The Palpebral Spring for Paralysis of the Upper Eyelid in Facial Nerve Paralysis

Technical Note

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WHEN seventh nerve dysfunction is accompanied by some degree of fifth nerve dysfunction, as may occur following total removal of acoustic tumors, there is always the possibility of corneal ulceration. The transient weakness or paralysis of the seventh nerve following acoustic surgery has classically been handled by surgical closure of the eyelid, a disfiguring operation.

Morel-Fatio and Lalardrie described the use of a stainless steel wire spring as an alternative means for correction of the eyelid in patients with facial paralysis. We have used the palpebral spring in nine patients. Eight of these had facial paralysis due to removal of an acoustic neuroma; one was due to Bell's palsy. All patients were unable to close the involved eye and had had either infections and corneal ulcers or had protected the eye with tape or surgical closure of the lids.

Technique

The spring is calibrated and fashioned so that it passively closes the upper eyelid, allowing levator action to overcome the power of the spring and open the eye at will. It is constructed from a round 35/100 mm diameter stainless steel wire containing 18% chrome and 8% nickel. It has elasticity, and does not cause tissue reaction.*

* The wire is obtained from Chevalier Frénes 5, Place de l'Odéon 25, Rue Racine, Paris XVIe, France.

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Fig. 1. The palpebral spring and sites of insertion in the eyelid and brow.
The insertion is carried out under local anesthesia, with care taken to give only moderate sedation since it is extremely important that the patient cooperate by opening and closing the eyes upon request. Before the anesthetic agent is injected, the sites of the incisions are marked with ink, one along the middle third of the superior orbital rim below the eyebrow, one in a natural skin line over the lateral orbital rim approximately one-half the distance between the lateral canthus and the lateral eyebrow, and the final one above and parallel to the lid margin, just medial to the midline of the lid over the tarsal plate (Fig. 1).

After the incisions have been made, the tarsal plate and the periosteum of the orbital rims superiorly and laterally are exposed. Small adrenalin packs are usually sufficient to control the bleeding while the spring is being prepared. Preparation involves bending the wire around the shaft of a skin hook to form a spiral, which will become the lateral, fixed coil. The superior arm is bent to conform to the superior orbital rim. It is imperative that the inferior arm be fashioned with a triple curvature to fit the contour of the eyeball, yet laterally to have concavity similar to that of the superior arm. The lateral curvature of the inferior arm is fashioned to fit the tarsal plate parallel to the lid margin after lateral and superior fixation. The strength of the spring is adjusted by opening or closing the lateral coil. The appropriate arms of the spring are inserted through two 20-gauge needles placed subcutaneously in position for the final site of the spring.

The central coil of the spring is fixed to the periosteum of the lateral orbital rim with non-absorbable sutures. The distal end of the superior arm is twisted into a circle, and fixed to the periosteum. At this point, further adjustment of strength of the spring may be made. This can be done fairly accurately by placing the unattached end of the wire in the proper position in the incision and instructing the patient to open and close the eye. Fixation of the inferior arm to the tarsal plate may now be accomplished. It is desirable to have a slight overcorrection to insure complete closure of the eye. An antibiotic ophthalmic ointment is applied and the eye dressed with a firm bulky dressing. This is removed after two days, permitting active use of the eye.

Results

Of the nine patients who have undergone this operative procedure all but two have tolerated the spring well (Table 1). One of these two had marked infection, swelling, and corneal ulceration before the insertion of the spring; these problems have persisted. The other patient had good function of the spring, but edema of the lid persisted. The spring in the latter patient has been removed