Pediatric Surgical Pearls II

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‘Lost’ Muscles

- Trauma
- Otolaryngology procedures
- Ophthalmic surgery
  - Strabismus surgery
  - Retinal procedures
  - Pterygium excision
  - Orbital surgery
  - Glaucoma procedures
‘Lost’ Muscles

• Muscle not truly lost
• Hopefully, only “misplaced”
Right MR inadvertently cut during pterygium surgery
Right MR transected during functional endoscopic sinus surgery
Right medial rectus ‘lost’ during strabismus surgery

Post-op bilateral medial rectus recession for congenital ET

Primary gaze

Left gaze
Causes of lost muscle during strabismus surgery

- Rupture of tendon/muscle
- Suture cut at time of tenotomy/myotomy
- Suture pulls loose from tendon/muscle
- Myectomy or tenotomy of wrong muscle
- Other causes
‘PITS’
“Pulled in Two Syndrome”

- Rupture occurs at tendon-muscle junction
- Predisposing factors:
  - Age
  - General health
  - Myopathy, especially with restriction
  - Prior steroids &/or orbital radiation
  - Prior surgery &/or trauma
  - Other factors

- Original name probably from M. Greenwald
- Wallace DK, Virata SR, Mukherji SK. “Strabismus Surgery Complicated By “Pulled In Two Syndrome” In a Case of Breast Carcinoma Metastatic to the Medial Rectus Muscle.” J of AAPOS. April 200: 117-119
Clinical Findings with “PITS”

- Hook appears to slip off tendon/muscle
- Tendon remains attached to insertion
- Muscle stump slides posteriorly in orbit
- Difficult to recover: Tendon is at insertion and stump of muscle is difficult to grasp and hold

Tendon stump attached to insertion
Muscle stump in forceps
Sub-Tenon’s approach to locate ‘lost’ muscle

- Good team and exposure
- Gently follow original path of muscle in Tenon’s space
- Attempt to locate the natural opening for the tendon/muscle in Tenon’s capsule
- Stump of the tendon or muscle is often at or just behind the opening in Tenon’s capsule
Right medial rectus ‘lost’ during strabismus surgery

Post-op bilateral medial rectus recession for congenital ET

Primary gaze

Left gaze
Conjunctival approach to ‘Lost’ MR
Pre-Op Repair of Lost Muscle

Post-op bilateral medial rectus recession for congenital ET

Primary gaze

Left gaze
Post-Op: Two days after recovery of ‘lost’ muscle

Primary gaze

Left gaze
The use of a Titanium T-Plate as a platform for globe alignment in severe paralytic and restrictive strabismus

Tse DT, Shriver EM, Krantz KB, Tse JD, Capo H, McKeown CA. The use of titanium T-plate as platform for globe alignment in severe paralytic and restrictive strabismus. AJO (Sep)150:404-411, 2010
Introduction

- Conventional strabismus techniques work quite well for most forms of strabismus
However -

These techniques are disappointing in certain forms of complex strabismus & eye movement disorders.
Causes of Complex Strabismus Include

- 3rd nerve palsy
- Orbital disease
- Orbital trauma
- Transection of EOM during functional endoscopic sinus surgery (FESS)
- Others
Problem Case

- 81 yo female
- 3rd nerve palsy following herpes zoster
- No medial rectus function
- Limited recovery of superior and inferior rectus
Complaining of:

• Disfigurement
• Absence of stereopsis
• Diplopia, particularly when she attempts to open the left eye
Left 3rd nerve palsy
This case is very challenging

• Conventional strabismus procedures are likely to yield results that are disappointing to the patient, her family and the ophthalmologist
Conventional Treatment Options Include:

- Weaken lateral rectus (not adequate alone)
  - Botulinum toxin to LR
  - ‘Supramaximal’ recession of LR
  - Attach LR to periosteum
- Superior oblique transposition (not very strong)
- Transposition of SR and IR (SR & IR paretic)
- Large and repeated resections of MR
- ‘Tethering’ procedures
Axial Diagram of Procedure
Titanium Plates & Screws
Medial Orbitotomy of Left Eye (Surgeon’s View)
Two Incisions: Orbitotomy and Limbal Peritomy

Double armed 6-0 Mersilene suture passed from limbal peritomy to exit through orbitotomy
Titanium T-plate with suture attached to posterior fenestration
T-plate slid into position
T-plate with screws in place
Vicryl to close periosteum
Periosteum closed.
Mersilene suture will be secured to sclera at insertion of MR
Incisions closed and adjustable suture in place
Result after T-Plate and Frontalis Sling
Post Op Versions – Globe retraction occurs on left gaze, allowing some abduction. This creates a useable field of single binocular vision.
Movie – Usable Field of SBV
## Patient Data and Results

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<th>Post-Op</th>
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<td>XT 6</td>
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<tr>
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Age Range 24 – 79 yr
Need

• More experience and follow-up time
• Establish proper role of this procedure in patients with complex strabismus where conventional techniques have failed or are likely to fail
• Ultimately, develop practical devices that are elastic or capable of active contractile instead of using inelastic polyester sutures
The End