

*Treatment of Progressive Esotropia  
Caused By High Myopia  
A New Surgical Procedure Based on Its  
Pathogenesis*

*Tsuranu Yokoyama, MD*

*(Dept. of Pediatric Ophthalmology, Osaka City General Hospital)*

*Shinsuke Ataka, MD*

*(Dept. of Ophthalmology, Osaka Ekisaikai Hospital)*

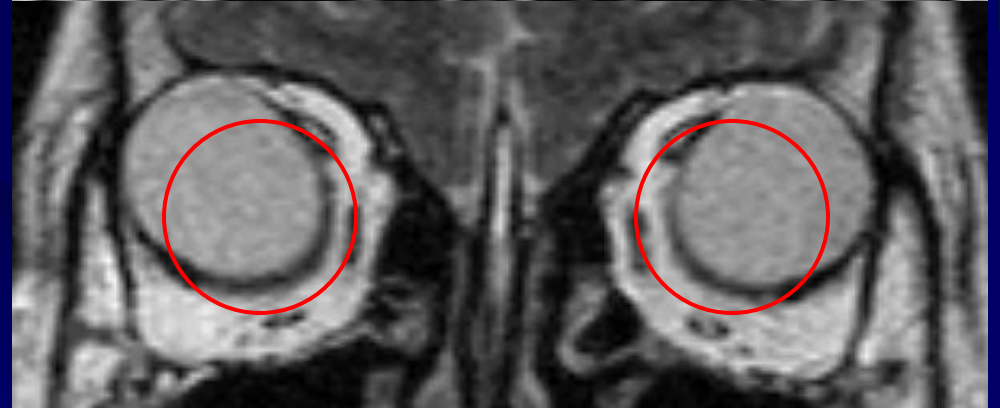
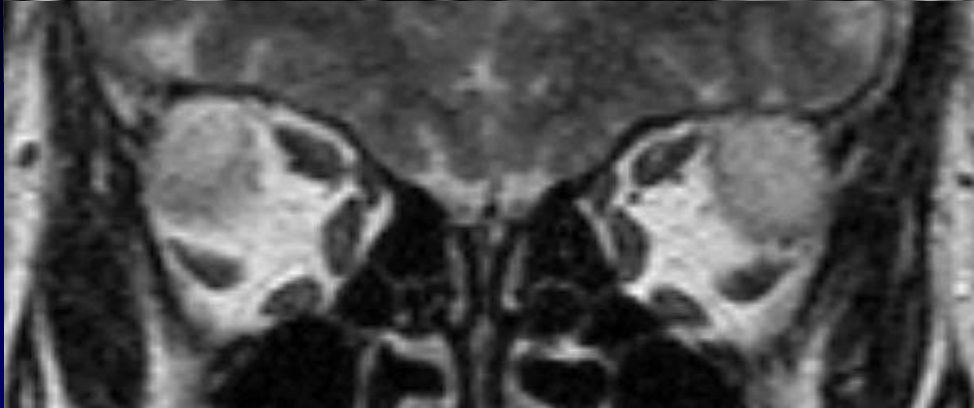
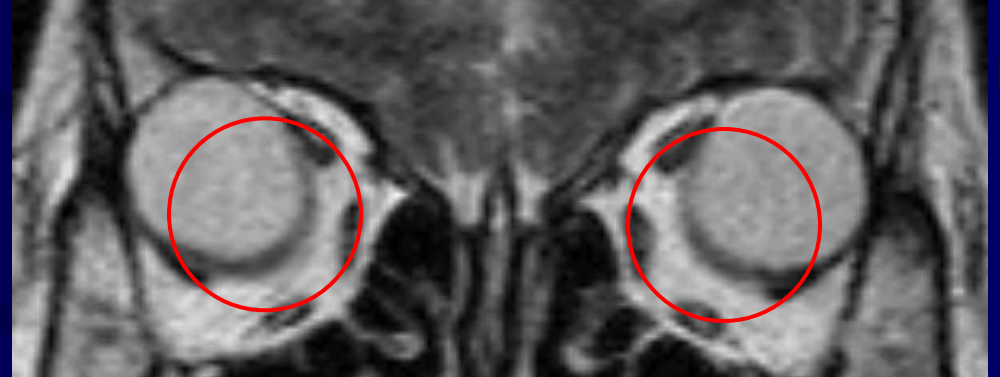
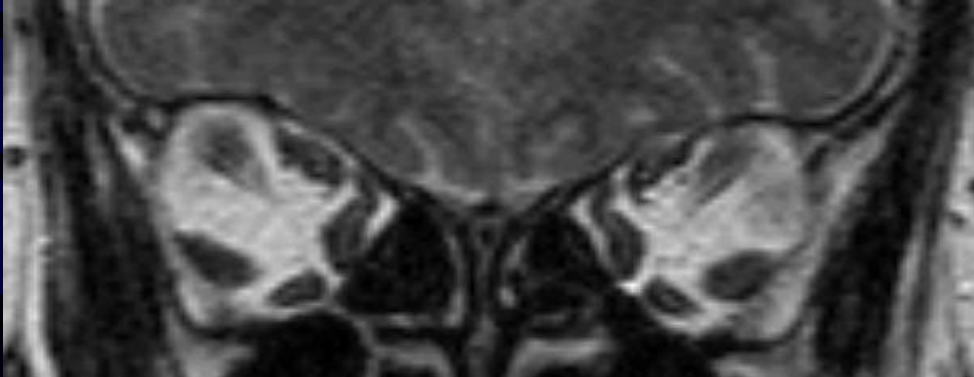
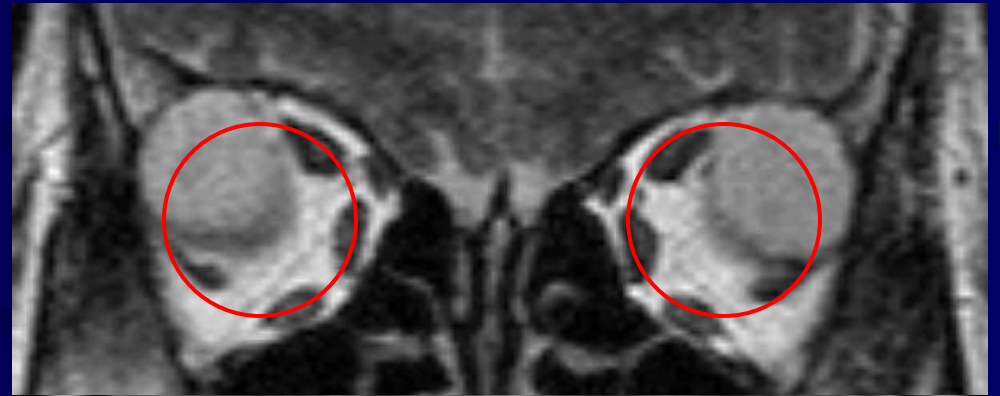
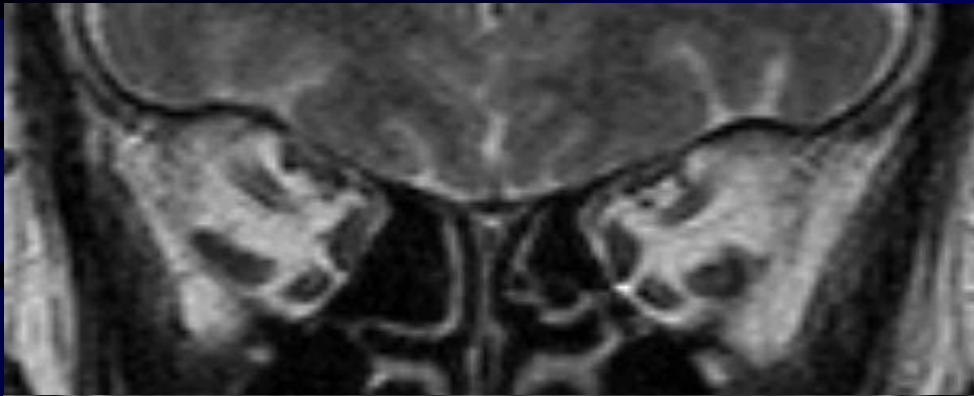
*Hitoshi Tabuchi, MD, Kunihiro Shiraki, MD and Tokuhiko Miki, MD*

*(Dept. of Ophthalmology, Osaka City University Medical School)*

# *Definition of Progressive Esotropia Caused by High Myopia*

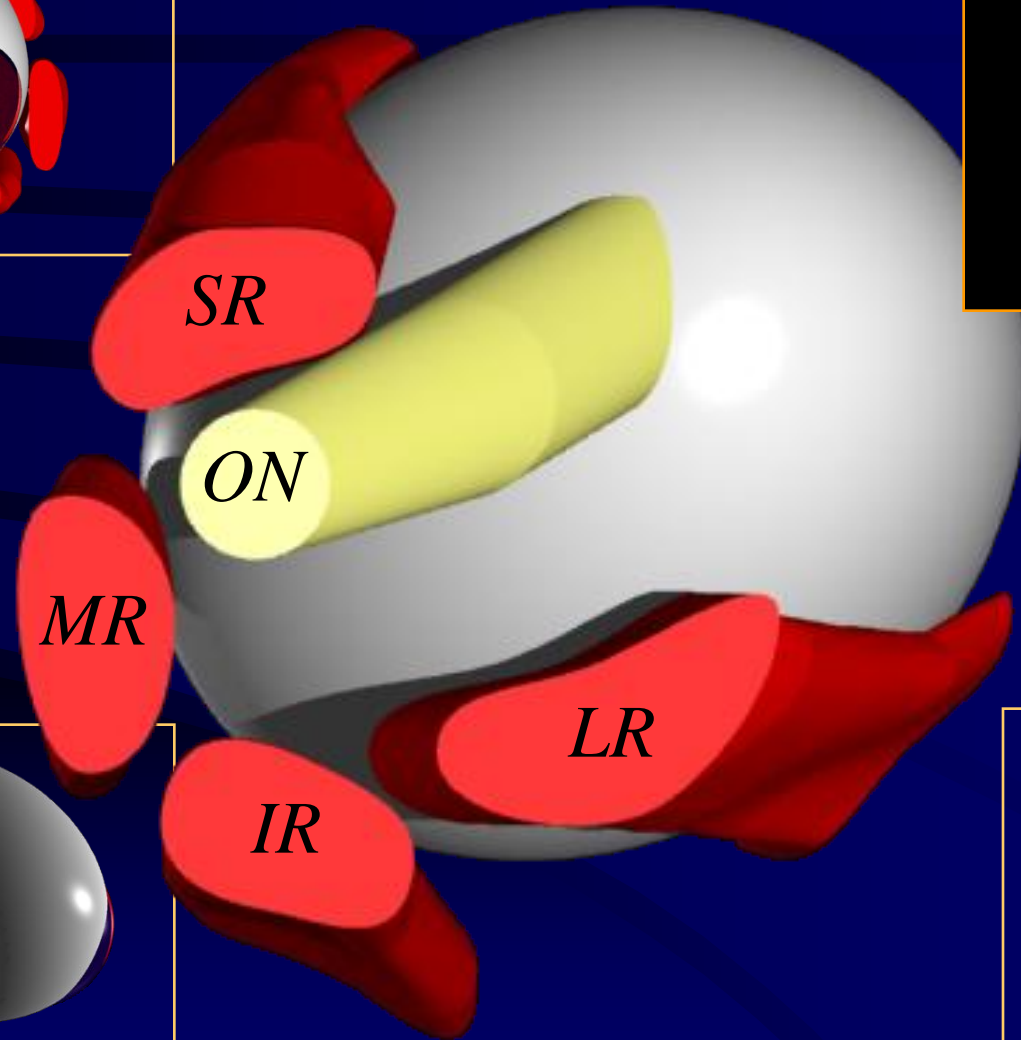
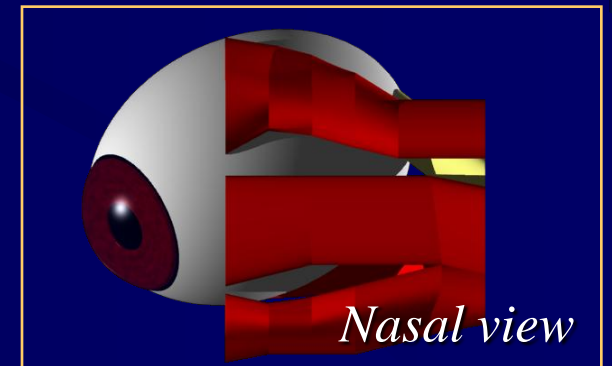
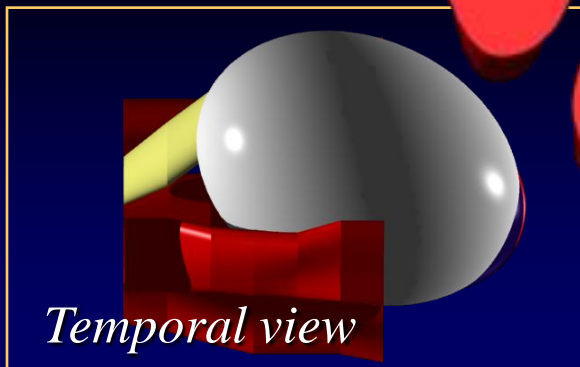
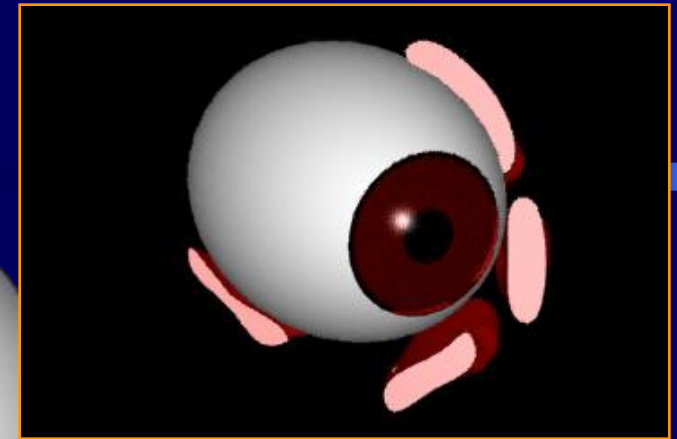
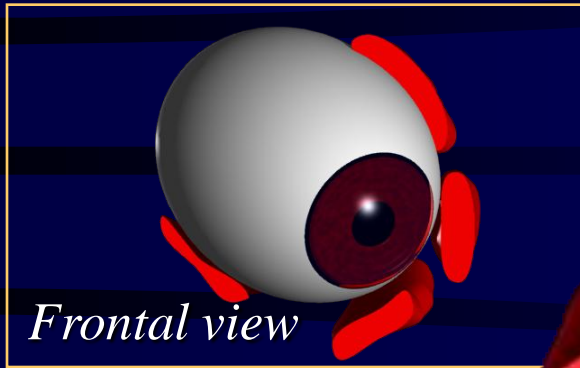
- *Presence of high myopia with an axial length sometimes greater than 30 mm.*
- *Abduction and sursumduction are limited, and the forced duction test is positive.*
- *Leads to esotropia fixus in some cases.*

# *Coronal MRI Scans of Case 2*



# 3-D Reconstruction from MRI

Right Eye of Case 2



# Summary of Patients

Case No.	Sex	Age at Surgery (years)	Onset (years)	Previous Surgeries*	Axial Length (mm)		Maximum Angle of Abduction (deg.)		Angle of Deviation (deg.)
					R	L	R	L	
1	F	53	38	RR	32.37	32.12	-70	-70	+140
2	F	58	35	RR, Tr	unknown	34.64	-70	-70	+140
3	F	70	unknown	none	27.86	-	-67	-	+67
4	F	66	51	RR	-	29.89	-	-15	+35
5	F	45	40	none	35.53	34.63	-40	-20	+40
6	F	62	14	MRR, Tr	30.30	-	+5	-	+31

\* RR: recession and resection, Tr: transposition of SR & IR, MRR: medial rectus recession

# *Possible Surgical Procedures*

*1. Recession and Resection*

*2. Recession of the MR*

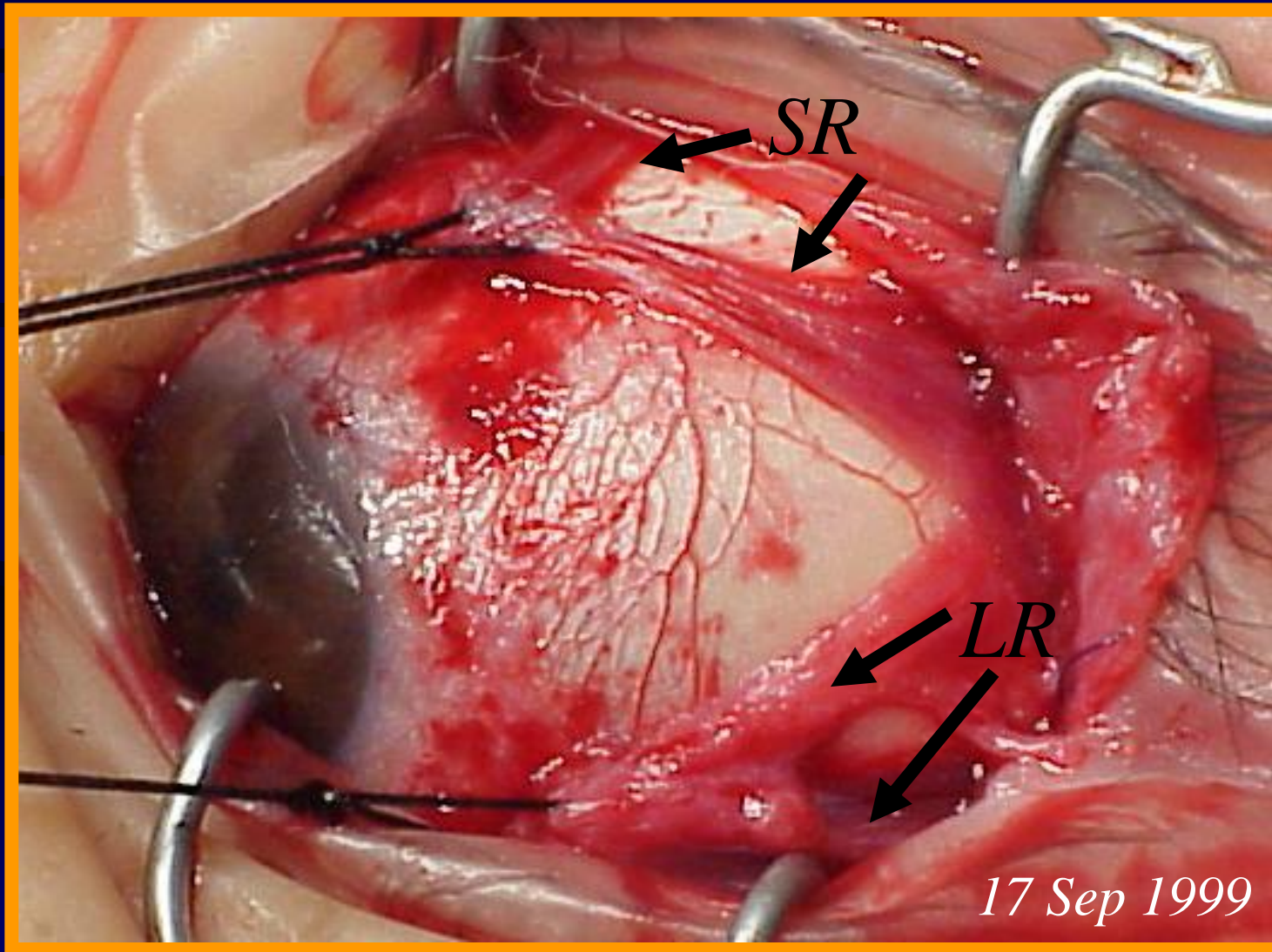
*3. Transposition of the LR and MR*

*4. Superior Fixation of the LR*

*5. Junction of the SR and LR*



*Case 4: Joining the SR and LR  
After Splitting (into halves)*

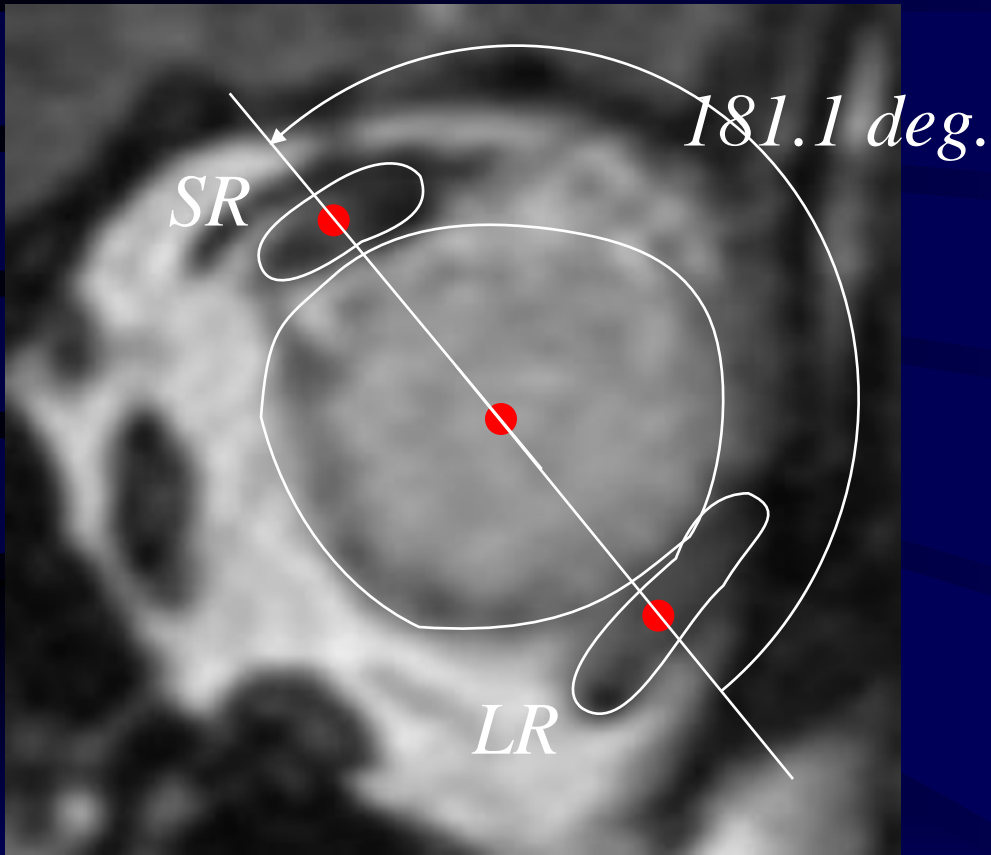


# *Variables to Evaluate the Results of Surgery*

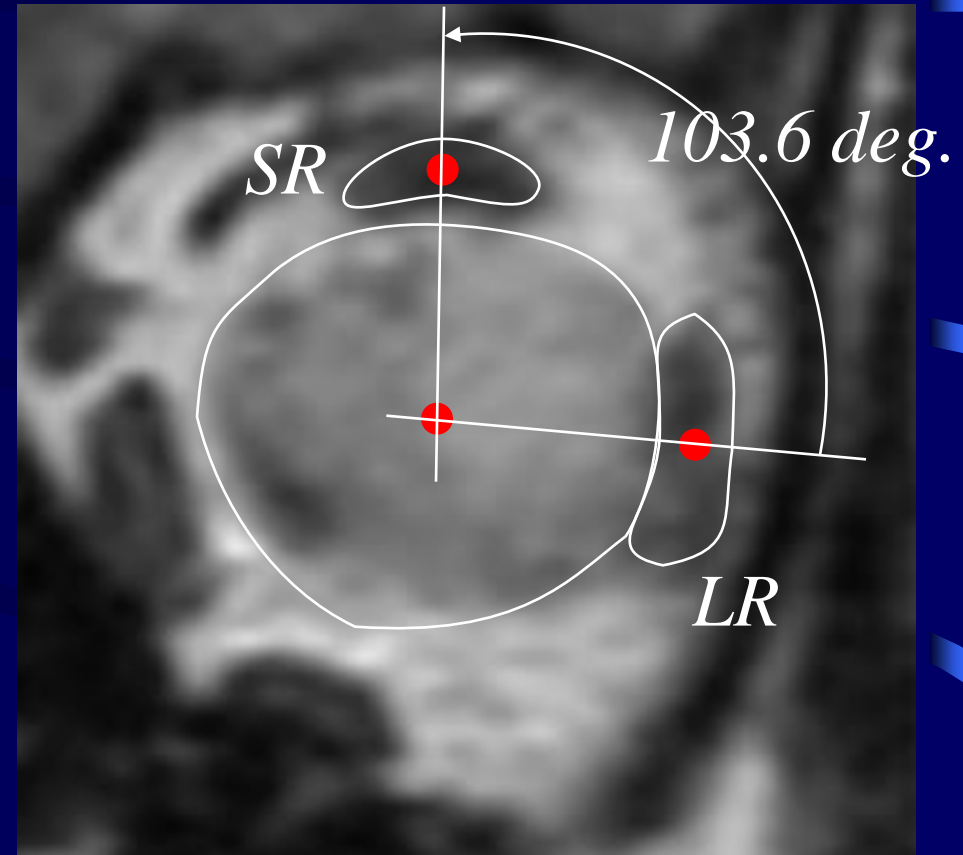
- 1. The degree of dislocation of the eyeball out of the muscle cone (angle of dislocation)*
- 2. The maximum angle of abduction*
- 3. The angle of ocular deviation*



# *Measuring the Angle of Dislocation of the Eyeball*



*Preoperative*



*Postoperative*

*The center positions were measured with Scion Image® software.*

# Decrease of the Angle of Dislocation

(deg)

300

250

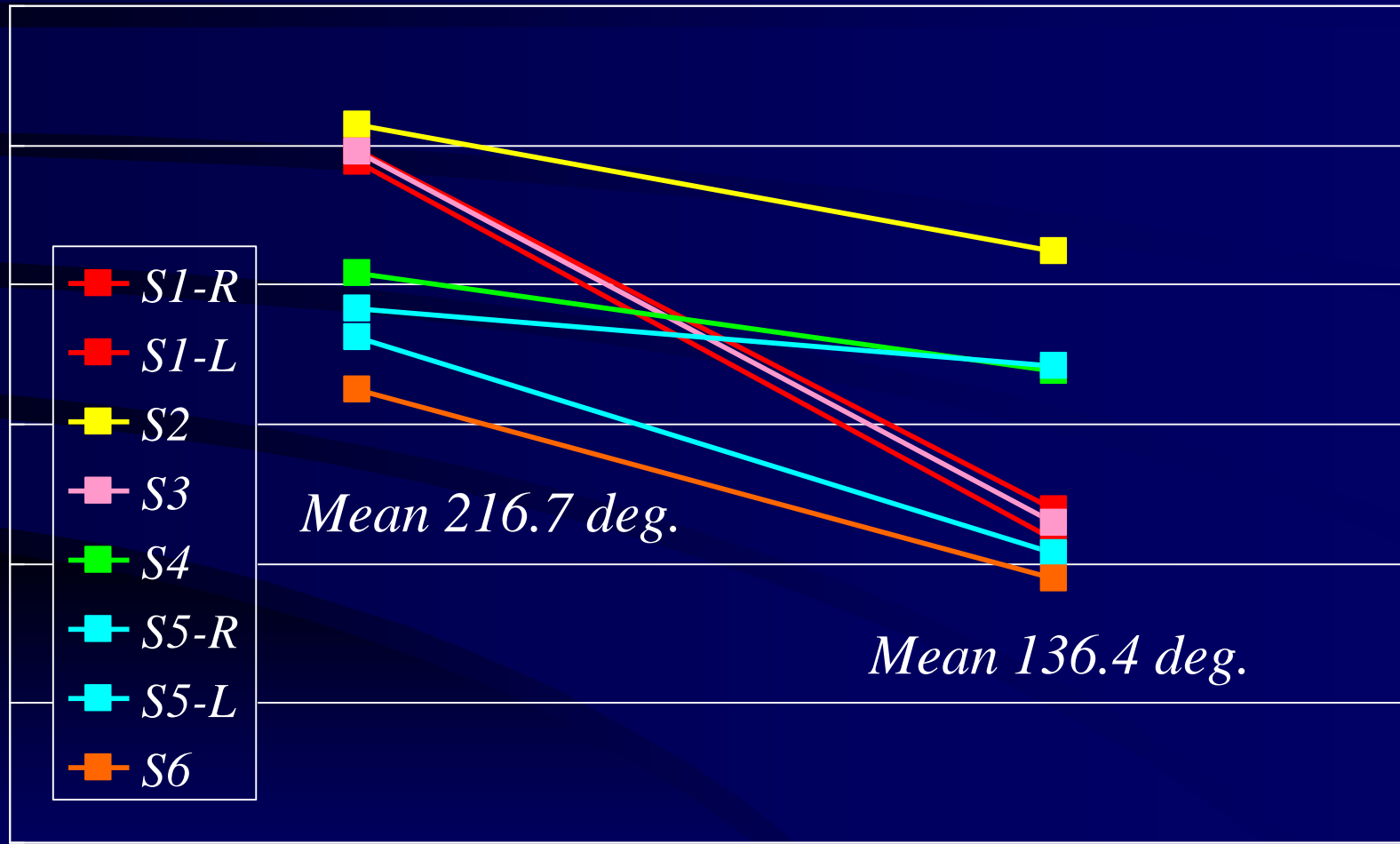
200

150

100

50

0



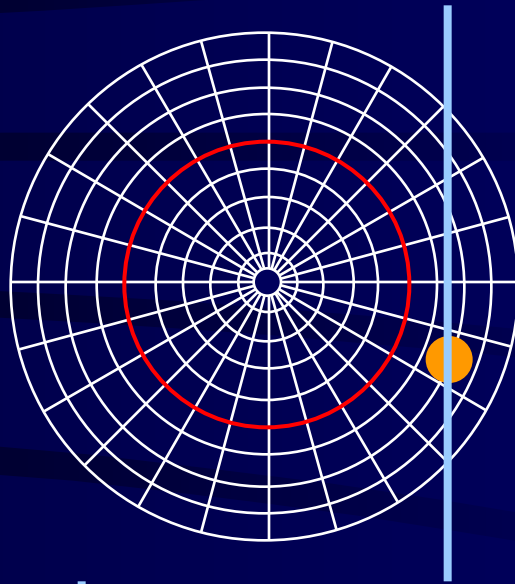
Preoperative

Postoperative

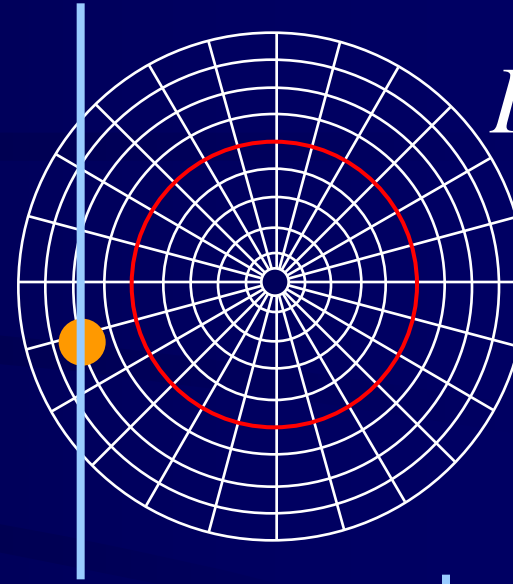
# Measuring the Maximum Angle of Abduction

*Preoperative*

*L*

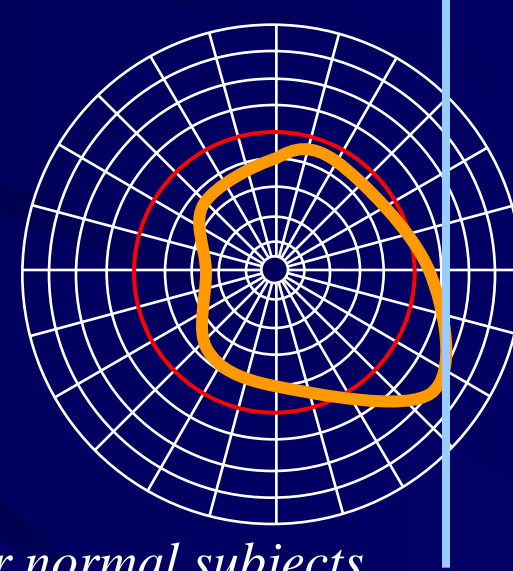
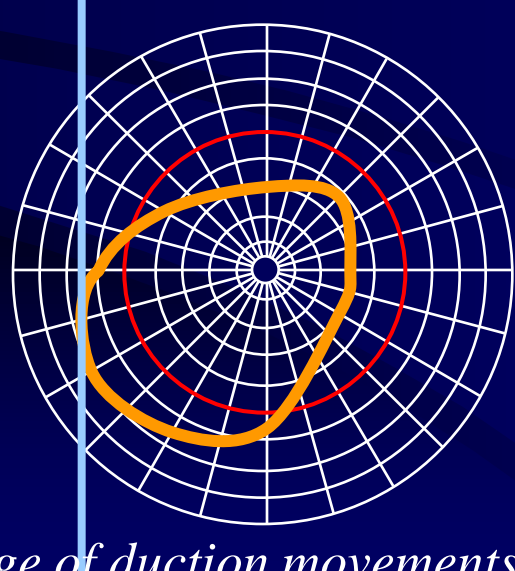


*R*



*30 Sep 1999*

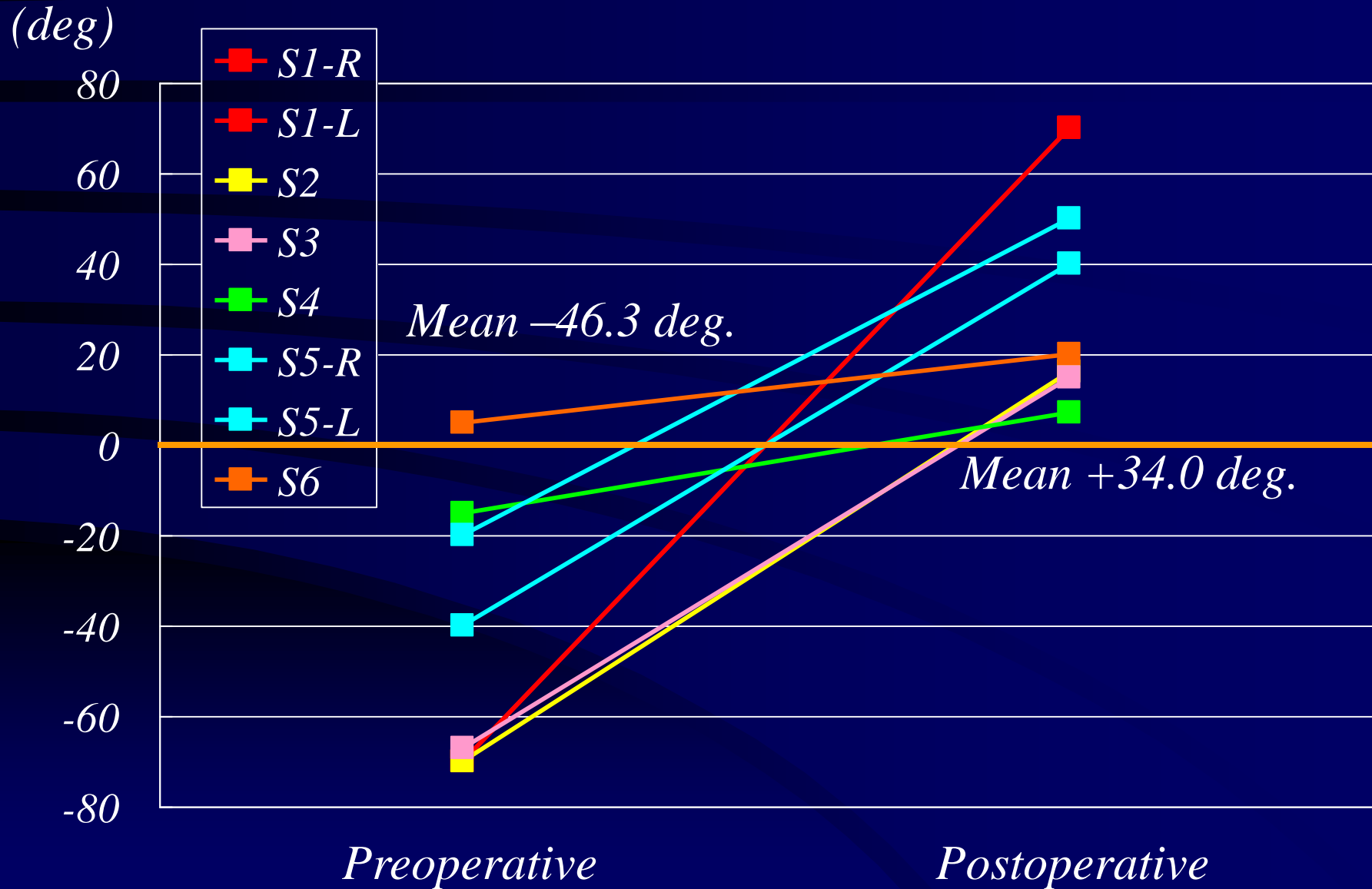
*Postoperative*



*20 Sep 2000*

*Red circles illustrate the range of duction movements for normal subjects.*

# Improvement of the Max. Angle of Abduction



# Case 1

*Preoperative*



*Postoperative (52 days after surgery)*





## Case 2

*Preoperative*



*Postoperative OS (69 days after surgery)*



# Case 6

*Preoperative*



*24 Dec 1999*

*Postoperative OD (52 days after surgery)*



*13 Mar 2000*

# Case 5: Photographic History of Surgery

5 Feb 1999



5 Feb 1999 MR recession OU

8 Feb 1999



20 Sep 1999



21 Sep 1999 SR-LR (split) OD

21 Oct 1999



5 Nov 1999 SR-LR (whole) OS

25 Nov 1999

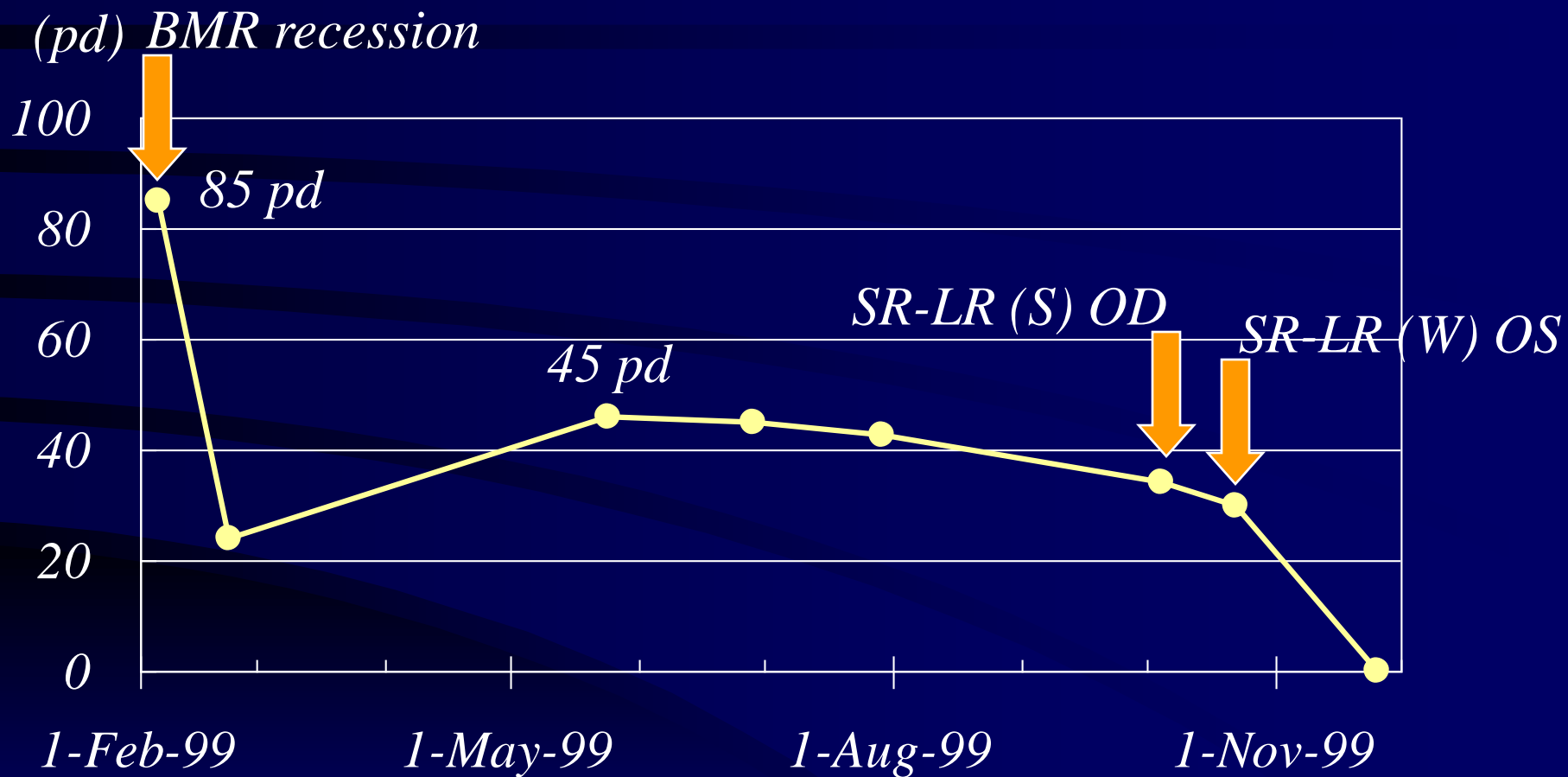


(split): Junction of split muscles

(whole): Junction of whole muscles

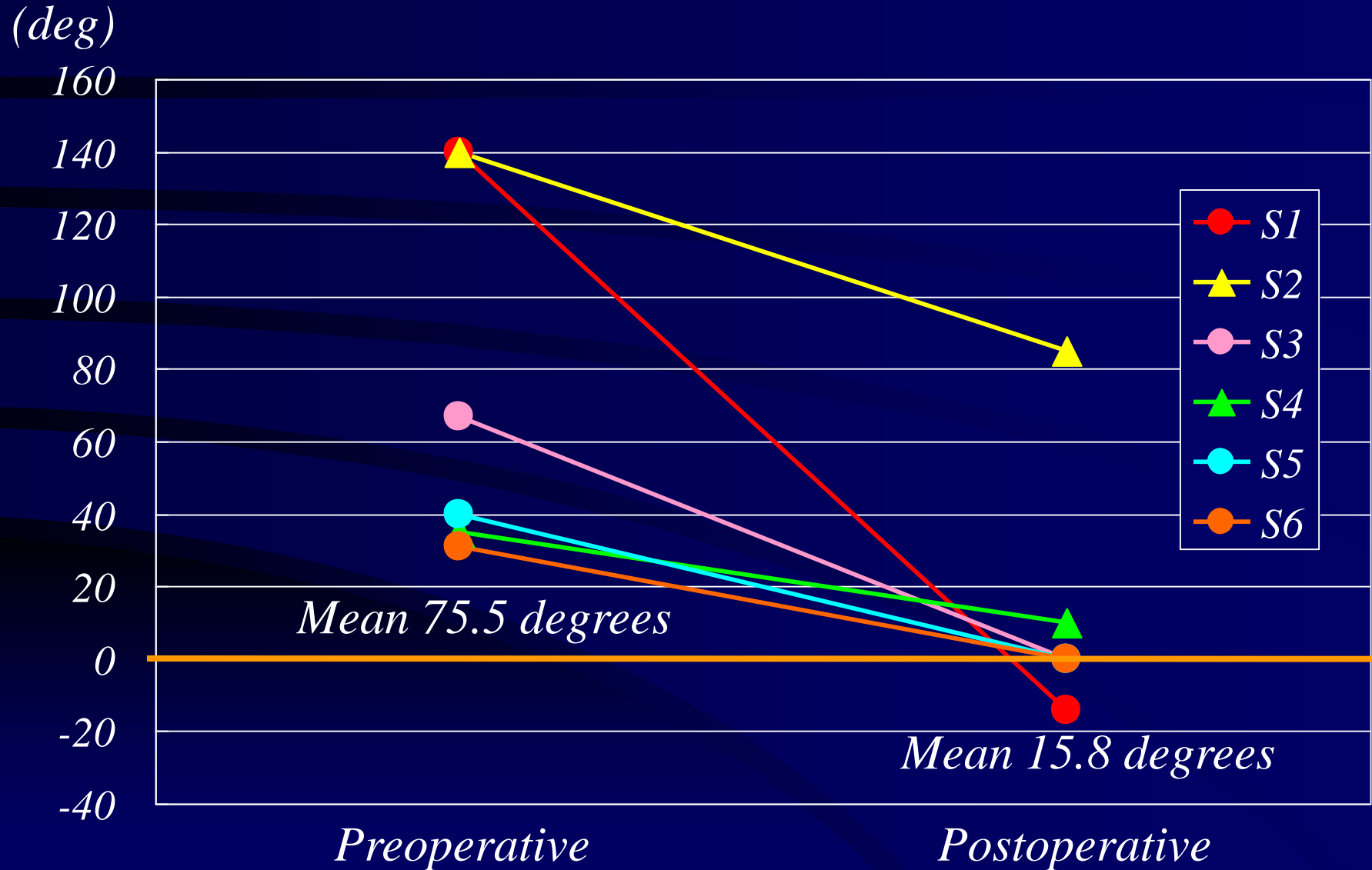


# Case 5: Changes of Ocular Deviation over Time



*Esotropia reappeared 3 months after bilateral MR recession*

# Improvement of the Angle of Deviation





# *Conclusions*

- *A surgical procedure to bind the superior and lateral rectus muscles was effective in improving the ocular motility and deviation in esotropia caused by high myopia.*
- *This procedure worked by restoring the dislocated eyeball back into the muscle cone.*

# *Conclusions*

- *Recession of the medial rectus muscle may not always be necessary for treating esotropia caused by high myopia.*
- *Resection of the lateral rectus muscle is best avoided, because it can facilitate dislocation of the eyeball out of the muscle cone.*