Facial Nerve Paralysis: Management of the Eye

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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

- Orbital portion
- Preseptal part
- Pretarsal part
- Medial canthal tendon
- Common canaliculus
- Tensor tarsi or Horner's muscle
- Pretarsal part
- Preseptal part
- Palpebral portion
- Orbital portion
Levator palpebral superioris and Müller’s muscle
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

- Pretarsal m.
- Medial canthal tendon
- Anterior limb of the medial canthal tendon
- Posterior limb of the medial canthal tendon
- Anterior lacrimal crest
- Lacrimal sac
Canthal Tendons

Deep head pretarsal orbicularis (Horner's muscle)

Posterior reflection of medial canthal tendon

Posterior lacrimal crest

Deep head preseptal orbicularis (Jones's muscle)

Anterior reflection of medial canthal tendon

Lateral orbital tubercle

Lateral palpebral ligament

Lateral palpebral raphe

Medial canthal tendon posterior limb

Posterior lacrimal crest

Whitnall's tubercle

Medial canthal tendon anterior limb

Lacrimal sac

Anterior lacrimal crest
Lacrimal System

Fig. 9-1 The anatomy of lacrimal system.
Lacrimal Excretory Pump
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- 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
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- **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

[Images of two different views of a surgical procedure]
Gold Weight Placement
Combination of Gold Weight and Lower Lid Shortening
Combination of Gold Weight and Lower Lid Shortening
Platinum Chain
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............
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
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)
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
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