

Amblyopia and Arc with Central and Eccentric Fixation Before and After Surgery

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ABSTRACT

Background: Adaptation may be defined as a process of advantageous variation and progressive modification whereby an organism becomes adjusted to the conditions of life in harmony with environment. A sensory adaptation to an ocular deviation is the process in which a patient adapts to an interruption in normal binocular vision. **Methods:** Cases of EXO and ESO deviation in various age groups and different sexes having central and eccentric fixation were taken. Out of 53 case, 28 were of ESO. **Results:** Of all the strabismic cases maximum number of cases reported in age group of 11-20 with male preponderance. **Conclusions:** Because of high sensitivity and very high specificity cuppers test would be the test of choice to find arc in patients with amblyopia.

Key words: Amblyopia, Central fixation, Strabismus

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INTRODUCTION

Adaptation may be defined as a process of advantageous variation and progressive modification whereby an organism becomes adjusted to the conditions of life in harmony with environment. A sensory adaptation to an ocular deviation is the process in which a patient adapts to an interruption in normal binocular vision. It is an acquired physiological reflex that develops during first several months of life. Its development demands certain requisite as each eye must be capable of seeing and both eyes must be aligned within first few years of life to present the projection of similar images onto corresponding retinal areas.^[1] Once established binocular vision is retained as long as there is sight in both the eyes. If the benefit of binocular vision is lost due to disruption in alignment or due to optical state of eye


binocular vision annoyingly continues in the form of diplopia and visual confusion.^[2-4]

METHODS

This study was done in Jawahar Lal Nehru Medical College and hospital, Aligarh. The cases were selected from the refraction section and squint clinic of the institute of ophthalmology, A.M.U and Gandhi eye hospital, Aligarh. The patients consent was taken and the criteria for selection of cases were:

1. Patients complaining of eye strain, diplopia and inward rolling of eyeball were taken up for study. The visual acuity for both right and left eye were recorded.

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2. Cases of amblyopia ex anopsia (due to opacities in the media, ptosis, foveal lesion) were not included in the study.
3. The patients were subjected to a group of tests which resulted in sensory changes in the strabismic eyes
4. The tests included Striated lenses, Major amblyoscope, WFDT, After image test and Cuppers test.
5. A total of 53 cases were selected of both Exo and Eso deviation.

RESULTS

In esodeviation of upto 5 years of onset 5 (9.4%) were found to have amblyopia with central fixation. Three (5.6%) cases of amblyopia with arc and central fixation and 12(22.7%) cases of amblyopia with arc and eccentric fixation. In 6-10 yrs of onset 2 (3.7%) cases were of amblyopia with central fixation and 1 (1.8%) of amblyopia with arc and central fixation and 1(1.8%) of amblyopia with arc and eccentric fixation were found.

In exodeviation upto 5 years of onset 4(7.5%) cases were of amblyopia with central fixation (7.5%), 4(7.5%) amblyopia with arc and central fixation and 10 were of amblyopia with eccentric fixation.

In 6 to 10 yrs of age of onset 3 (5.6%) cases were of amblyopia with central fixation an increase of 1.8% and 1 case (1.8%) Amblyopia with ARC and Eccentric fixation. In 11-15 years age of onset there was no change as compared to before surgery.

In EXODEVIATION of upto 5 years age of onset 7(13.2%) cases of Amblyopia with central fixation an increase of 5.6%, 5(9.4%) cases were of amblyopia with ARC and central fixation and 6 (11.2%) cases of amblyopia with ARC and eccentric fixation, a decrease of 7.5%. Shows comparison of sensory responses in 25 exotropic patients prior to surgery using different methods. After image test was able to detect maximum patients with nrc were as WFDT was able to detect maximum cases of suppression.

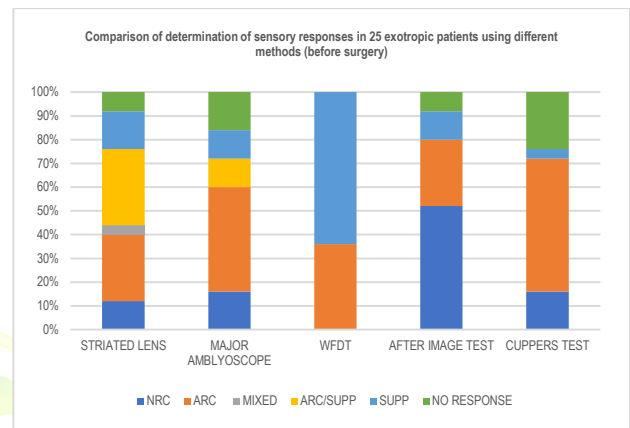
Table 1: Existing techniques

Age Of Onset Of Squint	No. of Cases	Amblyopia With Central Fixation	Amblyopia With Arc And Central Fixation	Amblyopia With Arc And Eccentric Fixation
Exo Upto 5 Yrs	20(37.6%)	5(9.4%)	3 (5.6%)	12(22.7%)
Upto 10 Yrs	4 (7.5%)	2(3.7%)	1 (1.8%)	1 (1.8%)
11-15 Yrs	4(7.5%)	4 (7.5%)	-	-
Total		11	4	13
Exo Dev Upto 5 Yrs	18(33%)	4(7.5%)	4(7.5%)	10 (18.8%)
6-10 Yrs	2 (3.7%)	2 (3.7%)	-	-
11-15	--	--	--	--
More Than 15	--	--	--	--

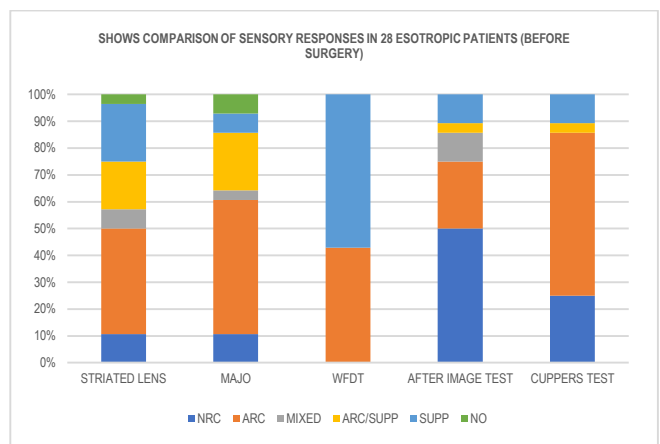
Table 2: Shows relationship of amblyopia and ARC with Central and Eccentric fixation related to age of onset of squint (after surgery)

Age of onset of squint	No. of cases	Amblyopia with central fixation	Amblyopia with ARC and central fixation	Amblyopia with ARC and Eccentric fixation
Esodev upto 5 yrs	20 (37.6%)	5 (9.4%)	3(5.6%)	12 (22.7%)
6-10 yrs	4(7.5%)	3(5.6%)	-	-
11-15 yrs	4(7.5%)	4(7.5%)	-	-
More than 15	-	-	-	-
Exodeviation upto 5 yrs	18(33.7%)	7(13.2%)	5(9.4%)	6(11.3%)
6-10 yrs	2(3.7%)	2 (3.7%)	-	-
11-15 yrs	-	-	-	-
More than 15 yrs	-	-	-	-

In ESO Deviation of upto 5 yrs age of onset 5 (9.4%) cases were of amblyopia with central fixation, 3 (5.6%) cases of Amblyopia with ARC and central fixation and 12(22.7%) of amblyopia with ARC and eccentric fixation.



Arc was best detected by cuppers test and NRC was detected by after image test. The cases of suppression was detected by WFDT.



Tests with major amblyoscope showed 9 patients of NRC and 23 patients of ARC and 9 patients of ARC with suppression. WFDT showed 21 patients of ARC and 32 patients of suppression. As far as detecting ARC was concerned the after image test on synaptophore and that by camera flashlight did not differ very much from each other although the prevalence of Suppression was lower in later due to higher intensity of stimulus. WFDT was done at 6 metres.

Table 3: Comparison of determination of sensory responses in 25 exotropic patients using different methods (before surgery)

	NRC	ARC	MIXED	ARC/SUPP	SUPP	No response	T
Striated lens	3 (5.6%)	7 (13.2%)	1 (1.8%)	8 (15%)	4(7.5%)	2(3.7%)	25
Major amblyoscope	4 (7.5%)	11 (20.7%)	0	3 (5.6%)	3(5.6%)	4(7.4%)	25
Wfdt	0	9(16.%)	-	-	16 (30)	-	25
After image test	13 (24.5%)	7(13.2%)	-	-	3(5.6%)	2(3.7%)	25
Cuppers test	4 (7.5%)	14(26.4%)	-	-	1(1.8%)	6 (11.3%)	25

Table 4: Shows comparison of sensory responses in 28 esotropic patients (before surgery)

	NRC	ARC	MIXED	ARC/SUPP	SUPP	NO	T
Striated lens	3(5.6%)	11(20%)	2(3.7%)	5(9.4%)	6(11.3%)	1(1.8%)	28
Majo	3	14	1	6	2	2	
Wfdt	0	12(22.6%)	-	-	16(30.1%)	-	28
After image test	14 (26.4%)	7(13.2%)	3(5.6%)	1(1.8%)	3(5.6%)	-	28
Cuppers test	7 (13.2%)	17(32%)	-	1 (1.8%)	3(5.6%)	-	28

Table 5: Result of 53 patients of concomitant squint using different methods after surgery

	NRC	ARC	MIXED	ARC/SUPP	SUPP	NO	T
Striated lenses	8(15%)	25(47.1%)	3(5.6%)	10(18.8%)	5(9.4%)	2(3.7%)	53
Major amblyoscope	9(16.9%)	23(43.3%)	-	9(16.9%)	7(13.2%)	5(9.4%)	53
Wfdt	-	21(39.6%)	-	-	32(60.3%)	-	53
After image test	30(39.6%)	16(30.1%)	-	-	7(13.2%)	-	53
Cuppers test	14(26.4%)	28(52.8%)	-	-	5(9.4%)	6(11.3%)	53

In majority it showed suppression and in 39.6% cases ARC. More cases of ARC would have been detected if the test were carried out at different distances. Pure ARC was invariably associated with amblyopia in unilateral strabismic cases. However cases of NRC with strabismus or NRC/ARC also showed amblyopia to a lesser or greater degree.

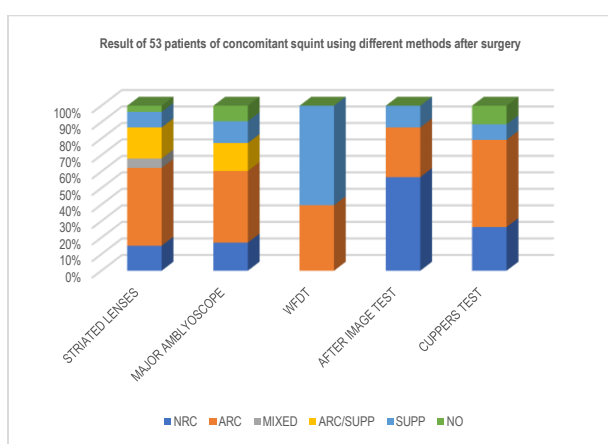
or greater degree. These cases were studied and the results of the test are recommendable.^[5,6]

CONCLUSION

1. More cases of ARC would have been detected if the test was carried out at different distances
2. After image test was able to detect maximum patients with arc were as WFDT was able to detect maximum cases of suppression.
3. Considering ARC, ARC/suppression and NRC/ARC together striated glasses and major amblyoscope exhibited maximum and nearly equal response for arc. Next to these was the cuppers test. However for pure arc cuppers test showed the maximum response.
4. Because of high sensitivity and very high specificity cuppers test would be the test of choice to find arc in patients with amblyopia.

REFERENCES

1. Wilsek, N. The examination of retinal correspondence by the method of projected after image strabismus, Symp. (Glessen 1966) Basel. 227
2. Ronne, G and Rindziunski E. The pathogenesis of anomalous correspondence, Acta . Ophthalmol 1953;31:347
3. Stephenson,R.W.(1950): Abnormal retinal correspondence, Trans. Ophthalmol. Soc. U.K. ,69:549
4. Parks, N.M. and Friendley,D.S. (1966) : Treatment of eccentric fixation in children under 4 years of age. Amer.J.Ophthal., 61:395
5. Noorden, G.K. Von and Mackensen, G.(1962). Phenomenology of eccentric fixation Amer . J.Ophthal. 53:642
6. Leving,M.(1954): Value of anomalous retinal correspondence in binocular vision Br .JOphthal 38:332



DISCUSSION

53 cases of squint were taken of central and eccentric fixation. They were subject to different tests depending on the age groups and also on the basis of their presentation before and after surgery. However cases of NRC with strabismus or NRC/ARC also showed amblyopia to a lesser