Original Research Article

EFFECT OF COLOUR VISION ON OCULAR DEVIATION

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Author's contributions

This work was carried out in collaboration between both authors. Author PHC had wrote the full thesis. Author BHS had managed the data collection along with the formatting of the article. Both authors had read and approved the final manuscript.

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ABSTRACT

Purpose: The aim of the present study is to correlate effect of colour vision in the presence of ocular 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. Colour vision was assessed with Fransworth Munsell D 15 colour vision test.

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. Mean scores of visual parameters were taken. In 50 % of cases, colour vision was found normal, 33 % were having mild tritanopia and 17% were having moderate tritanopia.

Conclusions: In cases of ocular deviation, mild to moderate tritanopia can occur.

Keywords: Ocular Deviation, colour vision

INTRODUCTION:

Colour vision plays an important role in Binocular Single Vision. [1,2]For colour vision, cone cells are precisely responsible. In cases of normal ocular deviation, images of an object falls on the foveal region. [3]Due to anatomical deformity, number of cone cells varied from region to region in macular area. [4]That's why, in the ocular deviation, there are chances of deterioration of colour vision in the presence of ocular deviation. [5,6]Image of an object will fall on the para foveal region in cases of ocular deviation, so there are chances that colour vision will deteriorate.[7]

METHODOLOGY:

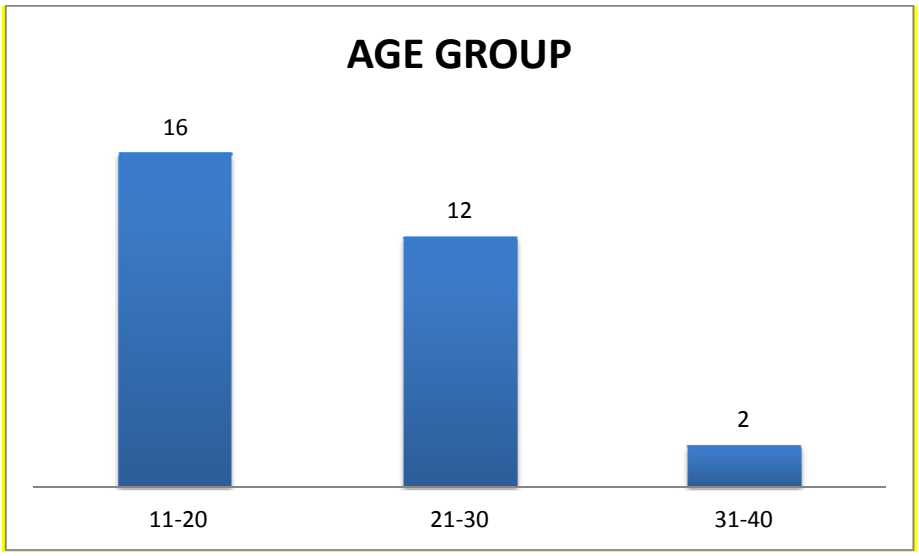
A pilot, cross sectional, observational study was performed at tertiary eye care centers. Subjects with Ocular deviation between 10 to 40 prism diopters, Corrected distance Visual Acuity should be greater than 6/18 and Age should be between 10 to 40 years of age were included in the study. Individuals 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. Colour vision was assessed with Farnsworth Munsell D 15 colour vision test.

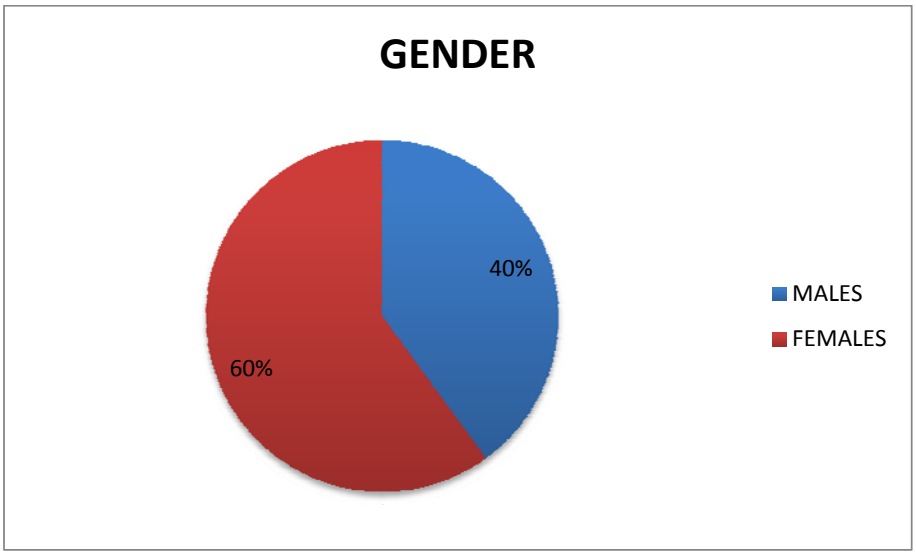
RESULTS:

30 subjects were included in the study. Graph 1 shows distribution of subjects in various age groups.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. Graph 2 shows gender wise distribution of the subjects. 60% subjects were Female and 40% subjects were Male. Mean scores of visual parameters were taken using SPSS Software version 20. Graph 3 shows 50 % of cases, colour vision was found normal, 33 % were having mild tritanopia and 17% were having moderate tritanopia.

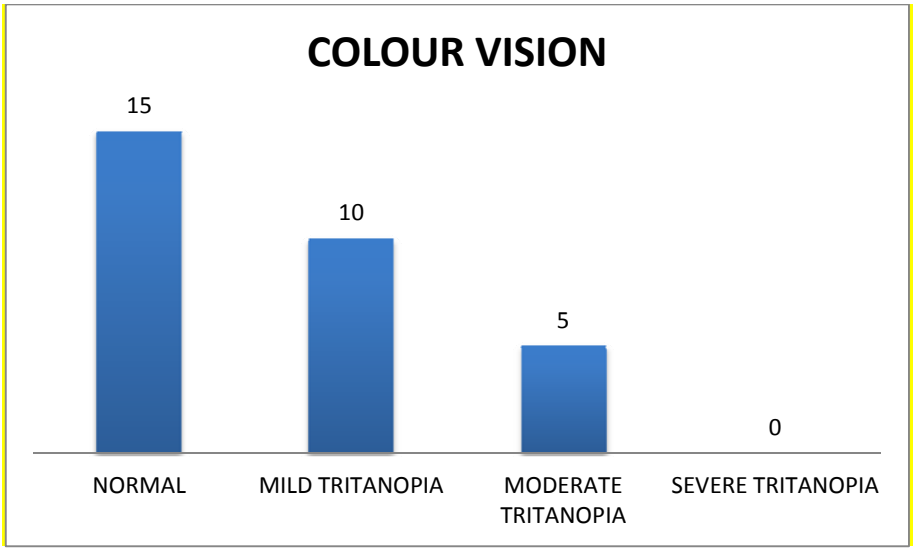
GRAPH 1: shows age wise distribution of the subject



GRAPH 2 shows gender wise distribution of the subjects



Graph 3: shows effect of colour vision in the presence of ocular deviation.



Discussion:

Colour vision was tested with Farnsworth Munsell D-15 colour vision test.

Here 30 subjects were evaluated. Out of that 15 were having normal colour vision, 10 were having mild tritanopia and 5 were having moderate tritanopia. Severe tritanopia was not found in any patient. According to statistical analysis, colour vision will deteriorate significantly with increase in ocular deviation. It mainly occurs due to number of cone cell variation in the macular region. The number of cone cells are highest in foveal region compare to parafoveal region. Cone cell is completely responsible for Colour vision, so any anomaly in cone cells will lead to deterioration of colour vision.

Conclusion :

In cases of ocular deviation, mild to moderate tritanopia can occur.

CONSENT :

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"Visual Acuity 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 Visual Acuity Loss in Strabismus” published in the journal of vision research, 1996, Vol. 36, No. 5, Pg. 765-774