



Association Between Refractive Errors and Convergence Insufficiency

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Objectives: Objective of the study was to find out association of refractive errors with convergence insufficiency and to find the effect of convergence insufficiency on refractive errors.

Method: The patients were selected on the basis of refractive error associated with convergence insufficiency from refraction room of outpatient department Mayo hospital Lahore. Near point of convergence was measured by using RAF rule in those patients who had refractive errors i.e. myopia, hyperopia and astigmatism. Persons who had no refractive error, who were not co-operative were not included in this study.

Result: Convergence insufficiency was found more in hyperopic patients than in myopic and astigmatic patients.

Conclusion: Convergence insufficiency was seen more in hyperopes than in myopes and astigmatic patients. These data and whole study supports the assumption that screening programs in our country could be useful in detecting and minimizing the visual disturbances due to convergence insufficiency.



Introduction:

During focusing, the pupils of the eyes move toward or away from each other, this simultaneous movement of pupils is called vergence i.e. it is the simultaneous movement of both eyes in opposite direction.¹ Eye converges with specific power of accommodation. The normal range for the near point of convergence is given 6-10 cm. When eye converge before the 10cm mark it is called convergence insufficiency while if eye converge after 6cm it is called convergence excess.² Convergence insufficiency can be measured by measuring near point of convergence. There are different methods to measure the near point of convergence. Mostly, RAF rule is used to measure near point of convergence.³

A refractive error is an error in the focusing of light by the eye and a frequent reason for reduced visual acuity. Its types are myopia, hyperopia and astigmatism.⁴ The terms "refractive error" or "image formation defects"⁵ or "ametropia" can be used interchangeably.

Myopic patients have pain in head, eyes, may have deviated eye and feel tiredness when working at close distance. All these symptoms can be treated by use of lenses or. When the optics are too powerful for the length of the eye ball one has myopia or nearsightedness. This can arise from a cornea with too much curvature or eye ball that is too much long (axial myopia)⁶spectacles.⁷ Contact lenses can also be used to treat myopia with other treatments.⁸

When the optics are too weak for the length of eye, one has hyperopia or farsightedness. Patients with hyperopia must use glasses all the time but especially while doing near work. Refractive surgery is one of the best treatments for hyperopia.⁹ Astigmatism is a refractive error in which light rays fail to come to a single focus on the retina because of differing amounts of refraction in the various meridians of the eye.¹⁰

Material and Methods:

It was descriptive cross-sectional, conducted in College of Ophthalmology and Allied Vision Sciences (COAVS), from August 2014 to December 2014. Ninety patients were included in study, out of which thirty patients were myopic, thirty were hyperopic and thirty were astigmatic. Patients between 15 to 30 years of age having myopia, hyperopia and astigmatism were included in study. Distance visual acuity was assessed by using Snellen visual acuity chart and near point of convergence was measured by using RAF rule. Data was recorded and entered in statistical

package for social science (SPSS version20.0). The results were analyzed and tabulated by using same software.

Results:

	type of refractive error			Total	
		myopia	hyper- opia		Astigm- atism
convergence insufficiency	Yes	8	20	7	35
	No	20	11	24	55
Total		7	90	1	90

Explanation: This table shows that hyperopics showed more convergence insufficiency instead of myopia and astigmatism.

Discussion:

Rapid, accurate eye movements are necessary to fixate and stabilize a retinal image. It is imperative to maintain a fixed retinal image to stabilize the visual world during body movement. According to studies convergence insufficiency is a major cause of asthenopic symptoms in children. These asthenopic symptoms include headache, muscle fatigue, eye strain and other associated complains of eye. These may be due to uncorrected refractive error particularly hyperopia and myopia. So these refractive errors must be treated first.

Convergence insufficiency in considered to be the distinctive anomaly of both eyes that effect the refractive status of eye. An Investigation was conducted to determine the most effective treatment plan for the managing the convergence insufficiency. They make a list of several plans include pencil push-ups, base-in prism, home and office based vision therapies/orthoptics, reading glasses etc. and they found pencil push-ups as the most beneficial management plan for treating convergence insufficiency.¹¹

This study showed the relation of convergence insufficiency with refractive errors. According to this study hyperopic patients had more symptoms for convergence insufficiency than myopic and astigmatic patients. The treatment of convergence insufficiency was checked by a study. In this study symptoms concerning this treatment were also observed. In this method near point of convergence was measured before and after treatment. To treat convergence insufficiency vision therapy was done on patients who had near point of convergence greater than 10cm. The result was improvement in convergence insufficiency.¹²

Convergence insufficiency is associated with different phorias so it should be detected on time. Near point of convergence is measured to detect it. If untreated, convergence insufficiency can cause difficulty to maintain fixation at near distance and can cause headache and eye strain.


Conclusion:

Convergence insufficiency was seen more in hyperopes than in myopes and astigmatic patients. These data and whole study supports the assumption that screening programs in our country could be useful in detecting and minimizing the visual disturbances due to convergence insufficiency

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