

Effect of muscle displacement of horizontal recti in pattern strabismus

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Sixteen cases of A & V pattern strabismus undergoing horizontal muscle surgery with half tendon width vertical offsets and three patients undergoing two third to full tendon width offsets were retrospectively studied. Half muscle width shift were found to be effective in cases of A & V pattern strabismus in which oblique muscle dysfunction is inadequate & pattern is less than 25PD. For pattern greater than 25PD, three quarter to full tendon with offset were effective in collapsing pattern.

Introduction:

A significant difference in size of horizontal strabismic deviation in defined positions of up gaze and down gaze is termed A- or V- pattern strabismus¹. The co-existence of an A or V pattern with horizontal strabismus is seen in 12.5% to 50% of cases^{2, 1, 3}. Surgical management of pattern is complex because of its different presentation. If oblique muscles are significantly overacting or underacting, they should be target of surgery. If there is no oblique muscle dysfunction, treatment of pattern by supraplacement or infraplacement of the recessed or resected horizontal rectus muscle can be effective. The MR is always transposed toward the apex of the V (infraplaced) or the A (supraplaced). The LR is supraplaced to correct V pattern and infraplaced to correct A patterns^{4, 5}.

In our study, the effectiveness of vertical offsets of horizontal muscles were studied on short term (4 weeks) and long term (6 months) basis.

Material and Methods

Patient Selection:

Nineteen cases of AV pattern that underwent muscle displacement surgery in the squint clinic of Global hospital institute of ophthalmology, Abu road were selected for retrospective study to evaluate the effect of vertical shifting. A complete orthoptic evaluation was done where deviations were measured in primary position, 25 degree up gaze & 25 degree down gaze by tilting the head. A difference of 15 prism diopter or more in V phenomenon and 10 PD or more in A phenomenon were taken as criterion for these patterns. Measurement was done with prism cover test and the tests for binocularity were done with worth 4 dot test. Oblique over action were clinically estimated on a scale of +1 through +4⁶ and those with +1 or less were considered for muscle displacement surgery.

Surgical Technique

Monocular recession-resection procedures were done for the deviation

in the primary position with vertical displacement of horizontal recti. For V pattern the medial rectus was depressed and lateral rectus was elevated and the reverse was done for A pattern. 5mm shift was done for pattern less than 25PD and 8-10mm shift was done for pattern more than 25 PD. Patient were assessed 1st post operative day and thereafter at 4 weeks and 6 months interval.

Results:

19 patients with pattern strabismus underwent muscle displacement surgery. The mean age at surgery in this study was 16.15 years with a range of 2 to 34 year. The male patients were 12(63.15 %) and female patients were 7(36.84%) RE surgery was done in 2 case and L/E was in 7 cases. out of 19 patients 11 patients(57.89%) had exotropia and 8(42.10%) has esotropia. 7 patients had V pattern exotropia and 4 has A pattern exotropia while 6 has V pattern esotropia and 2 had A pattern esotropia. 16 patients(84.21%) had pattern less than 25PD while 3 patients(15.78%) had pattern more than 25 PD.

On the basis of surgery performed, patients were divided into two groups.

Group 1 consists of patients having pattern <25PD and underwent 5mm muscle displacement. (Table 1 shows pre-operative & post-operative deviation observed in cases of 5mm shift).

Group 2 consists of patients having pattern >25PD and underwent 8-10mm muscle shifting. (Table 2 shows preoperative & postoperative deviation in cases of 8-10mm shift).

In group 1 the initial correction to within ± 10 PD of pattern was 100% over all with 93.75% remaining collapsed over 6 month follow up.

In group 2, 8-10mm muscle offsets were effective in 66.67% cases in collapsing pattern within ± 10 PD in 6 months follow up.

In group 1 mean preoperative pattern was 16.18 prism diopter and postoperative pattern was 4.25PD. in 6 month. Average correction was 14.25PD

In group 2 mean preoperative pattern was 28.33PD and postoperative pattern was 9.33 PD in 6 month with average correction of 19PD.

Discussion:

Monocular vertical displacement of horizontal recti were successful in decreasing the A and V pattern. Surgical procedures on different extraocular muscles and their transposition have been practiced for many year and many ophthalmologists agree that in cases with no obvious oblique muscle dysfunction, symmetrical vertical displacement of horizontal recti muscle should be performed^{7, 8, and 9}. Goldstein

¹⁰ performed monocular vertical displacement of horizontal recti, comparing 5mm and 8mm shifting and concluded that both the procedures were effective for reducing the vertical incomitance. Metz ¹¹ and Almedia ¹² performed only 5mm shift and claimed that the procedure was effective in reducing A and V phenomenon. Metz ¹¹ also reported 15 PD correction with the 5mm shift. Our study confirmed the finding of Almedia and Metz that 5mm shift was effective in correcting AV phenomenon. Scott ¹³ performed three quarter to full tendon width offsets for pattern greater than 30PD. Our study also revealed that 8-10mm muscle displacement is effective for pattern greater than 25PD.

Dr. Pradeep Sharma ¹⁴ advocates a 5-mm shift is as effective as an 8mm shift done along with a monocular recession-resection procedure to correct the A or V phenomenon but 8mm shift causes incomitances in extreme gazes, so in our study we have done 8mm shifting only in pattern greater than 25 PD.

To conclude a 5mm shift is effective along with a monocular recession – resection to correct the A or V pattern less than 25 PD and 8mm shift is effective for pattern more than 25 PD.

	pattern	preoperative pattern			postoperative pattern (4 week)			postoperative pattern 6months	
		primary	up gaze	down gaze	pattern	pattern left	correction	pattern left	correction
1	V	40	45	30	15	0	15	0	
2	V	30	45	25	20	5	15	0	
3	V	35	40	25	15	0	15	0	
4	V	40	40	18	22	4	18	7	
5	V	45	50	30	20	0	70	5	
6	V	20	35	16	19	0	19	6	
7	A	30	25	45	20	5	15	5	
8	A	45	40	55	15	0	15	0	
9	A	40	20	45	25	10	15	12	
10	V	35	25	45	20	5	15	5	
11	V	40	35	50	15	0	15	0	
12	V	30	20	40	20	4	16	6	
13	V	40	30	45	15	0	15	0	
14	V	35	35	50	15	0	15	0	
15	V	25	20	40	20	5	15	8	
16	A	45	50	30	20	7	13	9	

GROUP-2 Table-2

s.no	age/sex	type	pattern	preoperative pattern			postoperative pattern (4 week)			postoperat (6 months	
				primary	upgaze	downgaze	pattern	pattern left	correction	pattern left	correction
1	18/M	XT	V	25	40	10	30	6	24	8	22
2	20/M	XT	A	25	15	45	30	10	20	12	18
3	4/F	ET	A	45	50	25	25	8	17	8	17

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