

Role of Spectacles in Refractive Accommodative Esotropia

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ABSTRACT

Aim: To evaluate the role of spectacles in children having refractive accommodative Esotropia.

Methods- Retrospective study of children who had accommodative Esotropia was conducted. Evaluation included visual acuity, ability to wear glasses, hypermetropia and change with time, degree of deviation, amblyopia, binocular single vision and response to using spectacles.

Results: 216 patients with refractive accommodative Esotropia were included in this retrospective study. All were above 3.5 years of age at start of study and used glasses. Average follow up was 5.8 years. 98(45.37%) patients were fully accommodative and 118(54.62%) partially accommodative. 124(57.40%) patients were amblyopic at start and 17(7.87%) at end. The hypermetropia ranged from +4 to +9.5 D at start and average change 0.9 D. Esotropia ranged from 8 to 15 degrees with normal AC/A ratio. Binocular single vision was seen in 183 (84.72%) at start and 207 (95.83%) at end.

Conclusion- Most children remain hypermetropic, need spectacles but develop good binocular vision and marked improvement in amblyopia.

Keywords: Esotropia, spectacles, binocular single vision

INTRODUCTION

Misalignment of visual axes is a common issue in children and Esotropia the most common type of concomitant type¹. This type is further divided into accommodative and non accommodative sub types. Refractive Accommodative

Esotropia may be partial or total and usually associated with Hypermetropia². These patients need detailed ocular examination including cycloplegic refraction, evaluation for amblyopia, extra ocular movements and binocular function in addition to visual acuity and stereopsis. The study was designed to assess the effects of glasses on deviation and helping in improvement of amblyopia. The conservative/non surgical approach was assessed only.

MATERIALS AND METHODS

This retrospective study spanned more than 7 and a half year, started from March 2011 and continued till November 2018. It was conducted at King Fahad Armed Forces Hospital, Jeddah, in Paeds Ophthalmology department. The children who had anatomical defect, for example, Ptosis, Cataract, Retinopathy of prematurity, macular scar or defect in function like paralysis were excluded. The patients lost during follow up were excluded as well. The children who had total or partial accommodative Esotropia were included in this study. All the patients were able to wear glasses were included only. The manifest deviation corrected with glasses was considered as total accommodative esotropes. Those who still had deviation after wearing glasses were considered partially accommodative esotropes. All the patients were assessed with help of orthoptist. Visual acuity was assessed with help of Snellen chart and other methods like Kay's pictures. It was recorded with and without glasses. All the

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patients had cycloplegic refraction at the start of study and at least once every year. Transparency of refractive media was noted in addition to fundus examination. The stereopsis was measured using different methods like Titmus test and Synoptophore.

RESULTS

All the patients in this almost 7.5 years long retrospective were above 3.5 years and average age at start of study was 49.5 months. The age ranged between 3 years 7 months to 10 years 11 months. . 124(57.40%) patients were amblyopic at start and 17(7.87%) at end of study. Anisometropia was seen more frequently in amblyopic 96 patients as compared to 50 patients without amblyopia. Patching was the most frequently used method in 115(92.74%) and Atropine penalization was used in rest of 9(7.25%) patients.

All the patients needed glasses at start of study and had improvement of deviation. These glasses were prescribed after cycloplegic refraction. 178(82.4%) patients used Atropine, 25(11.57%) used Homatropine and 13(6%) Cyclopentolate for cycloplegia. There was no gross change in refraction during the course of study. The change was less than 1D in spherical equivalent. All the patients continued to wear glasses during whole study.

118(54.62%) patients were partially accommodative. The average Esotropia for distance was 8.5 degrees and 12.5 degrees for near while with glasses it reduced to 4.5 and 5 degrees respectively. 98(45.37%) patients were fully accommodative. The average Esotropia for distance was 10.5 degrees and 14.5 degrees for near which reduced to 3.5 and 5.5 degrees respectively. 1(1.02%) of totally accommodative and 3(2.54%) of partially accommodative group patients were decompensated during the study.

Precise level of binocular single vision was possible to asses in 183(84.72%) of patients at the start due to age of

the patient and level of cooperation. 95(96.93%) out of 98 patients in fully accommodative group had stereopsis of 100 seconds of arc or better. In partially accommodative group 53(44.91%) stereopsis of 100 seconds of arc or better and 55(46.61%) between 100 to 400 seconds of arc. 10(8.47%) had less than 400 seconds of arc stereopsis.

The change in refractive power, with age, is a well known entity in children. Hypermetropia keeps on increasing till the age of 6 years. It is stable during 6-8 years and then starts reducing after the age of 8 years. If the patient is having Esotropia then the progress maybe different as is the case while using glasses. Environmental factors affect the outcome in addition to fine work like reading and writing. During the study the average change in refraction was 0.9D reduction in hypermetropia which meant the using glasses improved the retinal image which lead to reduction in myopic shift commonly seen in patients who are deprived of clear retinal image.

DISCUSSION

Esotropia like any other deviation of eyes behaves differently in each patient and is influenced by multiple factors. The longer the duration of the follow up easier it will be to comment on results and outcome of the study and so will be the recommendation. Our study spanned more than 7 and a half year which is quite adequate to assess, follow and observe the changes. This long duration makes the study satisfying even from the patient's point of view.

Amblyopia is a known entity with misalignment of visual axes and is considered to be cortical disease³. Patching was used in our study to overcome amblyopia. Atropine penalization and using opaque glasses are other options but patching is better to attain complete blockage of retinal image formation⁴. This method is cheaper, easier and does not have systemic side effects like atropine. Trauma to eye with glasses is also ruled out. Significant number of patients improved with this disease as number reduced from 124 at start to 17 at the end of the study.

Esotropia and hypermetropia are well known to co-exist. Cycloplegic refraction is needed in most of the hypermetropes especially in children. Deviation of the eye dictates for cycloplegic refraction as well. Atropine is the best cycloplegic with cyclopentolate being third choice after homatropine. Post mydriatic test was conducted to know the best prescription and we opted to give full correction. This will lead to better retinal image and leads to less reduction in hypermetropia. Esotropia response well to glasses and should be kept in mind which is a cause of amblyopia. Under correction of hypermetropia results in more chances of emmetropia⁵. In our opinion better option would be to wear full correction and avoid amblyopia by reducing the deviation rather than under correcting the

hypermetropia and trying to attain emmetropia at the cost of amblyopia. Continuous wearing of glasses after cycloplegic refraction is the key to success.

Patients with minor degree of deviation are happy with glasses but with high refractive error and more deviation the parents need to be convinced. They are more inclined towards surgery due to rapid response and limited follow up. The situation is also affected by those few who are decompensated during study and need surgery. The long follow up, better outcome in most of the patients, avoiding amblyopia and chances to avoid surgery are quite pleasing for the parents. Stereoacuity is poor after surgery in accommodative esotropia⁶ although surgery may be needed in significant number of patients⁷. Reducing the need for accommodation with glasses reduces Esotropia. Stereopsis is important part of daily life and is helpful in maintain straight eyes. This is true the other way around as well. Multiple factors affect stereopsis in accommodative Esotropia. Use of glasses helps to reduce Esotropia in refractive accommodative type which leads to binocular vision. This situation in return results in better stereopsis.

CONCLUSION

The use of glasses is the best type of treatment in refractive accommodative Esotropia. The duration of treatment is prolonged but conservative option. The resulting binocular vision outweighs the reduction of emmetropia in such patients.

REFERENCES

- 1 Shaaban S, Mackinnon S, Andrews C et al. Genome-Wide Association study Identifies a Susceptibility Locus for Comitant Esotropia and Suggests a Parent-of-Origin Effect. *Invest Ophthalmol Vis Sci* 2018 Aug 1;59(10): 4054-64
- 2 Esposito Veneruso P, Bruzzese D, Magli A. Long – term development of refractive error in refractive, non refractive and partially accommodative Esotropia. *PLoS* 2018 Sep 24;13(9)
- 3 Gaier ED, Glse R, Heidary G. Imaging Amblyopia: Insights from Optical Coherence Tomography(OCT). *Semin Ophthalmol.* 2019;34(4):303-311
- 4 Papageorgiou E, Asproudis I, Maconachie G et al. The treatment of amblyopia: current practice and emerging trends. *Graefes Arch Clin Exp Ophthalmol.* 2019 Jun; 257(6): 1061-1078
- 5 Ahn YJ, Park SH, Shin SY. Changes in axial length in accommodative Esotropia patients with minimal hyperopic correction. *PLoS One.* 2019 Jan 25; 14(1)
- 6 Park KA, Oh SY. Esotropia with an accommodative component after surgery for infantile Esotropia compared to primary accommodative Esotropia. *GAAPOS.* 2017 Feb;21(1):9-14
- 7 Lembo A, Serafino M, Strologo MD et al. Accommodative Esotropia: the state of the art. *Int Ophthalmol.* 2019 Feb; 39(2):497-505