Re-Operation Strategies in Strabismus

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Introduction

• Reoperations in Strabismus surgery has its own set of unique challenges.

• Proper planning is required taking into account the measurements, incomitancies and assessment of versions.

• It should also include an assessment of the stiffness or laxity of previously operated muscles.

Re-Operation Strategies in Strabismus—Cooper's Dictum Amended
Common Postop Misalignments

- Undercorrections
- Overcorrections
- Slipped muscle
- Lost muscle

Development of a new Strabismus problem

( DVD )
History taking for Resurgical cases

History for reoperation cases:
- Elicit history of childhood strabismus
- Which strabismus documented

Records from prior surgery can be invaluable, and should be obtained whenever possible

What type of surgery?
- How long eyes remained straight after surgery?

OLD photos
Surgical planning

The first step
Should the Surgery be done on previously operated muscles or fresh unoperated muscles

The second step
Is it an undercorrection or overcorrection

The third step
Assess incomitance patterns and limitations of rotations.

Undercorrection
Re- recession or Resection of antagonist

Overcorrection
Advancement and/or resected a larger amount
Resurgeries: 1\textsuperscript{st} Strategy

- Overcorrection
  - Limitation of rotation
  - Incomitance

- FDT and FGT

- Dynamic MRI
  - Check for slipped muscle, disinserted muscle

- Operate previously operated muscles
Case 1

- Outward Deviation of Both eye for 16yrs following 2 squint surgeries (eye was inward before surgery)
- Has to turn his face to see things clearly
- No history of diplopia

- H/o (OU) squint surgeries done at the age of 3yrs elsewhere
  I: BE MR Recess
  II: BE LR Resection (after 1 month)
  (amount of surgery not mentioned)

AHP:
- Face turn to Right
- Fixation Preference: Left Eye
Orthoptic evaluation

| BCVA | 6/36 | 6/6 |

- **65ΔBI**
- **-4 add deficit**
- **70ΔBI**
- **40ΔBI**

- Distance: RE Suppression
- Near: RE Suppression
- Near: 65ΔBI WFDT
Dynamic MRI was done to rule out slipped MR

Left Orbit: neutral
- The scleral insertion of the left MR is slightly posteriorly placed
- Minimal thinning of the tendinous insertion of Lt MR & LR

Dynamic
- Adduction:
  - There is slight increased bulk of the LT MR muscle belly on adduction representing retained contractility of the muscle
- Abduction:
  - The Right EOM appear unremarkable
Stretched scar syndrome

Ludwig and Chow in 1999

- **Late secondary strabismus** associated with variable degrees of muscle underaction which occurs months up to years from the primary procedure is thought to result from improper wound healing with stretching of the scar tissue intervening between normal muscle tissue and the sclera.

**TENDON STEP TEST**

BMC 2020
Mohamed Farid et al
Operative Finding:

- MR was found 8 to 9mm from insertion, stretched scar 3mm anteriorly
- Extensive fibrosis on LR muscle (FDT positive)

Surgery done:
- LE MR Advancement done up to insertion
- Fibrosis from LR released.
- Repeat FDT done – improvement in resistance
- Resected LR was recessed 9 mm (OU)

After 3 weeks
**Dynamic MRI**

**Slipped muscles or disinserted muscles**

- **Disinserted muscle:** At re-operation, the muscle and its attachment to the sclera may look normal, with the only anomaly being the location of the insertion site, which is posterior to what was expected.

- **Slipped muscle:**

  Dynamic MRI of an LMR slipped in its capsule.

  In the image on the left (A), the patient is attempting to look in right gaze.

  With this attempt at adduction OS, there is a fusiform swelling of the posterior belly of the LMR; however, anteriorly there is thin empty capsule which does not show contractility (arrow).

**Re-Operation Strategies in Strabismus—Cooper’s Dictum Amended**
If slipped muscle

Tracing the empty capsule posteriorly to reach true muscle fibre

The muscle end at its penetration through tenon’s capsule is grasped with a small clamp

Recovered slipped muscle

Ref: Pictures from Strabismus Book by Dr Rosenbaum
COMPLAINTS OF DIPLOPIA WITH OUTWARD AND DOWNWARD DEVIATION OF EYES AND ABNORMAL HEAD POSTURE SINCE 6 MONTHS. INVESTIGATED OUTSIDE ... NO SYSTEMIC CAUSE

MARKED HEAD TILT TO LEFT
LIMITATION OF ADDUCTION, ELEVATION AND DEPRESSION

ACQUIRED RECOVERING THIRD NERVE PALSY
LEFT HYPOTROPIA WITH EXOVEREIA

50 XT WITH 30 LHOT
Surgery done:
MAXIMUM LR RECESSION 12 mm with
8 mm MR RESECTION WITH
SO Tenectomy (significant incyclotorsion) was done in left eye

Postoperatively
No head tilt, No hypo
Large Consecutive esotropia with -4 abduction deficit
Large recession of Lateral rectus or slipped Lateral rectus

Limitation in abduction
Resurgeries: 2nd Strategy

• If a consecutive ET has a distance deviation that exceeds the near measurement
• Lateral rectus Underaction
• The LR should be explored and advanced or tightened.

Lateral rectus advancement 8mm done
Resurgeries
3rd Strategy

Exotropia greater at distance than near

RE Lateral rectus recession done

Overcorrections

No Incomitance

Operate on fresh muscles

Consecutive esotropia
RIGHT eye Mr recession
Resurgeries
4th Strategy

Residual esotropia after MR Recession BES
Lateral rectus resect

Under corrections
No incomitance
Strengthen the antagonist

Residual Exotropia (oU lateral rectus recession done)
Resect Medial rectus
Resurgeries
5th Strategy

If after prior horizontal surgery one is now dealing with a vertical problem
Treat the vertical strabismus like a fresh case as long as there is no limitation of rotation.

DVD after 4 yrs of medial rectus recession surgery
Resurgeries: 6th Strategy

Overcorrection
Limitation of rotation
Restrictive (FDT positive)

FDT and FGT

Operate previously operated muscles
Case:
when referred one week after surgery

Operated by a colleague and referred urgently as limitation in movements both elevation and abduction and enophthalmos of left eye (uneventful surgery)

Notes: 70 XT with 40 Left hypertropia

Bes lateral rectus recess 9mm with left eye MR resect 6 mm
Left eye IO recession
Right eye IR recession 5mm
Preop pics
Surgical plan (same eye or both eyes)

1. FDT IR and IO (rule out inferior oblique adherence syndrome), FDT right eye
2. FDT left eye Medial rectus and lateral rectus
3. Recess IR same eye if adherence syndrome
4. Botox on Medial rectus
Video clippings of surgery
Surgery done (intraop decision)
Left eye Mr recess with upshift
Botox on Inferior rectus left eye

Postop 3rd day

LHoT 4 PD

LHoT 6 PD

LHoT 7 PD

LHoT 10 PD

LHoT 7 PD
Question

Next step

1. Repeat Botox on left inferior rectus immediately

2. Right eye Inferior rectus advancement on an adjustable immediately

3. Right eye Inferior rectus advancement on an adjustable after 4 months

4. Left eye Inferior rectus recession after 4 months (as 3rd recti surgery)
When is immediate surgery indicated?

- Lost muscle
- Large overcorrection after SO tuck
- Large vertical deviation induced by the muscle transposition procedures

Advantage of immediate intervention:
- It is technically easy to go back within first few days
- Fewer adhesion and neovascular proliferation is minimal
- Surgical plane can still be clearly defined
- Surgeon can use the same incision to gain access to the operative field
- The muscle suture can still be easily identified and retrieved in case of lost or slipped muscle
Conclusion

- Despite the best preoperative evaluation and surgical technique, reoperation will continue to be a part of strabismus management.

- The surgeon must be prepared to modify the surgical plan based on intra-operative findings.

- Mild overcorrection and under corrections may be treated nonsurgically by the means of prisms and orthoptics and by manipulating spectacle correction.
THANK YOU
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