Facial Nerve Paralysis: Management of the Eye

- Introduction
- Anatomy
- Options
- Discussion of Literature
Introduction-Facial Nerve Paralysis

- Functional and cosmetic problems
- Upper lid fails to drop down and close
- Lower lid loses tone and sags downward
  - May evert leading to ectropion
- Produces lagophthalmos and consequent corneal exposure.
- Interruption of the tear film
- Leads to drying of cornea,
  - Ocular discomfort
  - Corneal ulcers
  - Infection
  - Perforation
Introduction-Facial Nerve Paralysis

- Increased risk of complications:
  - Poor Bell phenomenon
  - Corneal anesthesia
  - Pre-existing dry eye
Normal Eye Closure

- Contraction of the obicularis oculi results in lowering the upper lid
- Elevation of the lower lid contributes minimally
Anatomy

- **Eyelid functions**
  - Protect eye (light, injury, desiccation)
  - Tear production and distribution

- **Extremely thin skin (upper > lower)**

- **Skin**
  - Little subcutaneous fat
  - Adherent over the tarsus (levator aponeurosis)
Anatomy
Anatomy

- Horizontal length – 30 mm
- Palpebral fissure – 10 mm
- Margin reflex distance
  - Number of millimeters from the corneal light reflex to the lid margin
  - Upper lid – 4 to 5 mm (rests slightly below limbus)
  - Lower lid – 5 mm (rests at the lower limbus)
Anatomy

- **Tarsus**
  - Dense, fibrous tissue
  - Contour and skeleton
  - Contain meibomian glands
  - Length – 25 mm
  - Thickness – 1 mm
  - Height
    - Upper plate – 10 mm
    - Lower plate – 4 mm
Anatomy – Muscles

- Protractor-Facial nerve
  - Orbicularis

- Retractors-Oculomotor
  - Levator
  - Müller’s
Anatomy: Upper and lower lids
Orbicularis Oculi Muscle
Anatomy: Obicularis
Levator palpebral superioris and Müller’s muscle
Lower Lid Anatomy

Fig. 2-28  Cross-section of the lower eyelid retractors.
Anatomy

- Orbital Septum
  - Fascial barrier
  - Underlies posterior orbicularis fascia
  - Defines anterior extent of orbit and posterior extent of eyelid
Anatomy

- Canthal tendons
  - Extensions of preseptal & pretarsal orbicularis
  - Lateral slightly above medial
  - Lateral tendon attaches to Whitnall’s tubercle
    1.5 cm posterior to orbital rim
  - Medial tendon complex, important for lacrimal pump function
Medial Canthal Tendon
Lateral Canthal Tendon
Canthal Tendons
Lacrimal System

Fig. 9-1 The anatomy of lacrimal system.
Lacrimal Excretory Pump
Facial Nerve Paralysis: Management of the Eye

- Initial treatment
  - Ophthalmic drops/ointments (*Jelks* 1979)
  - Protective taping, occlusive moisture chambers, soft contact lenses, scleral shields (*Goren and Clemis* 1973)
  - Tarsorrhaphy suture

- Majority of patients require definitive surgical treatment to correct chronic impairment
Facial Nerve Paralysis: 
Management of the Eye

- Surgical options include:
  - Temporalsis muscle transfer (*Gillies*)
  - Encircling the upper and lower eyelids with silicone or fascia lata (*Freeman*)
  - Palpebral springs (*Levine, May*)
  - Tarsorrhaphy (*McLaughlin*)
  - **Lid loading** (*Sheehan, others*)
  - Combinations
Surgical Procedures

- Palpebral Spring
  - Advantages
    - Less visible
  - Disadvantages
    - Technically difficult
    - Higher risk of extrusion
Tarsorrhaphy

- Poor cosmesis
- Decreased peripheral vision
Surgical Procedures

- Lower lid shortening
  - Wedge excision with lateral canthopexy
  - Used in combination with gold weight implantation
Lid Loading

- Early technique
  - Incision in the supratarsal crease
  - Subcutaneous pocket
  - Insert weight
  - Close skin
Lid Loading - Early Technique

- **Stainless steel**
  - High profile
  - Migratory
  - High rate of extrusion

- **Gold**
  - Higher density - more weight in same size
  - Malleable - conforms to the globe - lower profile
  - Lower reactivity
  - Reversible
  - Migratory
  - High rate of extrusion
Gold Weight
Surgical Procedures

- Gold weight implant-placed beneath levator aponeurosis
  - Advantages
    - Technically straightforward
    - Consistent
  - Disadvantages-less than with previous technique
    - Less Visibility
    - Less Extrusion
    - Less Mobility
Gold Weight Placement
Combination of Gold Weight and Lower Lid Shortening
Combination of Gold Weight and Lower Lid Shortening
Platinum Chain
Relevant Literature

- Kinney et al: “Oculoplastic Surgical Techniques for Protection of the Eye in Facial Nerve Paralysis”
  - Described an algorithm for surgical management of corneal exposure 2nd to CNVII paralysis
  - Auricular cartilage vs lateral canthotomy vs dissection of suborbicularis oculi fat pad (SOOF) vs brow elevation............
Ocular Management Paradigm

CNVII PARESIS OCULAR MANAGEMENT PARADIGM

CNVII with orbicularis weakness

All patients receive medical management - some combination of: lubricating ointment and drops, occlusive dressing, weights taped to upper eyelid

Temporary Paresis

Post-op nerve felt to be intact, but paresis may last weeks to months

Etiology unclear

Medical management until patient develops corneal irregularity

Permanent Paresis

Lagophthalmos and lower lid laxity with inferior scleral show ≥ 1.5 mm

Gold weight*, ear cartilage graft, lateral canthal resuspension

Lagophthalmos, lower lid laxity, brow ptosis, cheek ptosis

Gold weight*, ear cartilage graft, lateral canthal suspension, brow lift, cheek resuspension

Acute corneal ulceration

Temporary tarsorrhaphy to heal cornea

Ulceraion healed

Corneal epithelium irregular, but does not show persistent ulceration

Gold weight

Continued corneal exposure

Complete resolution of paresis

Remove gold weight ± Remove cartilage

Gold weight

Lateral canthal resuspension

Ear cartilage graft

Partial resolution of paresis

Non-resolution of paresis

Consider other reconstructive procedures if not yet performed lateral canthal resuspension ear cartilage graft brow ptosis repair cheek resuspension

Gold weight*

Ear cartilage graft

Lagophthalmos and inferior show > 2 mm

Gold weight*

Ear cartilage graft

Lagophthalmos

Ear cartilage graft
Snyder et al: “Early vs Late Gold Weight Implantation for Rehabilitation of the Paralyzed Eyelid”

- Evaluated outcomes and complications of early (<30 days) vs late (>30 days) gold weight implantation
- 89.2% achieved satisfactory lid closure
- Statistically similar lid closure and complication rates
Literature

- Foda: “Surgical Management of Lagophthalmos in Patients with Facial Palsy”
  - Gold weight in combination with canthoplasty
  - Complete correction of lagophthalmos and ectropion with resolution of pre op symptoms in 92.5% of patients.
Literature

- Jobe: 2080 procedures with gold weight implants.
  - Only 3% patients with reported complications
- Harrisberg et al: 103 patients with gold weight implants
  - 46 had weights removed
    - 78% due to facial nerve recovery
    - 22% due to cosmetic dissatisfaction, implant becoming too superficial, migration, partial extrusion (implanted into prefashioned soft tissue pocket in the preseptal space)
Literature

- Chepeha et al: 16 patients
  - Lagophthalmos: pre op 7.5mm, post op 0.5mm
  - Corneal coverage: pre op 73%, post op 100%
  - High patient satisfaction
  - No extrusions
Conclusions

- Gold weight implants safe and effective
- Early implantation-reversible
- Excellent results when used in combination with lower lid shortening
Bibliography

- Jobe, R A Technique for lid loading in the management of lagophthalmos of facial palsy. Plast Reconstr Surg. 53; 1974
- Tremolada, C Temporal galeal fascia cover of custom-made gold lid weights for correction of paralytic lagophthalmos: long term evaluation of an improved technique.
- Snyder M Early vs late gold weight implantation for rehabilitation of the paralyzed eyelid. Laryngoscope. 111: 2001
- Lavy J Gold weight implants in the management of lagophthalmos in facial palsy. Clinical Otolaryngology. 29:2004