Practical Perspectives on Adult Strabismus: From Diagnosis to Surgical Management

AAPOS Adult Strabismus Committee Workshop

Evaluation of New-Onset Strabismus - Leila Khazaeni, MD

- Be on the lookout for subacute cases of adult strabismus you don't want to miss
- Use history to guide suspicion, and your examination to confirm
- New-onset adult strabismus should not have abnormal fusional amplitudes

Adult-Onset Esotropia - Maanasa Indaram, MD

- Adult-onset divergence insufficiency esotropia includes more than just age-related distance esotropia ("sagging eye syndrome") and myopic fixus strabismus ("heavy eye syndrome"). A subset presents similarly at younger age and/or with minimal refractive error
- In high myopia, consider high-resolution orbital MRI to evaluate the relationship between the lateral rectus (LR) and superior rectus (SR) muscles
- Inferior displacement of the LR and nasal displacement of the SR, as in myopic fixus strabismus, often requires correction with surgery on these two muscles
- Standard surgical tables very often under-dose what is required for full correction
- Augmented surgery, particularly larger medial rectus muscle recessions, is recommended

Adjustable Suture Techniques - David Granet, MD

- Indications for Optimal Use
  - Complex re-operations with scar tissue and altered anatomy
  - Mechanical restrictions (thyroid eye disease, post-scleral buckle, post-glaucoma implants)
  - Paretic strabismus (cranial nerve palsies, etc.)
  - Sensory deviations where fusion is less helpful and long-term drift anticipated
- Delayed Adjustable Suture (DAS) Technique
  - Extends the adjustment window up to 1-week post-operatively
  - Avoids anesthesia-related issues
  - Allows time for binocular adaptation
  - Optimal application:
    - HA-Based Viscoelastic: sodium hyaluronate at the muscle-sclera interface reduces early adhesions
    - Sub-Tenon's steroid irrigation (e.g. dexamethasone) suppresses inflammation and prevents early adhesion of muscle
    - Primary conjunctival closure protects ocular surface and increases patient comfort; allows a "no-touch" if adjustment not needed
    - No patching to allow immediate binocular adaptation
  - Aim for accurate alignment rather than overcorrection as often done in adjustable sutures, affording less need for adjustment

Rules for Surgical Management of Incomitant Strabismus - Saurabh Jain, MD

- Target muscles acting in the field of greatest deviation
- Be aware of secondary effects of surgery on extraocular muscles and use them to your advantage
- If a muscle has no function, borrow force from a muscle that works
- If there is restriction or mechanical limitation, aim to release it
- If not possible to release limitation, aim to match restriction in contralateral eye

Third Cranial Nerve Palsy - Linda Dagi, MD

- Complete third nerve palsy
    - Discuss chronic diplopia management with all binocular patients
    - Use more powerful options for patients prioritizing optimal primary position alignment
    - Consider less powerful procedures for those prioritizing preservation of ductions at the cost of less centered alignment
- Partial Third Nerve Palsy
    - A moderate field of binocular single vision can often be achieved
    - Best outcomes often require bilateral surgery
    - Evaluate and address preoperative torsion to improve chances of fusion
- Ptosis
    - Look for opportunities to reduce ptosis during strabismus surgery in patients with aberrant regeneration that involves the eyelid

Fourth Cranial Nerve Palsy - Kammi Gunton, MD

- Understand goals of surgery—align with patient expectations
- Recognize variability in dose-response of classic procedures
- Correcting hypertropia often improves head tilt without superior oblique muscle surgery

Sixth Cranial Nerve Palsy - Luis Cardenas, MD

- Assess severity of abduction deficit
- Evaluate LR muscle function and MR muscle contracture with forced duction and force generation testing
- Assess abducting saccade velocity to differentiate paresis from restriction
- Severity of abduction deficit drives surgical choice—consider transposition procedures ± medial rectus recession when deficit is severe due to poor lateral rectus muscle function

Thyroid Eye Disease - Jasleen Singh, MD

- Restrictive strabismus results from extraocular muscle enlargement and fibrosis
- Inferior and medial rectus muscles are the most commonly involved
- Vertical diplopia with hypotropia, worse in up gaze, is common
- Strabismus surgical timing is critical: wait for inactive disease, misalignment stability, and after orbital decompression if required
- Surgical goals include single vision in primary and down gaze positions
- Adjustable sutures may improve post operative alignment success

Teprotumumab in Thyroid Eye Disease - Sean Donahue, MD

- Rule out myasthenia gravis and other mimickers
- Ensure stability for at least 6 months
- Apply algorithms as with other restrictive strabismus cases
- Unclear why some muscles become flaccid after teprotumumab and how this alters surgical response
- Recurrence of disease is far more common than initially believed
- Hearing side effects also more common than initially reported

Torsional Strabismus - Manju Bhate, MD

- Causes → cyclovertical muscle palsy, thyroid eye disease, Brown syndrome, craniosynostosis, pattern strabismus, skew deviation
- Tests for torsion → objective and subjective tests
- Acute onset: subjective torsion = objective torsion
- Longstanding cases: subjective torsion < objective torsion
- Congenital cases: there is only objective torsion
- Match surgery to torsional etiology
    - Harada Ito procedure (+/- adjustable) is effective in managing excyclotorsion without primary position deviation and torsional diplopia in bilateral 4th nerve palsy
    - In thyroid eye disease, torsion often improves with vertical muscle surgery

Strabismus Following Scleral Buckle and Jones Tube Procedures - Shatha Alfreihi, MD

<u>Strabismus After Scleral Buckle</u>

- Usually transient but may persist in approximately 1%–15% of cases
  • Multiple mechanisms include:
    – Mechanical factors**:** scarring, mass effect of the scleral buckle
    – Muscle factors: damage, ischemia, slippage, loss, disinsertion, or malposition
    – Sensory factors: macular ectopia
  • Surgical exploration with meticulous dissection is often necessary
  • Relieve restriction if present. If no restriction present, operating on the fellow (non-buckled) eye may yield more predictable outcomes
  • Preservation of the scleral buckle is preferred when feasible
  • Be mindful of thin sclera and anterior segment ischemia

<u>Strabismus After Jones Tube</u>

- Restrictive strabismus and diplopia are uncommon complications of conjunctivodacryorhinostomy with insertion of a Lester–Jones tube
- Should be discussed during informed consent process
- Medical management can include corticosteroids and Mitomycin C
- Surgical options include scar lysis, amniotic membrane transplantation, conjunctival autograft, and tube removal
- Multiple procedures may be required

Approaches to Small Angle Strabismus - Yi Ning Strube, MD, MS, FRCSC, DABO

- Central Plication
    - Corrects ~6 - 8 PD per horizontal muscle
    - Corrects ~5 - 6 PD per vertical muscle
- Central Tenotomy
    - Corrects ~1-2 PD per vertical muscle
    - Doesn't work well for ET
- Great for post-LASIK, post-cataract patients, can reduce /eliminate prism glasses
- Can be performed under topical anesthesia
- Additional tool for complex strabismus