

COMPARISON OF VISUAL ACUITY IN DIFFERENT TYPES OF OCULAR DEVIATION FOR DIFFERENT AMOUNT OF DEVIATION

Partha haradhan chowdhury^{1*}, Brinda haren shah²

¹*M.optom, associate professor, principal Department of Optometry, Shree Satchandi Jankalyan Samiti Netra Prasikshan Sansthan, Pauri, Affiliated to Uttarakhand State Medical Faculty, Dehradun, India*

²*M.optom, guest lecturer Department of Optometry, Shree Satchandi Jankalyan Samiti Netra Prasikshan Sansthan, Pauri, Affiliated to Uttarakhand State Medical Faculty, Dehradun, India*

***Corresponding Author:-**

Abstract:-

Purpose: Aim of the present study is to compare visual acuity in different types of ocular deviation for different amount of deviation.

Methods: A pilot, cross sectional, observational study was performed at tertiary eye care centers. Subjects with Ocular deviation between 10 to 40 prism diopters, Corrected distance Visual Acuity should be greater than 6/18 and Age should be between 10 to 40 years of age were included in the study. Visual Acuity was assessed with Log Mar chart.

Results: 30 subjects were included in the study. Out of that, 16 subjects were in the age group of 11-20 years, 12 subjects were in the age group of 21-30 years and 2 subjects were in the age group of 31-40 years. 60% subjects were Female and 40% subjects were Male. The mean visual acuity was considered in each type and amount of deviation. It shows that maximum acuity is deteriorated in Esotropia and in the ocular deviation of 31-40 prism diopters.

Conclusions: This concludes that with increase in ocular deviation, there is a deterioration of Visual Acuity. Maximum Visual Acuity is deteriorated in Esotropia which is followed by Exotropia, Alternate Esotropia and Alternate Exotropia.

Keywords:- Visual Acuity, Type of Deviation, Amount of Deviation

INTRODUCTION:

For the binocular single vision, Ocular Deviation is a very important factor. Because in case of anomalies of ocular deviation, the images of an object is falling on the parafoveal region. In case of Eso deviation, the images of an object is falling on the nasal fovea and in case of Exo deviation, the images of an object is falling on the temporal fovea. Anatomical variation is present in the cone cells in retina. The density of the cone cells is highest at the foveal area compared to para foveal area. Cone cell distance is varied from foveal to para foveal region. That's why ocular deviation is a very important factor for visual acuity also. In case of normal Ocular Deviation, the images are falling on the foveal region and in case of abnormal ocular deviation, the images are falling on the para foveal region and due to cone cell variation, there may be chances to deteriorate visual acuity proportionately with ocular deviation. It means with increase in ocular deviation, there will be decrease in the visual acuity.

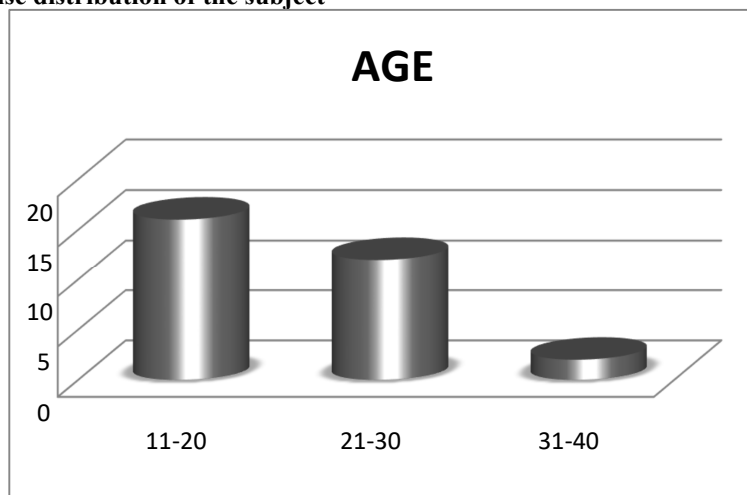
METHODOLOGY:

Cross sectional, pilot and observational study was performed at tertiary eye care centers. Inclusion criteria includes Subjects with Ocular deviation between 10 to 40 prism diopters, Corrected distance Visual Acuity should be greater than 6/18 and Age should be between 10 to 40 years of age. Individuals with any other systemic disease(specially which can affect study), Individuals with any other Ocular Pathology, with any active ocular infection, any ocular anomalies like Corneal Scar etc ,ocular deviation if less than 10 degree and Significant amount of amblyopic patient were excluded from the study. Full refractive correction along with detailed fundus evaluation was performed in each and every patient. Visual Acuity was assessed with Log Mar Chart in different amounts of deviation of Alternate Exotropia. Data analysis was done using SPSS software version 20.

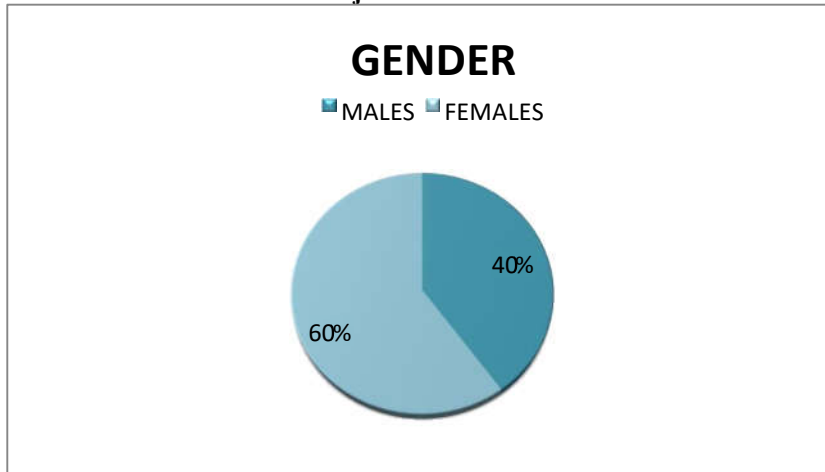
RESULTS:

A total of 30 subjects were included in the study. Age wise distribution is shown in Graph 1. 16, 12 and 2 subjects were in the age group of 11-20 years, 12 21-30 years and 2 subjects were in the age group of 31-40 years. Graph 2 shows gender wise distribution of the subjects. 60% subjects were Female and 40% subjects were Male. Graph 3 shows comparison of mean Visual Acuity with each ocular deviation in every amount of ocular deviation. Blue colour indicates amount of ocular deviation of 11-20 prism diopters. Red colour indicates amount of deviation of 21-30 prism diopters. Green colour indicates amount of deviation of 31-40 prism diopters. In the ocular deviation of Esotropia, mean Visual Acuity for 11-20, 21-30 and 31-40 prism diopters are 0.175, 0.28, 0.33 respectively which shows that maximum deterioration of Visual Acuity is in 31-40 prism diopters of Esotropia. In the ocular deviation of Exotropia, mean Visual Acuity for 11-20, 21-30 and 31-40 prism diopters are 0.13, 0.2, 0.27 respectively which shows that maximum deterioration of Visual Acuity is in 31-40 prism diopters of Exotropia. In the ocular deviation of Alternate Esotropia, mean Visual Acuity for 11-20, 21-30 and 3140 prism diopters are 0.126, 0.22, and 0.24 respectively which shows that maximum deterioration of Visual Acuity is in 31-40 prism diopters of Alternate Esotropia. In the ocular deviation of Alternate Exotropia, mean Visual Acuity for 11-20, 21-30 and 3140 prism diopters are 0.09, 0.13, and 0.18 respectively which shows that maximum deterioration of Visual Acuity is in 31-40 prism diopters of Alternate Exotropia.

Graph 1: shows age wise distribution of the subject



Graph 2 shows gender wise distribution of the subjects



Graph 3: shows comparison of mean visual acuity with each ocular deviation in every amount of ocular deviation.

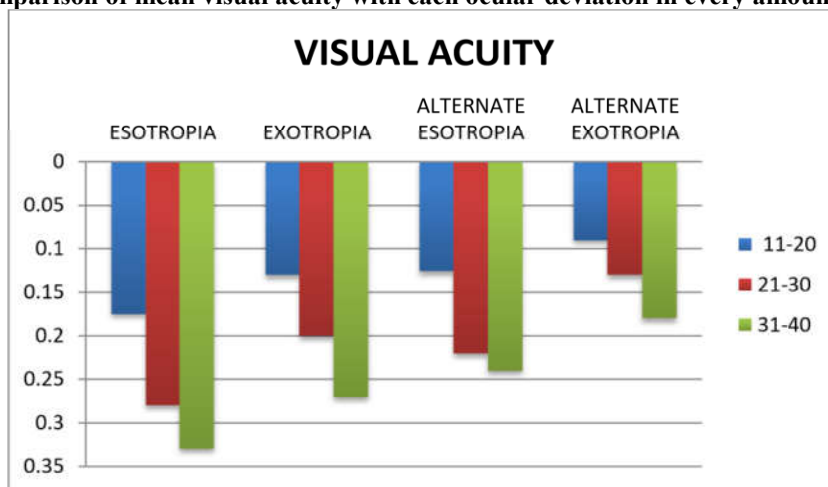


Table 1: shows the mean values of visual acuity with each ocular Deviation in every amount of ocular deviation

OCULAR DEVIATION	11-20	21-30	31-40
ESOTROPIA	0.175	0.28	0.33
EXOTROPIA	0.13	0.2	0.27
ALTERNATE ESOTROPIA	0.126	0.22	0.24
ALTERNATE EXOTROPIA	0.09	0.13	0.18

DISCUSSION:

According to this study, it has been proved that in case of significant amount of ocular deviation, visual acuity will be deteriorated. It mainly occurs because, in case of ocular deviation, the images of an object is shifted to the para foveal region and due to anatomically variation of the cone cell at the macular region. In the foveal region, the cone cell density is highest compared to para foveal region. So, in case of visual acuity, ocular deviation is a common factor. In case of Eso deviation, the images are shifted to the nasal fovea and in case of Exo deviation, the images are shifted to temporal fovea. Due to intermittent timing of the Exo deviation compared to Eso deviation, the deterioration is more in Eso deviation compared to Exo deviation. In this study, it has been proved that visual acuity is much more deteriorated in Esodeviation compared to Intermittent Eso deviation, Exo deviation and Intermittent Exo deviation.

CONCLUSIONS:

This concludes that with increase in ocular deviation, there is a deterioration of Visual Acuity. Maximum Visual Acuity is deteriorated in Esotropia which is followed by Exotropia, Alternate Esotropia and Alternate Exotropia.

CONSENT:

Oral/ written consent was obtained from patient as well as from tertiary eye care centres.

ETHICAL APPROVAL:

It is not applicable.

REFERENCES:

- [1]. HANDBOOK OF PEDIATRIC STRABISMUS AND AMBLYOPIA, Kenneth W.Wright, Peter H. Spiegel, Lisa Thompson, First ed, 2006
- [2]. Hui Zhu et al.,“Association between Childhood Strabismus and Refractive Error in Chinese Preschool Children “Journal of Plos One, March 2015
- [3]. Zhale Rajavi et al, “Prevalence of Colour Vision Deficiency and its Correlation with Amblyopia and Refractive Errors among Primary School Children”, Journal of Ophthalmic and Vision Research, 2015; vol. 10, issue 2, pg 130-138...
- [4]. Anika K. Tandon et al. “Binocular Inhibition in Strabismic Patients is Associated with Diminished Quality of Life”, Journal of American Association for Pediatric Ophthalmology and Strabismus, October 2014, volume 18, issue 5, pg – 423-426
- [5]. Ye et al,“Strabismus genetics across a spectrum of eye misalignment disorders”, Journal of clinical genetics, 2014, vole 86, pg 103-111
- [6]. A.G. KOCAK-ALTINTAS et al“Colour vision and Colour Vision deficiency in Amblyopia” European Journal of Ophthalmology, 2000, vol. 10, no.1, pg 77-81
- [7]. ALAN W. FREEMAN et al. “Components of Colour vision Loss in Strabismus” published in the journal of vision research, 1996, Vol. 36, No. 5, Pg. 765-774