

Medial Rectus Pulley Sutures: Update 2010

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New Times. Old Problem

- Convergence excess ET
 - ET 25 ET' 35
 - [nearly] everyone BMR 5mm
 - ET 35 ET' 50.....6mm
 - **ET 15 ET' 50**
 - *What surgical dosage BMR?*

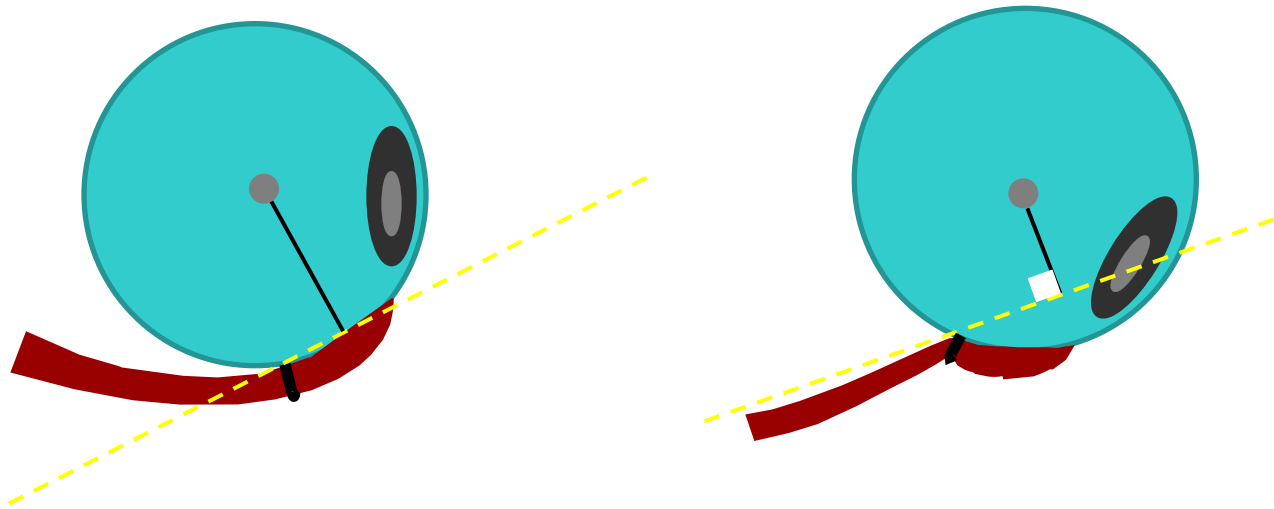


Scleral Posterior Fixation Suture

- Cüppers 1976
- Became known as “Faden” suture
- Attaches rectus muscle to globe 12-14mm behind insertion
 - Medial rectus – convergence excess
 - Superior rectus – DVD
- Limits effect of muscle in its field of action
 - Minimal effect on primary position



Scleral Posterior Fixation Suture



- Preventing arc of muscle contact from unravelling decreases moment arm and thus torque acting on muscle

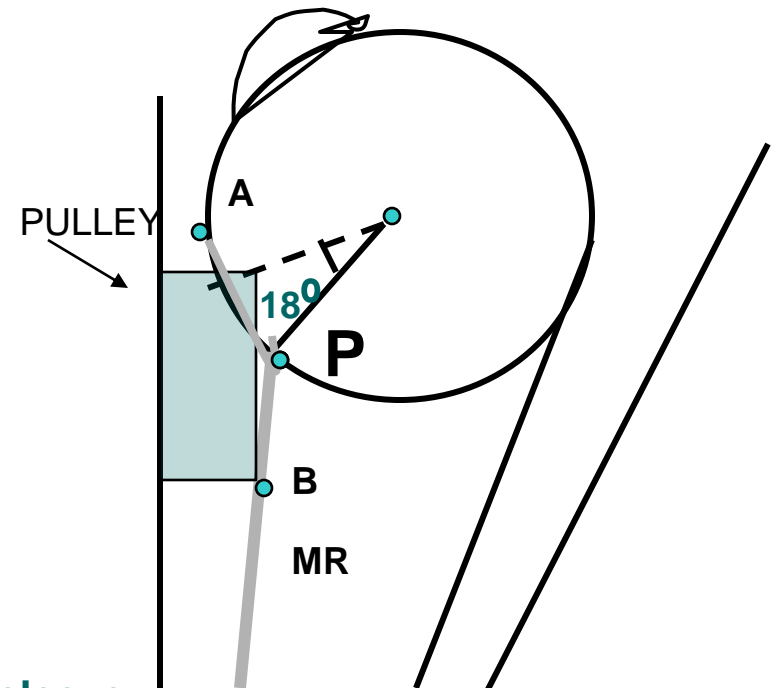
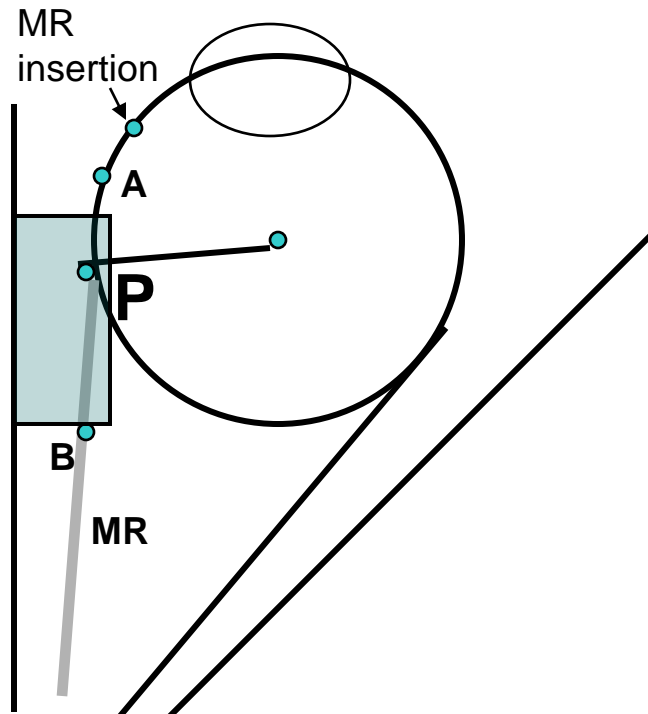
Scleral Posterior Fixation Suture

- Forced duction test post-Faden
 - **Sutured muscle is tight**
- Change of lever arm is not the only effect
- **Clark, Demer**
- **Posterior fixation sutures: a revised mechanical explanation for the fadenoperation**
- **Am J Ophth 1999**



Faden Suture

- Restriction thus explained

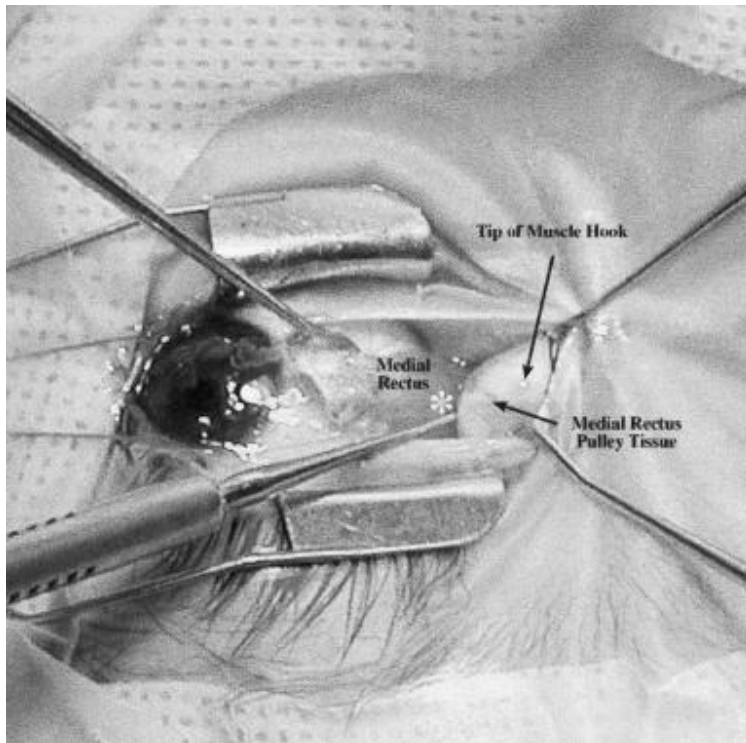


A, B : ant & post extent of pulley sleeve

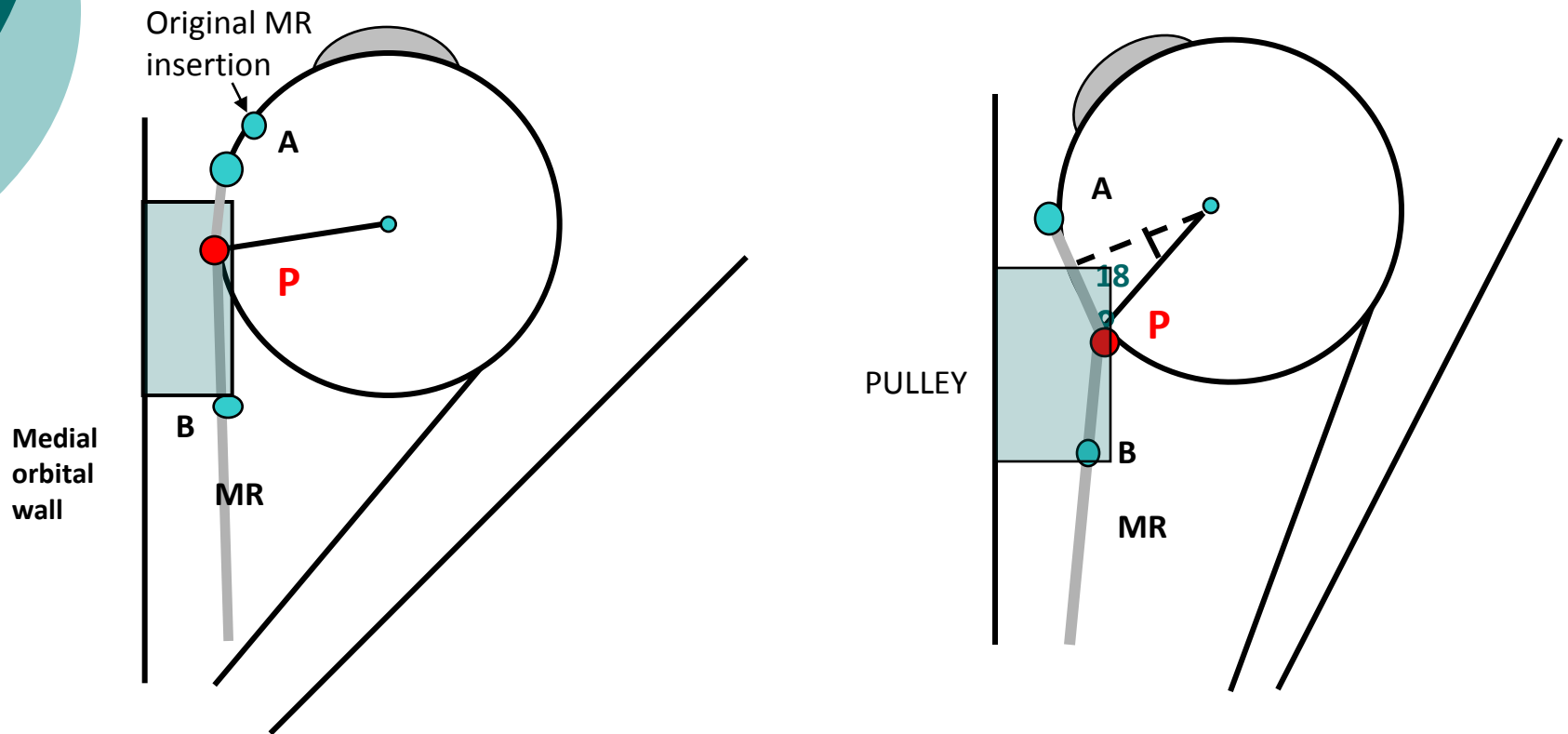


Medial Rectus Pulley Suture

- Clark, Ariyasu and Demer
 - American Journal Ophthalmology, June 2004



Medial Rectus Pulley Suture



Medial Rectus Pulley Suture

- 22 pts: acquired ET with high AC/A ratio
 - 9 scleral fixation
 - Mean F/U 22 months
 - Mean near excess decreased from 16.2[^] to 4.4[^]
 - 1 under-correction (didn't have BMR)
 - 13 "pulley posterior fixation"
 - Mean F/U 9.7 months
 - Mean near excess decreased from 16.8[^] to 2.5[^]
 - 1 over-, 1 under-correction (didn't have BMR)
- No significant differences between groups apart from F/U



Pulley Suture Article #2

JAAPOS 2004

- Recurrent ET
 - Near excess decreased from 12.1[^] to 1.3[^]
- Sensory ET
 - 2 over-corrections
 - ?poor measurements
 - ?enhanced effect of LR resect combined with pulley suture
 - Recommend decrease MR dose in this setting



Melbourne Experience

- Lionel Kowal performing MR pulley fixation suture surgery from late 2006
 - Invaluable guidance/advice from Joe Demer

- 44 cases thus far
EW: n=2

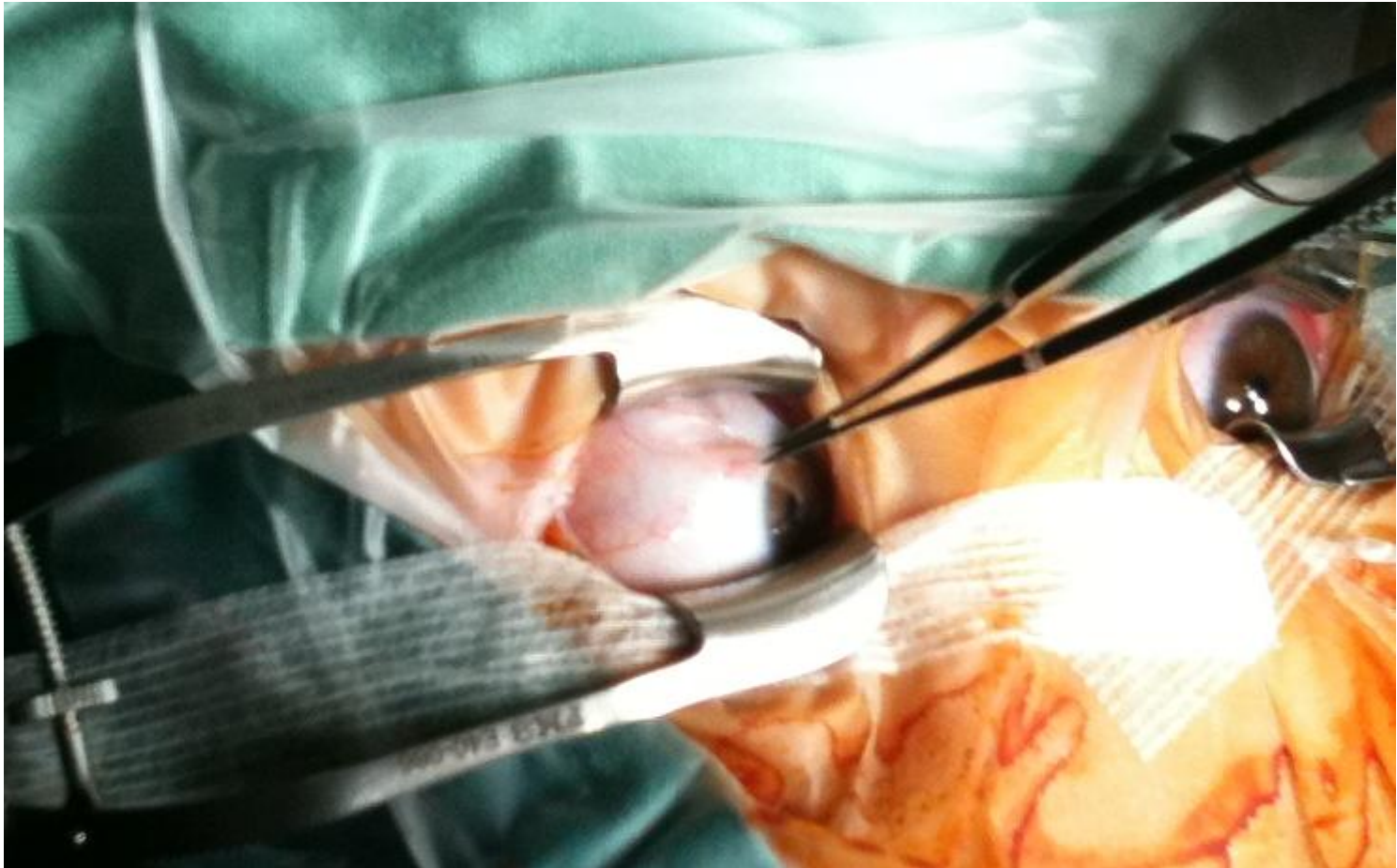


3 key slides

- 1. forced duction test to show that there is no restriction of MR
- 2. measure distance from lateral limbus to caruncle
- 3. repeat measurement after MR pulley placed



Melbourne Experience: Surgical technique



Forced duction test to show that there is no restriction of MR



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Melbourne Experience: Surgical technique



Measure distance from
lateral limbus to caruncle



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Melbourne Experience: Surgical technique



Repeat measurement after MR pulley placed



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Melbourne Experience: Checking restriction produced

- 26/44 with restriction check
- Average (when measured) 3.2mm
 - increase in distance from temporal limbus to caruncle on adduction



Melbourne Experience: Surgical technique

- Pulley final copy 2 wmv

Melbourne Experience: Patient characteristics

Convergence excess		25
Aim: spectacle independence		16
	Low hyperopia	9
	D=N with bifocals	4
	Spectacle intolerance	3
Variable ET		4
	Infantile ET	3
Sensory ET		2
Recurrent ET	Addition to previous BMR	3

- NB some overlap between groups

Melbourne Experience: Pre-operative details

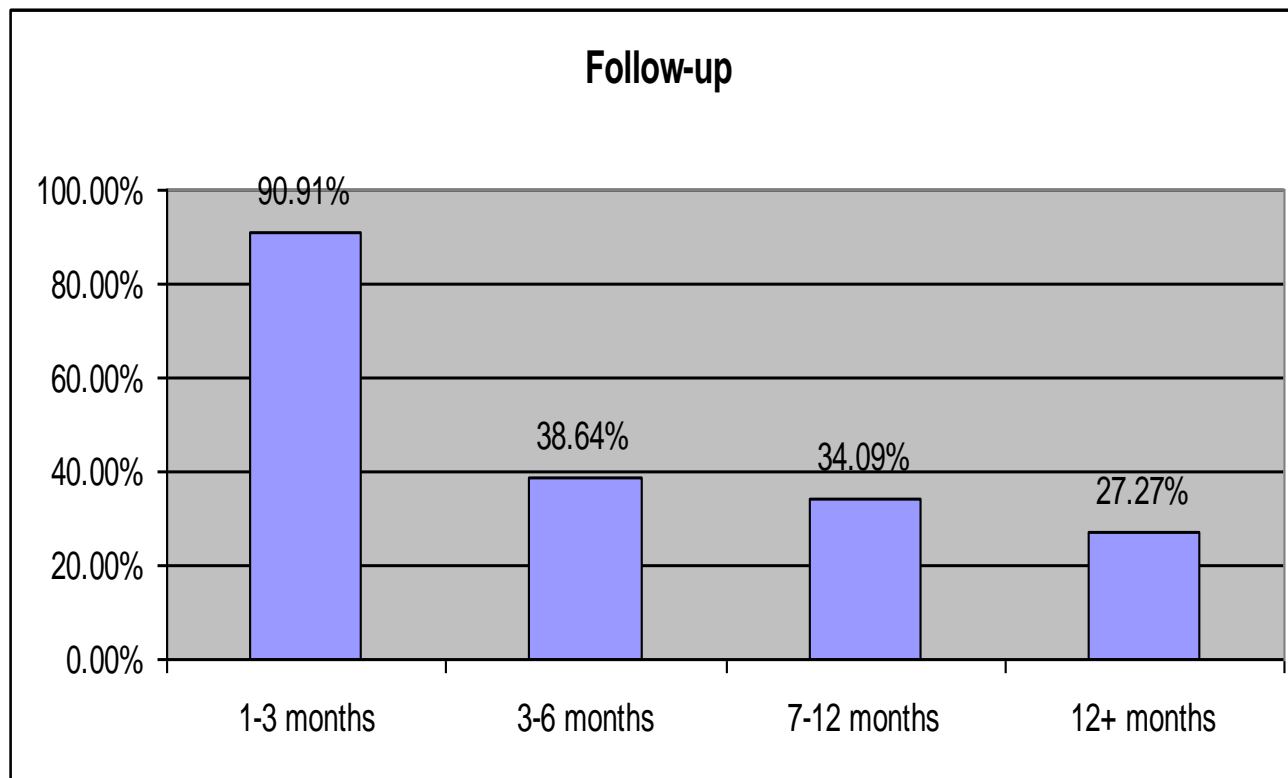
- For n=44

	Mean	Range
Age at surgery (yrs)	6.0	(0.6 – 23.7)
Follow-up (months)	8.6	(0 – 28.1)
N>D disparity (Δ)	20.9	(-5 – 65)



Melbourne Experience: Follow-up

○ For n=44



Melbourne Experience: Outcome measures

○ For n=44

Δ	CT D (with best available correction)	N-D	ΔN-D
1-3 months	1.3	6.6	-13.8
4-6 months	4.1	4.1	-13.4
12+ months	3.8	0.7	-22.3



Melbourne Experience: Outcome measures

- For n=44
 - Over-corrections
 - At 1-3 months: 4 (10%)
 - At 4-6 months: 2 (11.8%)
 - At 7+ months: 0
 - At final follow-up: 3 (6.8%), 1 > 10^{XT}
 - Technical failures
 - 4 pulley sutures unable to be placed (4 eyes, 4 pts)
 - Used Faden in 2 cases, (unplanned) unilateral pulley sutures in 1 case, and no fixation suture in 1 case
 - 2 patients required further surgery
 - At one month and seven months



Melbourne Experience: Pre-operative details

- For convergence excess cases (n=25)

	Mean	Range
Age at surgery (yrs)	5.4	(1.8 - 11.0)
Follow-up (months)	8.9	(0.1 - 28.1)
N>D disparity (Δ)	23	(6 - 47)

Melbourne Experience: Surgical details

- For convergence excess cases (n=25)
 - All underwent BMR recessions
 - Mean 4.85 mm
 - General dose = for average of near and distance deviations
 - All underwent bilateral pulley sutures
 - Except one technical failure
 - Scleral Faden placed left eye, pulley suture right eye
 - Straight at near and distance at 3 months



Melbourne Experience: Outcome measures

- For convergence excess cases (n=25)

Units = Prism dioptries	CT D (with best available correction)	N-D	Δ N-D
1-3 months	-0.2	7.4	-14.7
4-6 months	4.6	3.6	-17.4
12+ months	4.0	0.8	-19.7



Melbourne Experience: Outcome measures

- For convergence excess cases (n=25)
 - 7 (28%) had bifocals pre-operatively
 - 3 (43%) were able to discontinue bifocal wear during follow-up period
 - 1 (5.6%) required bifocals post-operatively, when not required pre-operatively



Melbourne Experience: Outcome measures

- For convergence excess cases (n=25)
 - Over-corrections
 - At 1-3 months: 3 (12.5%)
 - At 4-6 months: 2 (25%)
 - At 7+ months: 0
 - At final follow-up: 2 (8%), 1 > 10^{XT}



Melbourne Experience:

- For variable esotropia patients (n=4)
 - 3 infantile esotropia
 - Variability or difficulty assessing deviation reliably = common feature



Pulley Posterior Fixation Suture

- Logical application of current understanding of orbital anatomy
- Safe
- Effective at decreasing near excess
 - Δ 12-17[^]
- Low risk significant over-correction ($\leq 3\%$)
- Technically difficult
- Probably not effective as isolated procedure



The Future

- Long-term follow-up?
- Is titratability possible?
- Role of intraoperative restriction?

