGLOSSAL NERVE

Brief reference should be made to two patients in whom the descendens hypoglossi nerve was sutured to the distal end of the facial nerve. In the first patient this was done because the hypoglossal nerve had been damaged by the electro-surgical current. There was complete failure of return of any motion in the affected side of the face. In the second patient there was moderate disfiguring asymmetry of the face at rest and no motion on talking or moving the tongue. When the patient swallowed, however, the corner of the mouth on the side of the paralysis moved 1 to 2 cm. This movement was definite and consistent, but far from impressive.

Of the seven patients in whom the descendens hypoglossi was sutured to the distal stump of the hypoglossal, three have been examined. In two there was marked atrophy and asymmetry of the tongue, the innervation by the descendens hypoglossi being of no value in preventing atrophy. In one patient the paralyzed side of the tongue showed undulating movements and less atrophy than is ordinarily seen. Interestingly enough in one individual observed ten months after hypoglossal facial anastomosis, there was good function of the face and almost no atrophy of the side of the tongue on which the hypoglossal nerve had been sutured to the facial nerve; the tongue actually deviated slightly away from the affected side. The descendens hypoglossi was not anastomosed to the distal stump of the hypoglossal in this patient. Speech was not disturbed by paralysis of half of the tongue in any patient.

DISCUSSION

Neuro-surgeons in their practice are particularly concerned with patients who have had an intra-dural severance of the facial nerve. General surgeons can expect to be called upon to treat patients who have had the facial nerve injured in the neck or as a complication of mastoid surgery, particularly when it is not feasible to send the patient to a surgeon thoroughly trained in mastoid surgery and interested in the highly technical problem of nerve suture in the facial canal. Also, facial canal suture is not feasible or will fail in about 25 per cent of cases even in highly skilled hands. In all these situations, we believe hypoglossal facial anastomosis, and not spinal accessory facial anastomosis, to be the operation of choice. The use of fascia to restore symmetry of the face should be reserved for patients who have had a wide resection of the parotid gland with the facial nerve and its branches.

Dr. Claude Coleman has recently called our attention to the feasibility of obtaining a good result when the trunk of the facial nerve has been removed but not its main branches. He successfully anastomosed the split end of the spinal accessory to the three main trunks of the facial nerve. His patient has an excellent cosmetic result. Further experience with this operation may

prove that it is better to anastomose a nerve to the three main branches of the facial nerve than to its main trunk. If so, the relatively easy and reasonably satisfactory hypoglossal facial nerve trunk operation will be replaced by a much more time-consuming and difficult procedure.

DISCUSSION.—DR. GILBERT HORRAX: I think this excellent paper of Dr. McKenzie's has brought out most of the important points regarding restoration of function of the facial muscles after operation for acoustic tumors.

We feel, as he does, that the hypoglossal-facial rather than the spinal accessory-facial is the nearest approach to something ideal as we would like to have it.

None of these procedures, of course—as you realize—are at all like a real facial nerve. The ideal thing, of course, is to spare the facial nerve if you possibly can, in taking out an acoustic tumor. Unfortunately, that is rarely possible, because it is so bound up with the capsule of the tumor that the facial nerve is almost inevitably destroyed.

Dr. Olivecrona of Sweden has perfected a method by which I believe he is able to spare the facial in some 25 per cent of the patients, but whether he leaves some of the cells of the tumor or not, I am not entirely sure.

Certainly, most of these tumors start in the meatus, and it is difficult to see how the facial can be spared very frequently, when you have curetted out the meatus as we have to do.

We have saved the facial in perhaps half a dozen cases out of a hundred of acoustic neuromas, but that is a rare thing, and patients must be prepared for the facial paralysis. We always tell patients exactly what they are in for when they have an acoustic tumor.

As I say, I think nearly all neurosurgeons feel that the hypoglossal-facial anastomosis is the procedure of choice rather than the spinal accessory.

Whether this operation of Dr. Coleman's—which he reported last week—is going to be an addition to our armamentarium, so to speak, remains to be seen. Certainly, he had very good results in that case.