

Surgical Results of a Muscle Transposition Procedure for Abducens Palsy Without Tenotomy and Muscle Splitting

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- **PURPOSE:**

- Transposition procedure without muscle splitting and tenotomy

- **PATIENTS:**

- 9 patients with abducens nerve palsy unable to abduct past midline (5 men, 4 women)
 - 1 congenital
 - 4 traumatic
 - 4 unknown aetiology
 - 3 bilateral CN VI palsy, 6 unilateral N VI palsy

- **METHOD:**

- 3 patients - unilateral muscle transposition
- 6 patients – unilateral MR recession + unilateral muscle transposition

TABLE 1. Profiles of Patients with Abducens Palsy Who Underwent Our Current Muscle Transposition Procedure

Patient No.	Sex	Cause	Laterality	Age at Surgery (y)	Time from Onset to Surgery (mos)	Muscle Transposition	Medial Rectus Recession (mm)	Preoperative Comments
1	F	Trauma	B	66	13	L	L (8)	—
2	F	Congenital	L	31	—	L	NP	With previous surgery of LR resection and MR recession in left eye at 22 y of age
3	F	Trauma	B	59	29	R	R (6)	—
4	M	Unknown	R	59	12	R	NP	—
5	M	Trauma	R	55	15	R	R (3)	With traumatic optic neuropathy in right eye
6	M	Unknown	R	50	151	R	R (3)	—
7	M	Unknown	R	56	17	R	NP	—
8	F	Trauma	B	54	39	L	L (5)	—
9	M	Unknown	R	54	12	R	R (6)	—

B = bilateral; L = left; LR = lateral rectus; MR = medial rectus; NP = not performed; R = right; — = unknown or nothing.

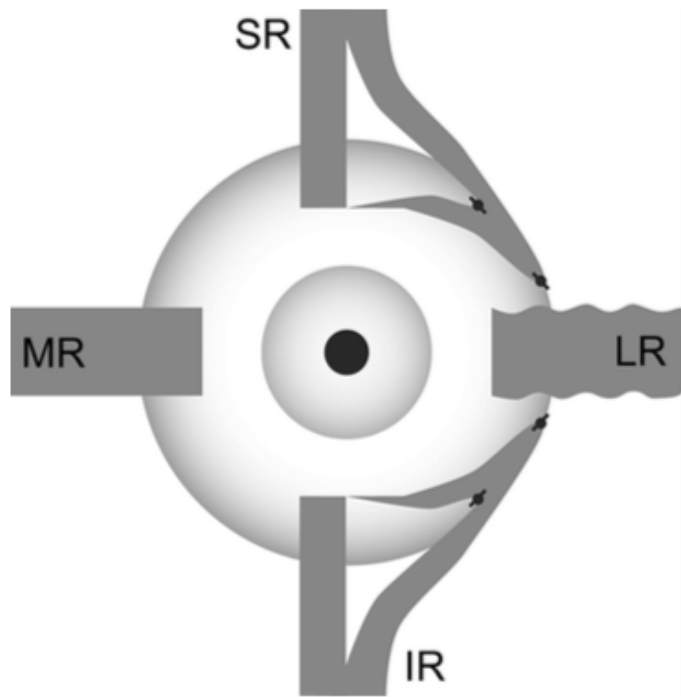
- PROCEDURE

- *A 6-0 polypropylene monofilament fiber suture or a 5-0 polyester braided fiber suture was inserted through the temporal muscular margin of each vertical rectus muscle at approximately one third of the width from the edge at a distance of 8 to 10 mm behind the muscle insertion.*
- *Each suture carefully should be placed apart from the large vessels of each muscle to prevent anterior segment ischemia.*
- *The same suture also was inserted through each scleral wall at a distance of 10 to 12 mm behind the limbus at the superotemporal or inferotemporal quadrant.*
- *The lateral margin of each vertical rectus muscle then was transposed superotemporally or inferotemporally and was sutured to the sclera.*

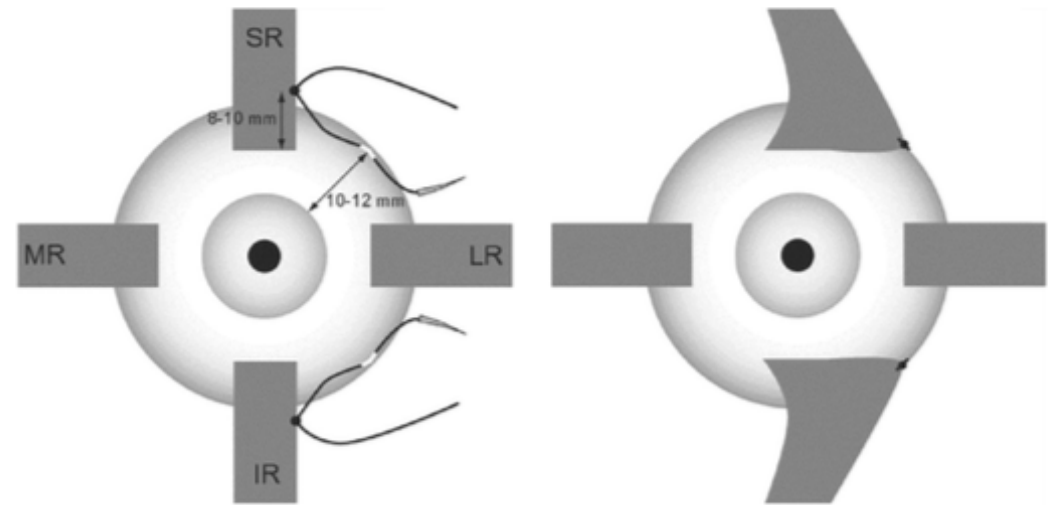
- PROCEDURE

- *the transposed rectus muscles in the current procedure (Figure 2) were not sutured adjacent to the lateral rectus muscle, but at each midpoint (ie, superotemporally or inferotemporally), because the muscle tension is so strong that it is difficult to transpose the muscles adjacent to the lateral rectus muscle. Moreover, the muscles were transposed at a midpoint to preserve their original vertical duction.*

Procedure 1



Procedure 2



- RESULTS

- The surgical correction by muscle transposition alone ranged from 24 to 36 prism diopters, and that by muscle transposition and recession of the medial rectus muscle ranged from 50 to 62 prism diopters. The mean correction was 46.3 ± 13.1 prism diopters per eye.
- All paretic eyes could abduct beyond the midline.
- No major vertical ductional disturbances developed.
- Anterior segment ischemia did not occur in any patients.
- One patient with BMRR and unilateral transposition overcorrected (from +30 to -20PD) – declined further surgery as no diplopia due to optic neuropathy
- if the preoperative squint angle is less than 40 PD of esotropia, perform the transposition procedure alone to avoid overcorrection.

TABLE 2. Preoperative and Postoperative Ocular Deviation of Patients with Abducens Palsy in Primary Gaze at Distance

Patient No.	Palsy	Preoperative Deviation (PD)	Deviation 1 Month after Surgery (PD)	Deviation at Final Examination (PD)	Corrected Deviation (PD)	Follow-up Duration after Surgery (mos)	Postoperative Comments
1	Bilateral	+75	+25	+25	50	1	Declined additional surgery
2	Unilateral	+24	0	0	24	89	—
3	Bilateral	+75	+20	+20	55	3	With additional surgery of MR recession of 6 mm in left eye 3 mos later
4	Unilateral	+30	0	0	30	9	—
5	Unilateral	+30	-20	-20	50	11	—
6	Unilateral	+60	+8	+6	54	9	—
7	Unilateral	+40	+4	+4	36	1	—
8	Bilateral	+70	+8	+8	62	2	SBV regained with prism glasses
9	Unilateral	+66	+10	+10	56	4	SBV regained with face turn to right

MR = medial rectus; PD = prism diopters; SBV = single binocular vision; — = nothing.

RESULTS

	Pre-op	Post-op	
Mean deviation	+52.2 ± 21.0 PD	+5.9 ± 12.9 PD	
Mean correction		46.3 ± 13.1 PD	
Postoperative deviation range			+8 to +25 PD in bilateral palsy -20 to +10 PD in unilateral palsy

- **BENEFITS**

- No tenotomy
- No splitting of muscles
- Preservation of anterior ciliary arteries – reduced risk of anterior ischaemia (if anterior ciliary vessels not strangulated)

- **WEAKNESSES**

- small number of patients
- Short follow up (5 patients less than 6 months)