

**Original Research Article****A STUDY ON THE CLINICAL PROFILE AND MANAGEMENT OF 35 CASES OF CONCOMITANT EXO DEVIATION AT A TERTIARY CARE CENTRE****Dr. Manupriya M.<sup>1</sup>, Dr. Saranya V.<sup>2</sup>, Dr. Mohammed Junaid K.<sup>3</sup>**<sup>1</sup>Assistant Professor, Department of Ophthalmology, Al Azhar Medical College and Superspeciality Hospital, Thodupuzha, Kerala, India.<sup>2</sup>Assistant Professor. Regional Institute of Ophthalmology, Madras Medical College, Egmore, Chennai, Tamil Nadu, India.<sup>3</sup>Junior Resident, Department of Ophthalmology, Al Azhar Medical College and Superspeciality Hospital, Thodupuzha, Kerala, India.**Corresponding Author**

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**ABSTRACT****Background**

A study to acquire knowledge about the causes, clinical manifestations and management of concomitant exo deviation.

**Methods**

This prospective study was conducted in 35 patients at Squint and Neuro ophthalmology department, Institute of Ophthalmology, Government Ophthalmic Hospital, Chennai for a period of 1 year October 2017 to September 2018.

**Results**

Maximum number of patients were of age less than 10 years in this study group and majority of patients had exotropia since birth. Constant exotropia was more compared to intermittent exotropia and it was alternating exotropia in majority. Majority of patients presented with an angle of deviation of 20-40 PDs in this study. 80% of patients in this study group required surgery and most among them underwent bilateral lateral rectus recession. Binocular single vision and mean angle of deviation improved after treatment.

**Conclusions**

Exodeviations occur less frequently than esodeviations. Majority of exodeviations are present from birth and require surgery. Patients who presented early in age and with less angle of deviation have better chance for restoration of binocular single vision.

**Keywords:** Exodeviation, Binocular single vision, Occlusion, Lateral rectus recession.

**BACKGROUND**

Binocular single vision is one of the hallmarks of the human race that has bestowed supremacy in the hierarchy of the animal kingdom, BSV<sup>1</sup> is accomplished by a perfect sensorimotor coordination of the two eyes both at rest and during movement. The two-dimensional images of an object formed at the fovea of each eye, transmitted to the respective

visual cortex are processed and perceived as three-dimensional percept. This requires constant and controlled activity of the appropriate muscles to maintain fixation on the object. It also requires the accommodational mechanism to maintain clear view even as the object moves closer or farther. An exodeviation<sup>2</sup> is a divergent form of strabismus that can be latent (controlled by fusion) or manifest. Abnormalities of innervation such as excessive tonic divergence has been proposed as an etiology. A hereditary basis for exodeviation is apparent in some family. Management<sup>3</sup> in a case of strabismus may be surgical or non-surgical. While many cases require surgical management, almost all will require some non-surgical modality either before surgery, after surgery or both. The quality of non-surgical management reflects the outcome of surgical management also, as the effect of surgery may be mended or spoiled by it.

## **MATERIALS & METHODS**

This prospective study was conducted at Squint and Neuro ophthalmology department, Institute of Ophthalmology, Government Ophthalmic Hospital, Chennai for a period of 1 year October 2017 to September 2018.

35 Patients with concomitant exodeviation presented to Squint and Neuro ophthalmology was registered, evaluated and followed up during the study period. A detailed history of the patient, unaided visual acuity, best corrected visual acuity, slit lamp examination for anterior segment evaluation, fundus examination for posterior segment evaluation, cycloplegic refraction, assessment of strabismus, extra ocular movements, binocular status of eye was evaluated at the time of presentation and followed up during the study period.

### **Inclusion criteria**

All cases of concomitant exo deviation presented in squint and neuro ophthalm department of age group 3-45 years.

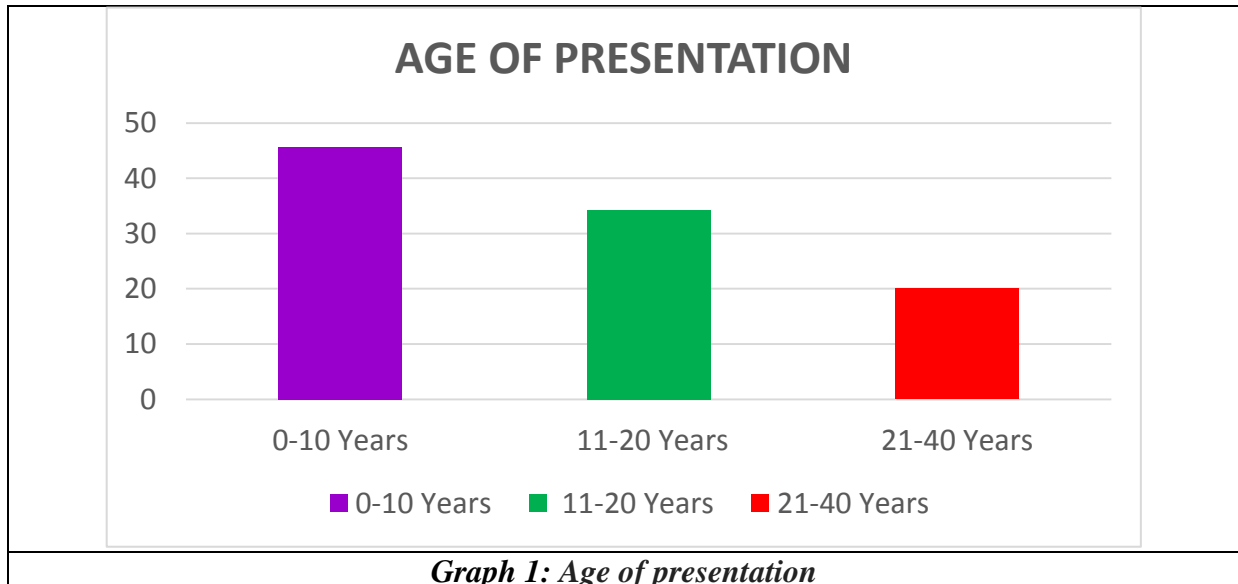
### **Exclusion criteria**

- Age < 3 and > 45 years
- Paralytic squint

## **RESULTS**

- Maximum number of patients (45.71%) were of age less than 10 years in this study group and majority of patients (71.42%) had exotropia since birth.
- In this study there was no sex predilection for exodeviation
- Constant exotropia was more (82.86%) compared to intermittent exotropia and it was alternating exotropia in majority (88.57%) of patients.
- Maximum number of patients (80%) didn't have any precipitating factors in this study.
- Family history was not significant in this study
- 11.43% of patients had associated nystagmus in this study.
- Majority of patients (40%) presented with an angle of deviation of 20-40 PDs in this study. Basic exotropia was more (82.85%) in this study.
- In this study, only 14.29% of patients had eccentric fixation.
- 25.7% of patients had amblyopia in this study.
- In this study there was an equal proportion of emmetrope and myopes (34.28%.) 2
- In 82.85% of patients Binocular single vision was absent during presentation.

- 80% of patients in this study group required surgery and 68.57% among them underwent bilateral lateral rectus recession.
- 34.28% of patients developed binocular single vision after treatment in this study.
- The mean angle of deviation for distance improved from 52 at the time of presentation to 22.41 in this study at 8 weeks after treatment.

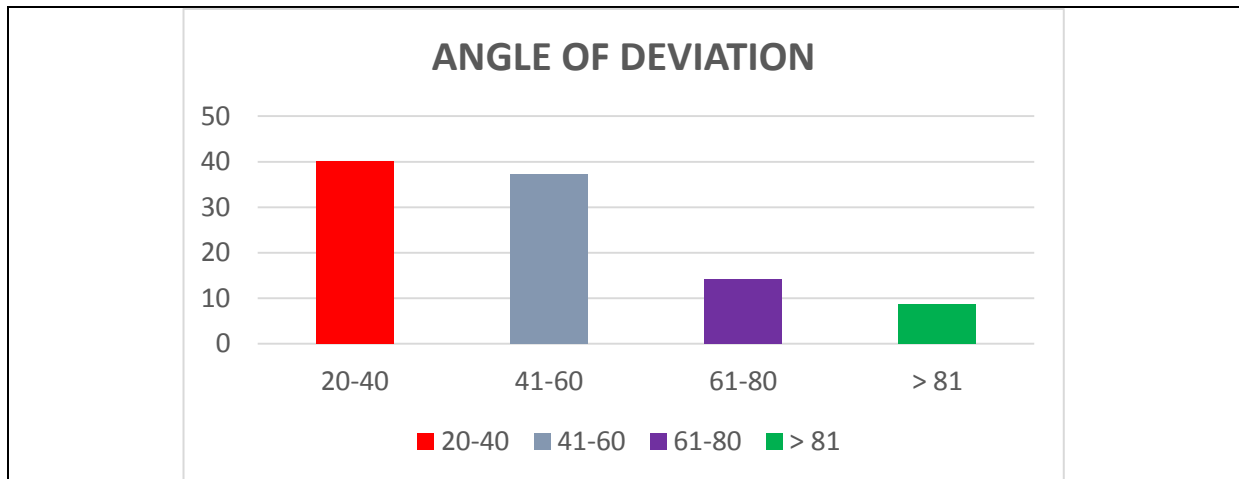


45.71% of patients in this study group belonged to 0-10 years. 34.28% belonged to 11-20 years and 20% of patients belonged to 21-40 years.

AGE OF ONSET	FREQUENCY	PERCENTAGE
SINCE BIRTH	25	71.42
1-5 YEARS	8	22.85
6-10 YEARS	1	2.85
>11 YEARS	1	2.85
TOTAL	35	100

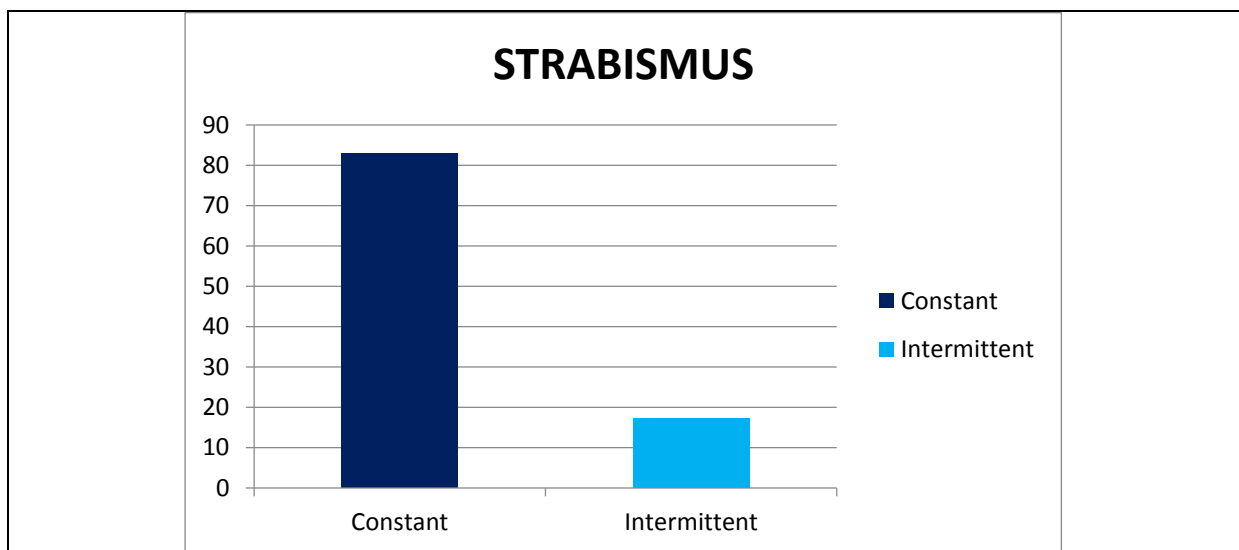
**Table 1: Age of onset of squint**

71.42% of patients in this study group had squint since birth. 22.85% developed squint in 1-5 years. 2.85% of patients developed squint in 6-10 years of age and after 11 years of age.



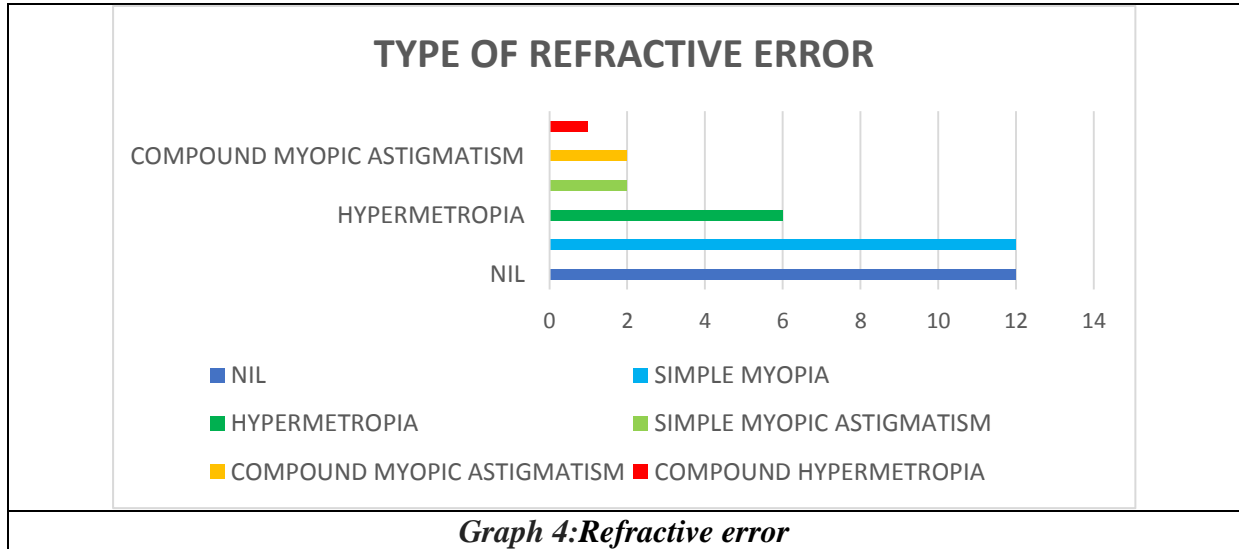
*Graph 2: Angle of deviation on presentation*

In this study group, 40% of patients had an angle of deviation of 20-40 PD. 37.14% had a deviation of 41-60 PD and 14.28% of patients had 61-80 PD. Only 8.57% of patients in this study group presented with an angle of deviation more than 80 PD.

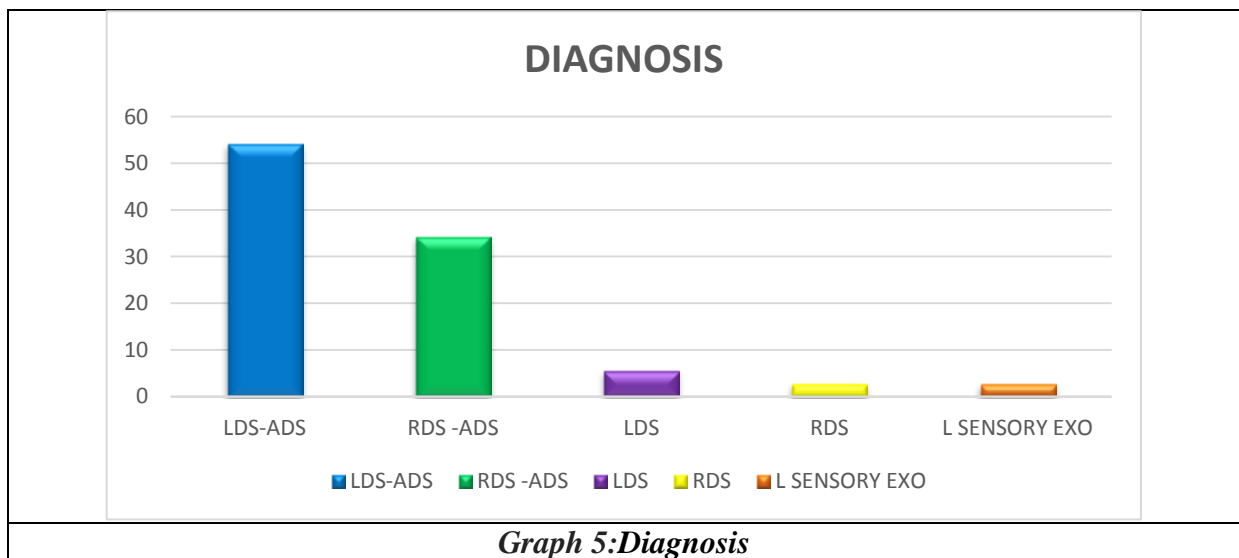


*Graph 3: Type of strabismus*

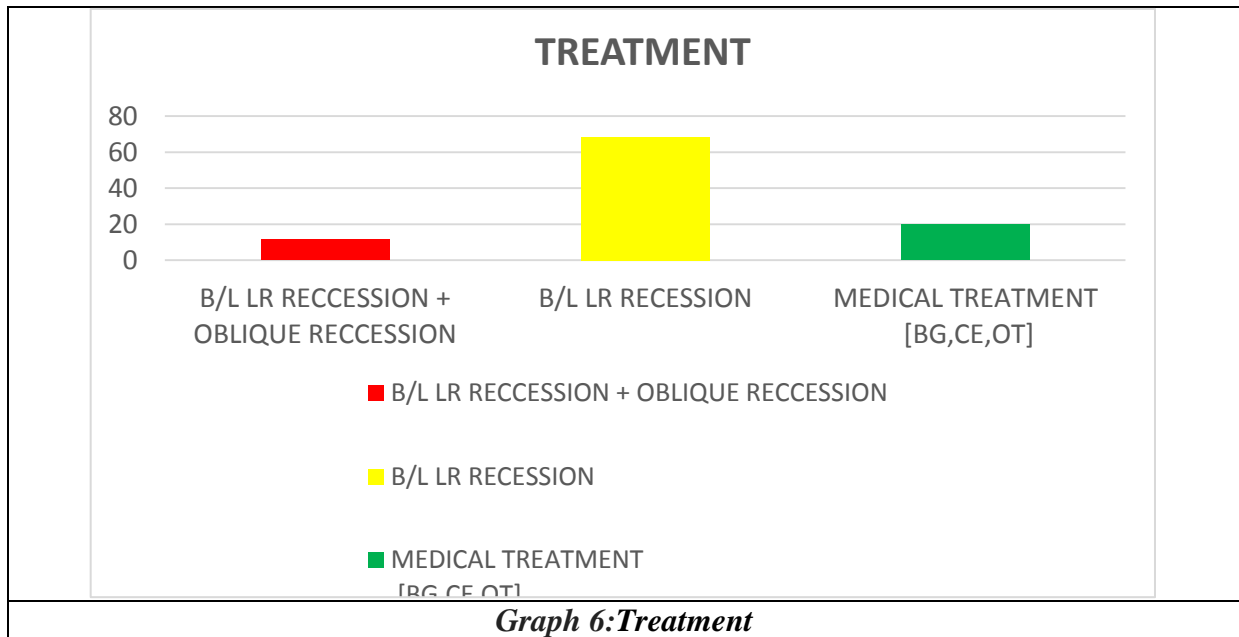
In this study 82.86% of patients had constant exodeviation while 17.14 % had intermittent exodeviation.



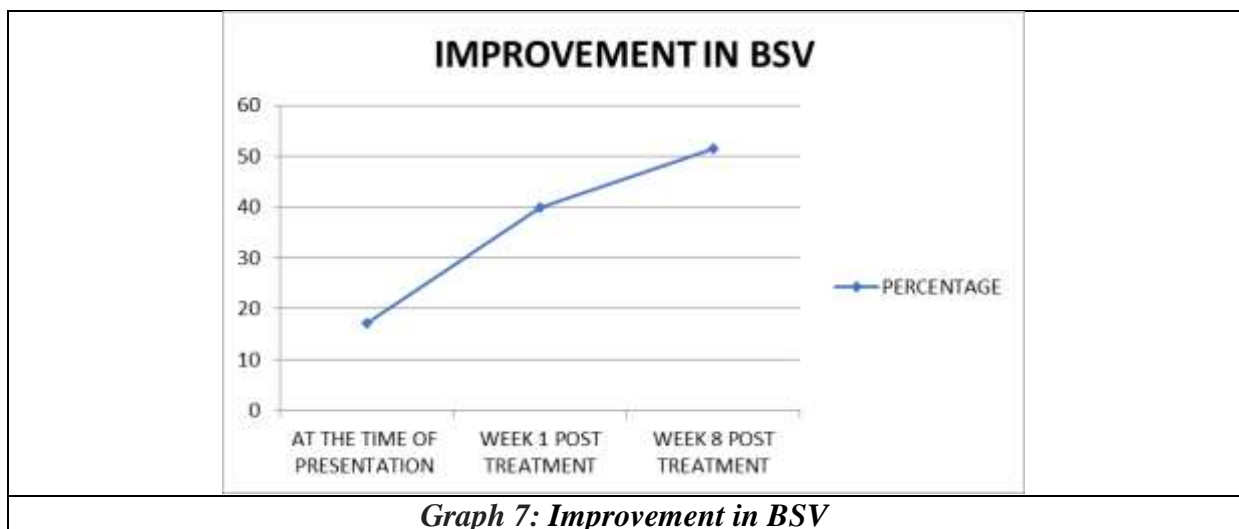
In this study 34.28% of patients were emmetropic and simple myopic. 17.14% of patients had hypermetropia and 5.71% showed simple and compound myopic astigmatism. Hence in this study simple myopia was the common refractive error in exodeviation when present.



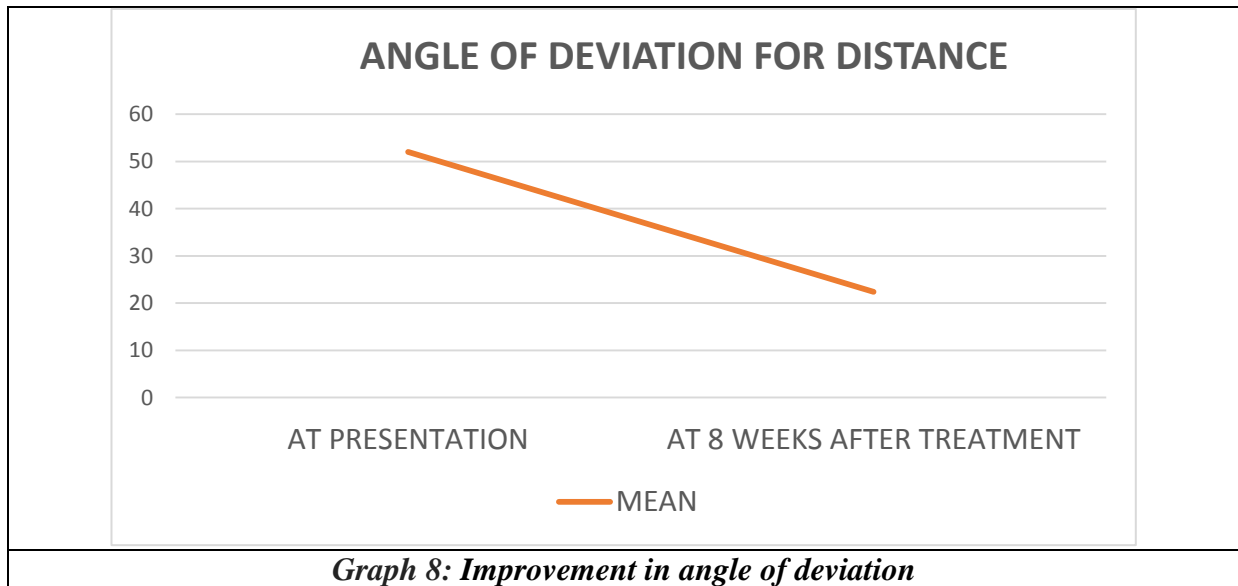
54.28% of patients in this study group showed LDS-ADS and 34.28% showed RDS-ADS. 5.71% of patients with exodeviation showed LDS and 2.85% showed RDS. Another 2.85% of patients presented with left sensory exodeviation.



20% of patients received medical treatment in the form of correction of refractive errors, convergence exercises, occlusion therapy. 80% of patients underwent surgery in which 68.57% underwent bilateral lateral rectus recession.



Percentage patients with binocular single vision improved from 17.14% at the time of presentation to 40 at week 1 after treatment. All patients were advised occlusion therapy and convergence exercises post operatively. 51.42% patients had binocular single vision at the end of 8 weeks following treatment.



Mean angle of deviation for distance reduced from 52 at the time of presentation to 22.41 at 8 weeks following treatment.

## DISCUSSION

In our study 71.42% of patients had exotropia since birth. Only 2 patients developed exotropia after the age of 5. In Costenbader's<sup>4</sup> series of 472 patients with intermittent exotropia of the divergence excess type, the deviation was present at birth in 204 and appeared in 16 at 6 months of age and in 72 between 6 and 12 months of age. In only 24 of his patients exotropia developed after 5 years of age. In our study of exodeviations, the associated refractive error, if at all present was found to be simple myopia. This was similar to Donders<sup>5</sup> observations, who found 70% of "comparatively high" myopes in a group of 100 patients with exotropia and concluded that reduction of accommodation in such patients is pivotal in the etiology of exodeviations.

According to von Noorden<sup>6</sup>, The angle of primary exodeviations generally exceeds 20PD, and unlike the situation in esotropia, small angle exodeviations are rare. In our study, all the patients of exotropia had an angle of deviation more than 20PDs.

In our study 20% of patients were treated with non-surgical management which included correction of refractive error, convergence exercises like pencil pushup test and occlusion therapy for patients with amblyopia. After 8 weeks of treatment these patients showed a slight reduction in angle of deviation. This was similar to findings of Flynn<sup>7</sup> and co-workers who observed an improved sensory state and better motor control in a group of patients with intermittent exotropia who were treated with alternating occlusion. 80% of patients in our study group required surgery in which 68.57% of cases underwent Bilateral lateral rectus recession. This was similar to a recent study by Kushner<sup>8</sup> which shown that bilateral lateral rectus recession is equally effective in simulated divergence excess and in basic exotropia.

The mean residual deviation at 8 weeks after treatment was 22.41 in our study. This is supported by Schlossman<sup>9</sup> and coworkers who concluded from their data that adult patients do better with slight undercorrection rather than overcorrection after surgery, provided the residual exodeviation remains under 15.

In our study, the percentage of binocular single vision improved from 17.14% to 51.42% at 8 weeks after treatment. Von Noorden<sup>10</sup> and his co-workers have occasionally observed recovery of normal binocular vision after surgical alignment.

## CONCLUSION

Exodeviations occur less frequently than esodeviations. Majority of exodeviations are present from birth. Most patients have an alternating type of strabismus with good visual acuity and normal fundus and fixation. Binocular single vision was absent in most of the patients. Most common refractive error associated with exodeviation is simple myopia. Majority of patients with exotropia require surgery. Surgical results, in terms of restoration of binocular function and conversion of a deviation from constant heterotropia to heterophoria, vary according to the binocular state before surgery. Patients who presented early in age and with less angle of deviation have better chance for restoration of binocular single vision. In conclusion, exotropia is a condition which can be improved and, in many instances, controlled by surgery.

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