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Sensory Evaluation of Cases of Primary Comitant Exotropia

Thesis

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To

My Family

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LIST OF ABBREVIATIONS

AC/A ratio	Accommodative convergence/ Accommodation ratio.
ambl.	Amblyopia.
ARC	Anomalous retinal correspondence.
Cyl	Cylinder.
div. excess	divergence excess.
Dsph	Diopters sphere.
DVC	Distance vision contour stereopsis test.
DVD	Dissociated vertical deviation.
DVRDE	Distance vision random dot E stereopsis test .
HARC	Harmonious anomalous retinal correspondence.
IOOA	Inferior oblique over action.
Ipd	interpupillary distance.
m	meters.
Monoc	Monocular closure.
NRC	Normal retinal correspondence.
Neurol	Neurological.
OD	right eye.
OS	left eye.
p	page.
PD	Prism diopters.
SD	standard deviation.
SG	Striation grade.
Signif	Significant.
Stat	statistically.
supp.	Suppression.
TPF	Tenacious proximal fusion.
UNHARC	Unharmonious anomalous retinal correspondence.
X(T)	Intermittent exotropia.
XT	Exotropia.

CONTENTS

INTRODUCTION

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Binocular Vision

Binocular vision is the motor coordination of both eyes and the sensory unification of their respective images. This is a unitary process, but for the sake of analysis it can be broken into sensory and motor components. [1,2]

The sensory component: is the ability to use both eyes simultaneously with bifoveal fixation, so that each eye contributes to a common single perception[3]

The motor positioning and alignment of the eyes, completely subserves the primary sensory function of image unification and allows visual perception to proceed efficiently. The task of the motor system is to bring both foveae onto the object of attention, within the visual field and keep them there. The motor system also holds the eyes in alignment and clear focus, thereby ensuring the maintenance of binocular vision.[1]

Normal Binocular Vision provides the individual with a high degree of stereoscopic binocular vision (three dimensionality).[4]

Also the binocular field of vision has the advantage of being at least 30 degrees larger than the monocular field (Diagram -1, p.6).[1]

Binocular visual acuity is better by approximately a half line of letters on Snellen chart, compared with either eye alone.[3]

Binocular stimulation of ocular images significantly heightens contrast sensitivity by about 40%.[5]

Binocular single vision is acquired and reinforced during first few years of life. There are many factors concerned in the successful development of binocular vision, which demands the existence of complicated and closely integrated sensory, motor and central mechanisms.[3,6,7]

For fusion of two ocular images to take place visual fields should overlap. Also a correct central development capable of interpreting images, with an adequate functioning of each eye and sufficient stimulation of corresponding retinal points in the two eyes is required.[8]

Retinal correspondence:

Retinal correspondence concerns the retinal areas of each eye, which have the same visual direction during binocular vision.

An individual is said to have normal retinal correspondence (NRC) when the stimulation of both foveae and geometrically paired retinal areas gives rise to a unitary percept (haplopia), this is fundamental to binocular vision.[7]

The correspondence actually occurs in the cortex. Stimulation of the corresponding retinal points results in haplopia (singleness of vision) if there is normal retinal correspondence, or even if there is anomalous retinal correspondence. [3]

Conversely, double vision results when non-corresponding retinal points are sufficiently stimulated. [6,9,10]

Types of sensory fusion:

- **Color fusion:**

Color fusion is a type of sensory fusion, wherein spectral stimulation, which differs for the two eyes, is combined or integrated into a unitary percept unlike either of the stimulating fields. Many vision testing and training procedures use color fusion e.g. Worth's four-dot test. [3]

- **Form fusion:**

Binocular fusion of form occurs within the singleness horopter, form fusion is the driving force behind good binocularity.[8]