Why Does Bimedial Recession [BMR] for Esotropia Fail?

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No financial Interests or relationships to disclose

Study Design

- **Retrospective case-control series** of **176** consecutive cases of patients, who underwent Bimedial Recession [BMR] between January 2009 to Dec 2011

- **Main indication** for surgery was Congenital ET or Partial Accommodative ET for : appearance, increased peripheral VF and fusion
  - In two cases surgery was indicated for Infantile Nystagmus Syndrome [INS] as artificial divergence surgery

- Single experienced surgeon (LK)

- **Definition of Failure:**

- **Had a 2nd or subsequent surgery**

Results

- Total **179** cases identified, three Thyroid Ophthalmopathy excluded- **A total of 176 cases were reviewed.**

- **2nd or subsequent surgery- N=17 (9.8%) Of these, 3 (of 17), 17.6% had 3rd surgery**

- **Months after initial operation** Mean 11.2 (SD 9.7) Median 9.5. Range 2 - 28 months.
  - **70%** less than 1 year; **30%** more than 1 year

- **ET aim at initial surgery**: Mean 38.6 PD (SD 11.6). Min 15 PD. Max 87 PD.

- ET > 60 PD (N=12, 6.8%)

- **ET at second surgery**: Mean 31.5 (SD 7.1 PD). Median 30. Range 20-40 PD.
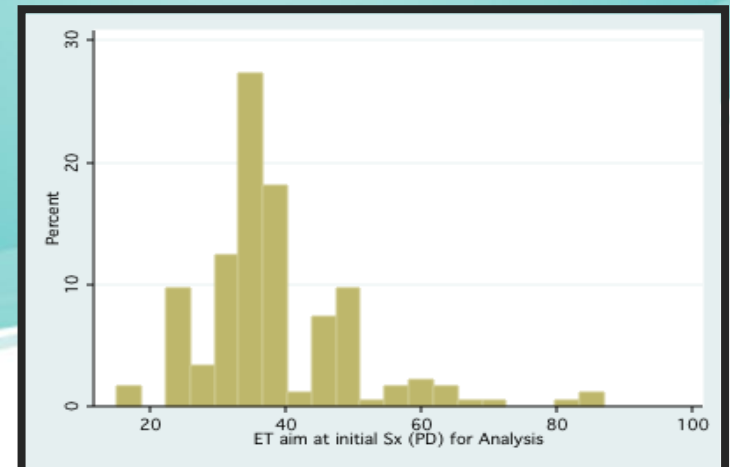
Differences between the two groups

	1 surgery	≥2 surgeries	P
Age (years): mean (SD)	4.8 (2.3)	9.3 (15.0)	0.005*
Female gender (%)	46.8	58.8	0.349#
ET (PD): mean (SD)	38.1 (10.1)	42.2 (20.2)	0.160*
Esotropia plus (%)	13.5	29.4	0.081#
Hyperopia >4.0D (%)	36.2	18.8	0.163#
Pulley suture (%)	10.8	5.9	0.525#
Amblyopia (%)	53.3	44.4	0.604#
Abnormal development (%)	6.3	6.5	0.954#

* t-test
# chi-square test

Over-Correction and Under-Correction

- **Over-correction** in **4/17 (23%)** cases that were defined as failure

  - One of which was recognized as a **slipped muscle** (Case #16)

  - Others: **stretched scars** detected **3 mo- 11mo- 17 mo** after initial surgery

- **Under-correction in 12/17 (70.50%)**

- **5/12 (41.66%)** unexpected under-correction upon exploration of more than 1.5 mm

Interval to Consec XT surgery - numbers

Repka et al Arch Ophthalmology 1992
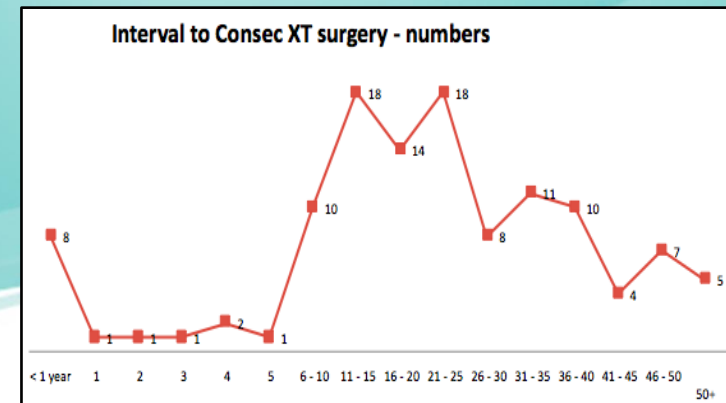
Uni-variable Analysis

Variable	Odds Ratio (OR) (95% CI (Confidence Interval)	P-Value
Male (vs. female)	0.61 (0.22 - 1.70)	0.349
Age (per 5 years)	1.38 (1.05 - 1.82)	0.021
Age (>5 years vs. < 5 years)	1.44 (0.52 - 4.00)	0.483
Age (>7 years vs. < 7 years)	4.05 (1.40 - 11.71)	0.010
ET (per 10 PD)	1.31 (0.90 - 1.91)	0.165
ET (>60 PD vs. < 60 PD)	3.94 (0.94 - 16.66)	0.060
ET (>70 PD vs. < 70 PD)	10.27 (1.35 - 78.20)	0.025
Concomitant procedure with BMR	2.56 (0.82 - 7.96)	0.105
ET (plus other pathology)	2.68 (0.86 - 8.38)	0.090
Amblyopia	0.70 (0.19 - 2.71)	0.605
Hyperopia (>6.0D)	1.08 (0.23 - 5.15)	0.926
Pulley suture (yes vs. no)	0.51 (0.06 - 4.12)	0.532

Multivariable Analysis

Variable	Age and gender-adjusted Odds Ratio (OR) (95% CI (Confidence Interval)	P-Value
Male (vs. female). Adjusted for age only.	0.60 (0.22 - 1.65)	0.321
Age (per 5 years) Adjusted for gender only.	1.38 (1.05 - 1.82)	0.022
Age (>5 years vs. < 5 years) Adjusted for gender only.	1.44 (0.52 - 4.00)	0.483
Age (>7 years vs. < 7 years) Adjusted for gender only.	4.04 (1.40 - 11.71)	0.010
ET (per 10 PD)	1.50 (1.00 - 2.24)	0.047
ET (>60 PD vs. < 60 PD)	5.65 (1.27 - 25.2)	0.023
ET (>70 PD vs. < 70 PD)	23.1 (2.5 - 210.2)	0.005
Concomitant procedure with BMR	2.11 (0.65 - 6.81)	0.211
ET (plus other pathology	1.72 (0.47 - 6.28)	0.410
Amblyopia (yes vs. no)	1.18 (0.26 - 5.39)	0.832
Hyperopia (>6.0D)	1.36 (0.27 – 6.69)	0.707
Pulley suture (yes vs. no)	0.47 (0.06 - 3.92)	0.492

Thank you

Usual indications for 2nd surgery

- Residual / recurrent / consecutive ET / XT ≥15Δ, or if symptomatic
- Development of DVD
- If was ortho for a time after 1st surgery &

- demonstrated sensory fusion: more reason for repeat surgery

- did not demonstrate sensory fusion: main indication for repeat surgery is to improve appearance

- High + : lower expectations of final outcome, possible higher % of consec XT: less enthusiasm for 1st and for repeat surgery

…& if patient / parents agree

Kushner Arch Ophthalmol. 1995

Why Do BMR Fail?

- High Hypermetropia
- Anisometropia
- Congenital vs Accommodative
- High convergence excess
- Developmental abnormalities
- Amblyopia
- Age
- Surgical technique
- Large Angle/ Large recession
- Hangback vs Fixed scleral fixation

Hiles DA et al. Arch Ophthal 1980
Helvestone EM et al. Ophthalmology 1999
Louwagie CR et al JAAPOS 2009
Shauly Y et al. AJO 1994
Holman RE and Merritt J Pediatr Ophthalmol Strabismus. 1986
Pickering JD, et al J Pediatr Ophthalmol Strabismus. 1994, 1995
Yahalom et al J AAPOS. 2010
Kushner Arch Ophthal 2001
Kushner Arch Ophthalmol. 1995

Baseline Characteristics

- Female: N=85 (48.3%), Male, N=91 (51.7%)

- **Age** (when BMR performed): mean 5.2 (Standard Deviation 6.2) years.

  (Median 3.9, IQR 2.4 - 5.6 years. Range 3/12 to 51 years).

  – Age > 7 years: N=30 (17.1%)

  – Age > 5 years: N= 60 (34.1%)

- **ET aim at initial surgery**: Mean 38.6 PD (SD 11.6). Min 15 PD. Max 87 PD.

  – ET <59 (N=164, 93.2%), ET > 60 (N=12, 6.8%)

- Concomitant Procedure with BMR: N=27 (15.3%)

  – Pulley suture: 18/177 (10.2%)

- **Esotropia plus**: N=26 (14.8%)

- **Amblyopia** (missing data on 15): N=85/162 (52.5%)

- **Hyperopia > +4.00**: 33.9%; Hyperopia > 6.00: 12.4%

Angle Size

- Case #4 and #12 congenital ET with a very large angle of **more than 80 PD**

- The technique chosen for this was large BMR 6.5 mm with adjunct Botox injection to both muscles

Lueder GT et al AJO. 2012

- Case #4 EUA: RMR 10 mm from limbus, LMR 11.5

- Case #12 EUA: RMR 11.5 from limb LMR 10.5

- **Possibly a different approach is needed in these cases?**

Forrest et al Clinical and Exp Ophthal 2003

Esotropia Plus

- A group of patients with other neurological/developmental issues or more complex ocular motility abnormality.

- Autism
- Down's
- Abnormal brain imaging
- Developmental delay
- Prematurity

- Duane's variant (Retraction on aDduction)
- INS
- Optic n hypoplasia

Holman RE and Merritt J Pediatr Ophthalmol Strabismus. 1986
Pickering JD, et al
J Pediatr Ophthalmol Strabismus. 1994, 1995
Yahalom et al J AAPOS. 2010

Pulley sutures

- 18/177 of BMR were performed with PS

- The only one that failed (Case #1) was not done with fixed scleral fixation!!! Because sclera was too thin

- Also…The indication was different -It was not a convergence excess but variable angle

Mitchell L and Kowal L JAAPOS 2012