Original Article

Convergence and Accommodation Insufficiency in School Going Children

Yousuf Ahmed,[1] Sehrish Akram,[2] Muhammad Awais Ashraf,[3] Hadia Iqbal,[4] Duaa Waseem,[5] Muhammad Rizwan khan[6]

Abstract

Objective: To assess Convergence and accommodation insufficiency in school going children presented in eye OPD Holy Family Hospital.
Study design: It was a Descriptive hospital-based study.
Place and duration of study: The study was conducted at The Department of Ophthalmology, Eye OPD, Holy Family Hospital, Rawalpindi from May to October 2023.
Material and Methods: 80 patients were studied for the research purpose. Detailed examinations were performed including history taking, slit lamp examination, vision and Orthoptics test for evaluation of any deviation related with strabismus.
Results: Out of the 80 patients with Convergence and Accommodation Insufficiency (CI) seen at HFH, 44 were female, and 36 were male. A total of 40 patients showed an association with CI. Among these patients, 42 presented with asthenopic symptoms, while 28 had no noticeable symptoms. Age distribution revealed that only 16 patients were under 10 years old, 36 were between 12 and 18 years, and 28 were between 19 and 22 years. Nearly all patients required an Orthoptics assessment, with only 12 having a history of deviation. A small number, about 8 patients, presented due to excessive near work, highlighting the impact of prolonged close-up activities on their condition.
Conclusion: Approximately 10% of the cases involved each of the visual syndromes, including Convergence and Accommodation Insufficiency (CI), and it was noted that visual discomfort is common among teenagers with these conditions. In cases of asthenopia, such as headaches and difficulty concentrating during near vision tasks,it is crucial to assess the quality of binocular vision. Evaluating and managing CI is essential to alleviate symptoms and improve visual efficiency, particularly during activities that require sustained near focus.

1. Introduction

Convergence is a disjugate movement in which both eyes rotate inward so that the lines of sight intersect in front of the eyes. It enables the maintenance of BSV at any fixation distance. Tonic convergence is the phrase used to describe convergence caused by the EOM's intrinsic innervational tone. Similar retinal pictures are projected on to corresponding retinas due to fusional convergence. Blurred retinal pictures encourage accommodating convergence.

It is one of the three components of the synkinetic near reflex complex, which also includes miosis and accommodation. The knowledge of an object's proximity is known as proximal convergence. [(1)]

The inability to achieve or sustain sufficient binocular convergence for an extended period of time without excessive effort is known as convergence insufficiency.[(2)] When you stare at things close together, like books, tablets, or smartphone screens, your eyes move in unison and point inward. This phenomenon is known as convergence. Eye coordination issues caused by convergence insufficiency cause your eyes to stray outward when you examine objects up close. Double or blurred vision may result from this.[(3)] Usually beginning in childhood, convergence insufficiency is frequently is diagnosed.

Internee, D.Watson, RWP,[1] Ophthalmology department, Holy family hospital, RWP,[2] Associate professor, Multan Medical and dental college, Ibn-e-Siena Hospital and research institute,[3] Internee, Suri eye care hospital,[4] Internee, Shifa international hospital,[5] Associate Professor and HOD Ophthalmology Deptt, Faisalabad Medical University and Allied Hospitals.[6]
Correspondence: Hadia Iqbal, Internee, Suri eye care hospital **Email:** hadiaiqbal988@gmail.com

When youngsters are learning to read, the disorder is frequently discovered by health care professionals who make the diagnosis.

Adults who have experienced a brain injury, such as a concussion, may also develop convergence insufficiency. A visual disorder called accommodative insufficiency impairs the eye's capacity to focus on close objects, resulting in symptoms like headaches, blurred vision, eye strain, and trouble reading or doing close-quarters jobs.[(4)]

This condition is more common in older adults. According to reports, early-stage Adie syndrome, head trauma, diphtheria, and conversion reactions can all result in secondary convergence insufficiency linked to primary accommodation insufficiency. Convergence insufficiency may be linked to neurological conditions like Parkinson's disease, myasthenia gravis, and Alzheimer's disease.[(5)]

Convergence insufficiency frequently runs in families. Convergence insufficiency may be more likely to affect you or your kids. Whether it has affected other family members. [(6)] Additionally, prolonged computer use may increase your chance of convergence insufficiency. Other forms include muscle imbalances, idiopathic or primary CI. Inadequate or delayed functional development and a broad IPD may be linked to primary CI. Overwork, mental instability, and general weakness are among other contributing factors. Uncorrected refractive defect may be linked to convergence insufficiency. CI can be brought on by a high degree of untreated hypermetropia or myopia. There is also poor accommodation convergence because high hypermetropes do not try to accommodate. Myopes may lack accommodating convergence since they don't need to accommodate. One of the main causes of binocular anomalies, such as convergence insufficiency, is uncorrected refractive errors. Students are far more likely than non-student patients to have hypermetropia.[(7)] This may lead to presentation of asthenopic symptoms, such as headache, eye strain, watering, and difficulty reading or working close to objects. The ability to work or study may be hampered by asthenopic symptoms linked to convergence insufficiency (CI). Computer eye strain is a condition that can result from excessive screen usage. [8] Digital eyestrain or computer vision syndrome are other names for this. It happens because looking at displays.requires alot of effort from our eyes hence leading to presentation of these symptoms. Strabismic association with convergence insufficiency is not unusual [9]. Typically, exophoria is linked to convergence insufficiency. Diagnosis of CI is confirmed by the measurement of near point of convergence using RAF rule or pencil pushup test, decreased fusional convergence for near and use of prisms. CI has excellent prognosis. Adults receive treatment on the basis of symptoms. The first-line treatment for children with CI symptoms is thought to be office-based vergence therapy (OBVT) along with home reinforcement. Compared to other recognized treatment alternatives like surgery, base-in prism glasses, computer vergence therapy, and pencil push-up therapy, OBVT has shown a considerable improvement in both symptoms and clinical indicators [10]. The treatment options include optical treatment for insufficiency associated with refractive errors and orthoptic treatment for insufficiency associated with strabismus. When all other approaches have failed, prism therapy is used to alleviate the symptoms [11]. Surgery is the last resort when all other options have failed, particularly incases with convergence insufficiency linked to a significant exophoria. [12]

2. Materials & Methods

Descriptive cross-sectional hospital based study was conducted within the duration of six months. Taking into account the study duration, I selected the sample size of 80 patients. The data of the patients having asthenopic symptoms associated with refractive error and mostly strabismus was obtained on performa. Detailed examination was done using slit lamp examination and orthoptics test for evaluation of any deviation related with strabismus. On the basis of inclusion criteria, Patients of both gender, Patients of School going children, Patients presenting with symptoms, Patients with focusing issue. I excluded the

following patients from the research: those who are unwilling to participate, uncooperative patients, and individuals with intellectual disabilities.

3. Results

Out of the 80 patients with Convergence and Accommodation Insufficiency (CI) seen at HFH, 44 were female and 36 were male. A total of 40 patients showed an association with CI. Among these patients, 42 presented with asthenopic symptoms, while 28 had no noticeable symptoms. Age distribution revealed that only 16 patients were under 10 years old, 36 were between 12 and 18 years, and 28 were between 19 and 22 years. Nearly all patients required an orthoptic assessment, with only 12 having a history of deviation. A small number, about 8 patients, presented due to excessive near work, high lighting the impact of prolonged close-up activities on their condition.

4. Discussion

The prevalence of definite Convergence and Accommodation Insufficiency (CI) in the children assessed was 80%, with these cases being associated with certain factors, while 20% showed no association. Out of 80 patients, 56presented with a history of asthenopic symptoms, and only 08 had a history of deviation. A small number, around 15 patients, presented due to excessive near work, which suggests that prolonged close-up activities may contribute to or exacerbate the symptoms of CI, such as eye strain, difficulty focusing, and reduced binocular coordination. Early detection and management of CI are essential to prevent long-term visual discomfort and academic difficulties in children. These findings highlight the need for thorough assessment and management of CI to address visual discomfort, particularly in children and teenagers who are more susceptible to these issues during near vision activities.

Conclusion:

Approximately 10%of the cases involved each of the visual syndromes, including Convergence and Accommodation Insufficiency (CI), and it was noted that visual discomfort is common among teenagers with these conditions. In cases of asthenopia, such as headaches and difficulty concentrating during near vision tasks, it is crucial to assess the quality of binocular vision. Evaluating and managing CI is essential to alleviate symptoms and improve visual efficiency, particularly during activities that requires near focus.

Conflict of Interest:

Authors declared no conflict of interest.

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