

Effects of Facial, Neck Massage and Traditional Chinese Eye Exercises Along with Eye And Facial Exercises on Visual Acuity and Convergence Insufficiency Among Young Adults with Low Myopia

Pooja J. Shah¹, Dr. M. Sangeetha²

¹Intern, Dr. APJ Abdul Kalam College of Physiotherapy, Loni, India.

²Professor and HOD, Community Physiotherapy, Dr. APJ Abdul Kalam College of Physiotherapy, Loni, India.

Corresponding Author: Pooja J. Shah

ABSTRACT

Background: Throughout the world, major reason for loss of vision is myopia and it is increasing day by day. We aim to study the effects of facial, neck massage over the traditional Chinese eye exercises along with eye and facial exercises on visual acuity and convergence insufficiency among young adults with low myopia.

Materials and method: 30 participants of age group 18-26 years were selected. They were randomly assigned into two groups: Group A were given traditional Chinese eye exercises (acupoint massage). Group B were given facial, neck massage. Both the groups were given eye and facial exercises. Visual acuity and convergence insufficiency were assessed using Snellen Eye Chart and Convergence Insufficiency Symptom Survey respectively, before and after 4 weeks of intervention.

Results were analyzed using student's t test. Result: After 4 weeks of intervention the mean spherical equivalent diopter scores of Group A and Group B showed significant difference in Right eye ($-0.083 \pm 0.007D$, p: 0.0192 vs $-0.13 \pm 0.139D$, p: 0.0148) and very significant difference in left eye ($-0.1 \pm 0.067D$, p: 0.0086 vs $-0.15 \pm 0.083D$, p: 0.0025). The Mean CISS score after 4 weeks of intervention showed very significant improvement and no significant improvement for group A and B respectively. (2.8 ± 1.54 , p: 0.0039 vs 3.4 ± 1.515 , p: 0.1682).

Conclusion: The findings of the study suggests that both Facial, Neck massage and traditional Chinese Eye Exercises can be effectively used as a therapeutic intervention for improving visual acuity and reducing symptoms Convergence Insufficiency among young adults with low myopia.

Key words: Low Myopia, Chinese Eye exercises, Visual acuity and convergence insufficiency.

INTRODUCTION

Myopia is becoming the most common cause of blindness and vision impairment in the world. [1] Globally, recent researches showed that number of people suffering from myopia in 2000 amounted to 1406 million and in 2010, it increased to 1950 million. By 2050, the amount will increase to 4758 million. It also showed that it is occurring in people with age between 10-39 years and soon it will develop in

people with age between 10-79 years by 2050. [2] Prevalence of myopia in India is 6.9%. [1]

One of the types of refractive error is myopia. Refractive error implies the state of eye that does not twist light effectively, bringing about an obscured picture. The types of refractive error are Astigmatism (Partial blindness), Presbyopia (Loss of close vision with age), Hypermetropia (Farsightedness) and Myopia (Near

Sightedness).^[3] In Myopia, excessive refractive power of the cornea or the lens is caused when parallel light rays fall in front of the retina.^[4] Diopter is the unit for measuring myopia and myopia is further classified according to its severity or degree as^[5] low myopia -1.00D to -3.00D or less, medium myopia -3.00D to -6.00D and high myopia -6.00D or more.^[1]

Myopia mostly begins in childhood and has a higher risk if parents are diagnosed with myopia. It stabilizes during early adulthood but in some cases, it continues to progress. Low myopia is a mild form of nearsightedness. Individuals typically have difficulty seeing distant objects clearly and reading road signs, but are able to see well for close up tasks like computer use and reading. Other signs include eye strain, constant blurred long-distance vision, diplopia, watery eye, squinting and headaches. If symptoms are uncorrected, individual experiences fatigue while playing sports or driving.^[6]

The etiology of myopia is still unknown.^[7] The cause for lengthening of eye in myopia is because of contraction of superior and inferior oblique muscles. Shape of the eyeball depends upon the extra ocular muscles acting upon it.^[5] Risk factors for myopia consists of genetic and environmental factors which together plays a role and it includes urbanization and education, electronic devices (phones, computers, TV), lifestyle and vitamin D levels.^[2]

Myopia can be corrected by surgical, medical and physiotherapy treatment. Surgical and medical treatment includes laser refractive surgery, glasses and contact lenses. Physiotherapy management includes massage of acupoints surrounding the eye, ocular muscle strengthening, eye exercises, osteopathy, eye bath, myofascial therapy, eye rest, proper eye hygiene and sleep.^[1] Acupuncture, acupressure, auricular massage is also known to be effective in the treatment of myopia.^[8] M. Sinclair reported that eye exercises help in ocular fatigue and

may also help in retarding the progression of myopia when treated earlier.^[9]

Zorena K, Gładysiak A, et al reported that Chinese eye exercises are traditional 'eye exercises of acupoints' involving acupoint massage for Chinese population. It is approved by their government as a compulsory measure which is to be performed by school children two times a day.^[2] Traditional Chinese eye exercises (acupoint massage) lead to increase in the level of lactoferrin and triggering of tear secretions affect the intraocular pressure. Lactoferrin is associated with its affinity for iron and is an element of immune system. As lactoferrin is associated with picking up and bonding iron in the body, it does not allow the bacteria to grow and develop. Long term use of Chinese eye exercises has shown effect in children with myopia. It has significant improvement on accommodation delay.^[2]

Most of the studies on myopia have only been carried out on school going children and till now little importance have been given to adults with myopia. And also, there have been many studies have proven the effects of traditional Chinese eye exercises but there has been little agreement on the use of facial and neck massage as therapeutic intervention for low myopia. Hence, we aim to study the effects of facial, neck massage over the traditional Chinese eye exercise along with eye and facial exercises on visual acuity and convergence insufficiency among young adults with low myopia.

METHODS

2.1: Participants Recruitment:

Participants aged between 18-26 years and students of Pravara Institute of Medical Sciences, Deemed University, were invited to participate in this study after obtaining Ethical Clearance from Institutional Ethical Committee. Inclusion criteria were participants of both genders, low myopia diagnosed with -1.00D to -3.00D spherical in both right and left eye. Exclusion criteria were individuals with color blindness,

malignancy, infections of eye, post-surgery for refractive error, glaucoma, eye injury, diabetes, injuries of head, any neurological disorder, cardiovascular diseases and any simultaneous ongoing ophthalmology treatment. Written informed consent was taken. Simple random sampling was done and they were divided into two groups randomly. Participants were not informed about group assignment. The study duration was for 5 months.

2.2PROCEDURE: At the enrollment, pre-intervention assessment was done by the ophthalmologist for visual acuity. Convergence insufficiency symptom survey (CISS) questionnaire was given for assessment of symptoms of convergence insufficiency. Group A were given traditional Chinese eye exercises involving acupoint massage. Group B were given facial and neck massage. Both the groups were given eye and facial exercises.

Chinese eye exercises (CEE): Chinese eye exercises involved acupoints massage of 8 acupoints surrounding the eyes. These acupoints were given gentle pressure in clockwise direction for 30 secs and then pressure was given in anti -clockwise direction for next 30 secs. The points surrounding the eye were BL-2 (Medial end of the eyebrows), BL-1 (located at medial angle of the eye), ST-2 (Located in the line of pupil, at the level of nostril), EX-HN5 (on the forehead three points exactly above the medial and lateral end of the eyebrow and third point above the angle of eyebrow) and lastly TE-23,EX-HN4,GB-1,ST-1 (around the eye socket).

Facial Massage: Self-massage of the face was performed by the participants themselves. The techniques used were effleurage, plucking and tapping. Effleurage was performed with finger tips and palmar surface of hand. Plucking was performed by the tips of the thumb and index finger, and tissues were plucked. Tapping was performed with finger tips. One, two or three finger tips were used according to the size of the area of the face being treated. ^[10] All the techniques were performed for 2

mins each, once a day, 5 days / week for 4 weeks.

Neck Massage: Three techniques were used which included effleurage, kneading and picking up. Effleurage in which the neck strokes were performed by the participants with the flat of the fingers. Kneading was performed in circular pattern where pressure was avoided on bony prominence. Picking up involved light squeezing of the muscles. ^[10] All neck massage techniques were performed for 2 mins each, once a day, 5 days/week for 4 weeks. Lotion/talcum powder was used for lubrication during massage. The contraindications for massage were also taken into consideration.

Eye exercises: Palming and visualization, Horizontal, vertical and oblique eye movements, Shutting the eyes tightly, Focusing the bridge of the nose with both the eyes, Shifting and lastly Near and far focusing. And, the participants were instructed to remove the glasses or contact lenses during exercises. All the eye exercises were performed for 10 repetitions once a day, for 5 days/ week for 4 weeks.

Facial exercises: Pouting, Smile expression with lips open showing teeth, raising and projecting forward upper lip, raising eyebrows, pulling eyebrows inwards and downwards, with lips closed together, squeezing tightly, Raising the outer edges of the nostrils forming diagonal lines on the bridge of the nose, Smile expression with lips closed and Joining lips and compressing cheeks. All the facial exercises were performed for 10 repetitions, once a day, for 5 days/week for 4 weeks.

Participants were advised to do the exercises and massage at home. And also, they were informed about the symptoms of visual discomfort. They were allowed to discontinue the intervention for any reason, at any time.

2.3 OUTCOME MEASURES: Visual acuity was assessed using Snellen Eye Chart. An ophthalmologist assessed the visual acuity through Snellen eye chart before and after 4 weeks of intervention. Visual Acuity is measured in angular terms.

Line assignment method is used as the scoring method where every line is given a credit point and not the letters which are read. [11] Snellen eye chart score was converted into Spherical Equivalent Diopter score.

Symptoms of Convergence Insufficiency were assessed using Convergence insufficiency symptom survey questionnaire. Before and after 4 weeks of intervention they were asked to fill the questionnaire. Convergence insufficiency symptom survey questionnaire is most common tool to assess the symptoms of Convergence insufficiency, and it included 15 questions, which is scored from 0-4. Total score is 60. Scores equal to or more than 21 is suggestive of Convergence Insufficiency in young adults. [9]

2.4 DATA ANALYSIS: Effectiveness of both the treatments was analyzed after 4 weeks of intervention. Descriptive and inferential statistics were used for analysis which was carried out using GraphPad InStat version 3.06.

RESULT

In total, 50 participants were tested between 1st October to 1st December 2018, out of which 17 participants did not match the inclusion criteria. A total of 33 participants were recruited and 16 were assigned to Group A involving traditional Chinese eye exercises along with eye and facial exercises and 17 were assigned to Group B involving facial, neck massage along with eye and facial exercises. There were 3 dropouts due to non-compliance of exercise after 2 weeks of intervention. Finally, 30 participants' results were considered for statistical analysis.

3.2 OUTCOME PARAMETERS:

At the baseline, there were no significant difference on age (p value: <0.0001), Spherical equivalent diopter score and Convergence Insufficiency symptom survey score between Group A and Group B (table no 1). After 4 weeks of intervention the mean spherical equivalent diopter scores of Group A and Group B showed significant difference in Right eye (-0.083±0.007D, p: 0.0192 vs -0.13±0.139D, p: 0.0148) and very significant difference in left eye (-0.1±0.067D, p: 0.0086 vs -0.15±0.083D, p: 0.0025). Out of 30 participants in Group A and Group B, significant improvement of -0.25D was seen in 6 participants and 5 participants respectively. There was also clinical improvement by -0.50D of left eye of one individual. And the mean difference of Spherical Equivalent Diopter scores between the two groups were insignificant for both the eyes (table no 2). The calculated t value for right and left eye were 0.87 and 0.95 respectively, which showed no significant difference on visual acuity between groups.

The Mean CISS score after 4 weeks of intervention showed very significant improvement and no significant improvement for group A and B respectively. (2.8±1.54, p: 0.0039 vs 3.4±1.515, p: 0.1682). The Mean difference of CISS scores between the group were very significant. (table no 2). And this study showed that there were only 13% and 20% participants with high CISS score in Group A and Group B respectively, which indicated symptomatic CISS of more than or equal to 21. (table no 3)

TABLE NO 1. OUTCOME PARAMETER DISTRIBUTION OF GROUP A AND B

SR.NO	GROUPS	EYE	SPHERICAL EQUIVALENT DIOPTR SCORE(D) (MEAN, SD)		P value	CONVERGENCE INSUFFICIENCY SYMPTOM SURVEY SCORE (MEAN, SD)		P VALUE
			PRE-TEST	POSTTEST		PRE-TEST	POSTTEST	
1.	GROUP A	RIGHT	-1.783±0.806	-1.7±0.882	0.0192	12.4±7.519	9.6±5.974	0.0039
		LEFT	-1.783±0.653	-1.68±0.72	0.0086			
2.	GROUP B	RIGHT	-1.716±0.549	-1.58±0.41	0.0148	14.06±7.275	10.66±5.76	0.1682
		LEFT	-1.751±0.590	-1.6±0.507	0.0025			

*GROUP A: TRADITIONAL CHINESE EYE EXERCISES; GROUP B: FACIAL AND NECK MASSAGE.

TABLE NO 2: COMPARISON OF OUTCOME PARAMETER DISTRIBUTION

OUTCOME PARAMETER	EYE	MEAN DIFFERENCE, STANDARD DEVIATION		'p' VALUE	't' VALUE	RESULT
		GROUP A	GROUP B			
SPHERICAL EQUIVALENT DIOPTER(D)	RIGHT	-0.083±0.122	-0.133±0.185	0.3910	0.8712	NOT SIGNIFICANT
	LEFT	-0.1±0.126	-0.15±0.158	0.3475	0.955	NOT SIGNIFICANT
CISS QUESTIONNAIRE	-	2.8±3.144	7.53±5.805	0.0097	2.777	VERY SIGNIFICANT

TABLE NO 3. NUMBER AND PERCENTAGE OF PARTICIPANTS WITH SYMPTOMATIC CISS SCORE (≥21 out of 60).

CISS	GROUP A	GROUP B
HIGH CISS	2(13%)	3(20%)
LOW CISS	13(86%)	12(80%)

DISCUSSION

Throughout the world, major reason for loss of vision is myopia and it is increasing day by day. Hence, the human eye requires proper care and attention. The present study demonstrates the difference in visual acuity between eyes which may be due to optical and neural properties. And also, it demonstrates the difference in the treatment effect between eyes. Group A and B showed significant improvement in right eye visual acuity and very significant improvement in left eye visual acuity. The current study also supports the finding of Zhong Lin et al (2016) which shows that Chinese eye exercises had quiet significant effect on visual acuity in myopia. [9] Another study showed that eye exercises of acupoints were effective and protective for juvenile myopia.

Contrary to expectations, this research did not find a significant difference between Facial, Neck massage and traditional Chinese Eye Exercises on visual acuity. There are several possible explanations for this result. For example, both traditional Chinese eye exercise involving acupoint massage and facial, neck massage may increase the blood supply to eye ball and may also decrease the tension of ocular muscles and may return the eyeball to its normal curvature and reduce the refractive error. In the current study neck massage was also found to be effective to reduce the tension of neck musculature which was being overused in people with myopia.

Traditional Chinese eye exercises group showed significant improvement in symptoms of Convergence Insufficiency than facial, neck massage group. In total of 30 participants, 11 participants had symptomatic Convergence Insufficiency. Findings of the present study are consistent with the findings of Anna M Horwood et al study which shows that majority of subjects with the clinical signs of Convergence Insufficiency have no symptoms and CISS questionnaire cannot be used as a screening tool in asymptomatic non clinical populations because of poor sensitivity and high false positive rate. [12] They also suggested that CISS may be useful method of monitoring symptoms in established symptomatic CI and for the research context for which it was designed.

The results may be interpreted with caution because of smaller sample size, shortest period of intervention, participants following the typical student's lifestyle, and only low myopia (-1.00D to -3.00D) were included. Despite of these limitations these interventions are effective for long term benefits.

CONCLUSION

These findings, while preliminary, suggests that both Facial, Neck massage and traditional Chinese Eye Exercises can be effectively used as a therapeutic intervention for improving Visual Acuity and reducing symptoms of Convergence Insufficiency among young adults with low myopia.

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