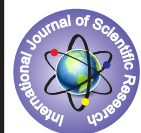


Effectiveness of orthoptic exercises in convergence insufficiency in childrens to relief the asthenopic symptoms



Ophthalmology

KEYWORDS:

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ABSTRACT

Introduction: Asthenopic symptoms associated with convergence insufficiency (CI) may compromise a person's ability to work or study. We investigated the effectiveness of orthoptic exercises in relieving symptoms related to CI and long-time results in children.

Methods: The data were retrospectively gathered from the patient clinical files. A total of 100 patients met the inclusion criteria of suffering asthenopic symptoms and CI.

Results: The mean age was 14 years, 69% of them were female and 31% are males. The patients (N = 100) suffered from CI and had at least one of the following symptoms: eyestrain, blurring of vision, problems in reading and while doing work-up at close distance or headache. After regular orthoptic exercises NPC is significantly decreased.

Conclusions: In conclusion orthoptic exercises are effective in relieving asthenopic symptoms in children. The effects of orthoptic exercises on NPC in children is better with time and not dependent on the number of visits needed for successful outcome. With orthoptic exercises it is possible to achieve longstanding relief on the symptoms of CI.

Introduction:

Convergence insufficiency is a common binocular vision disorder¹⁻⁴ that is often associated with symptoms that occur when a person reads or performs close work. Complaints such as eyestrain, headaches, blurred vision, diplopia, sleepiness, loss of place, difficulty concentrating, movement of print, and poor comprehension after short periods of reading or performing near activities are often reported⁵⁻¹¹. 46% of adults have been reported to experience asthenopia during or after working on a computer and 23% of schoolchildren have been reported to have asthenopic symptoms¹².

Material and method: This study was a retrospective analysis of case records.

The study population consisted of patients referred to orthoptic exercises in the Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh during years 2016-2017. The patients were eligible for inclusion into the study if they had asthenopic symptoms, such as problems in reading and while doing close-up work, had blurred vision or headache and had no prior history of strabismus surgery or had previously performed prior orthoptic exercises. Only patients with convergence insufficiency (defined as near point of convergence with RAF rule more than 6 cm) were included. Refraction is also done in all patients. The total number of patients was 175 and 100 patients met the inclusion/exclusion criteria.

Common symptoms at the time of presentation (N 100)		
	N	%
Difficulties while doing close-up work	78	78
Headache	88	88
Difficulties when reading	62	62
Eyes are tired	32	32
Diplopia	08	08
Blurring of vision	40	40
Painful eyes	20	20
Watery eyes	40	40

Mean Near point of convergence and Average number of visits (in months)	
	N (100)
NPC before exercises (cm)	8.3
NPC after exercises (cm)	6.0
Change in NPC (cm)	2.3

Number of visits

3.5

Result:

The total number of patients was 100 and they were aged from 6 to 18, with mean age 14 years. 69% of them were female and 31% were male. Most of them were teenagers between 12 to 16 years. The patients had made 1-6 visits to conduct orthoptic exercises with a mean of 3.5 visits at a mean interval of 21 days according to improvement in NPC. The average duration of performing the exercises was 102 days. Fifty three (53%) had a minor degree of exophoria at the beginning of exercises and forty five (45%) had orthophoria.

In 71% of patients, the near point of convergence (NPC) was insufficient (range from 7 to 40 cm) at the beginning of exercises. NPC improved in most of the patient after exercise and reduction in asthenopic symptoms also. However, those patients whose convergence did not improve, had good convergence (6 cm or less) already at the beginning of the exercises. The mean change in convergence was 2.3 cm. The significant reduction in mean NPC before the exercise and after the exercise showing the effectiveness in CI.

Discussion:

Several treatment modalities have been used in the treatment of convergence insufficiency, such as base-in prism glasses, reading glasses, pencil push-up therapy, home-based vision therapy/orthoptics, and office-based vision therapy/orthoptics.¹³ Recently, the effect of office-based orthoptic exercises has been shown to be superior to placebo treatment, pencil-push ups or home-based computer vergence/accommodative therapy in the treatment of children with symptomatic convergence insufficiency.¹⁴ The current study aimed at evaluating the effect of orthoptic exercises in relieving asthenopic symptoms in children and furthermore to investigate the long term treatment effect.

In present study we determined the success rate as absence of all symptoms and found that the children were free of symptoms after they had completed the exercises. This is in line with a study by Scheiman et al.¹⁵ having success rate of 42% and Scheiman et al.¹⁶ 55.9% with office-based vision therapy/orthoptics. The success rates are also in concert with other previous studies such as study by Daum (1983) where the symptoms totally disappeared in 53% of patients.

and altogether 96% gained some relief of exercises and with a study Birnbaum et al.¹⁷ who observed a success rate of 61.9% in patients who gained in-office therapy with supplementary home therapy. Majority of the rest gain some relief on their symptoms. The orthoptic exercises are easy, non-surgical and cheap intervention on convergence insufficiency and this treatment has proved its efficacy. Nevertheless, there was considerable variability in number of visits needed for successive outcome in our present study and in patients with more than 6 visits this was mainly due to worse NPC at the beginning of the exercises. The study has been shown that by increasing the treatment time even beyond 12 weeks the proportion of patients being asymptomatic increases.

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