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ORIGINAL ARTICLE

EVALUATION OF THE COMBINED EFFECT OF YASHTI LODHRA SEKAM AND NETRA VYAYAMA IN ASTHENOPIA- A RANDOMIZED CONTROLLED CLINICAL TRIAL

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Abstract

Asthenopia is a very common clinical condition nowadays due to impaired lifestyle. They are of two types refractive asthenopia and muscular asthenopia. In Ayurveda, asthenopia can be considered as poorva rupa of timira which has predominantly vata kopa lakshana. For managing the eyestrain, the relaxation of the eye and mind is an effective technique. Eye exercises relax the eye and mind and thereby pacify the vitiated vata

Study design: Randomized controlled clinical trial with concurrent control in 60 patients

Methodology: The 60 patients were divided into 4 groups of 15 patients each. Group 1 was given the best possible correction with spectacles. Group 2 was given netra sekam with yashti lodhra kashayam twice daily. Group 3 patients were given a set of 10 eye exercises twice daily. In group 4, the patients were given sekam and eye exercise twice daily. The patients were assessed on 0^{th} day, 15^{th} day(AT1), 30^{th} day(AT 2), 45^{th} day(AT 3) and 60^{th} day(AT 4). Follow up was done on 75^{th}(AF 1) and 90^{th} day(AF 2)

Findings

Eye exercise, sekam and combination have significant effect in reducing asthenopia during treatment and in the follow up period. In the follow up period, the effectiveness of eye exercise and sekam are far ahead of spectacle usage.

Conclusion

Though eye exercise and sekam alone are effective in managing asthenopic symptoms, the combination helps to provide a more sustained effect than when used alone.

Introduction

[1]Asthenopia is a term used to describe a sense of strain and weakness or ocular fatigue set up using eyes. (a=not, stenos= strength, ops= vision). Asthenopia is a common presenting complaint among patients with accommodative and convergence insufficiency., refractive errors and intermittent strabismus.

Asthenopic symptoms are less frequent at distant vision than at near vision because there is less strain on the accommodation and vergence symptoms. Asthenopic symptoms are becoming more common in modern society where near work at computers requires sustained fixation for hours at the same visual distance which puts a strain on the system for near vision However asthenopia can occur in school children also and recent studies report a prevalence of 15.2% in 6-year-old children and 34.7% in school children between 8-14 years

[3]Asthenopia is of two types :-refractive and muscular. Asthenopia caused by uncorrected refractive errors is called refractive asthenopia and those caused by neuromuscular anomalies are muscular asthenopia

Mild to moderate refractive errors cause most of these symptoms as in severe refractive errors patients cannot compensate and resort to monoclarity or learn to tolerate the resultant reduced visual acuity. On the other hand, in small to moderate refractive errors, the defect is compensated by the patient with increased muscular efforts which then results in muscular fatigue and asthenopic symptoms

CLINICAL PROFILE OF ASTHENOPIA

Asthenopia usually occurs secondary to increased muscle work and muscular fatigue. Symptoms of asthenopia are very variable and related to the use of eyes.

1. **Non-visual ocular symptoms** described as tired, aching poor bleary eyes. The patient usually complains of tiredness of the eyes after near work. However temparory relief can be obtained by resting or rubbing the eyes. The nature of pain is often described as dull aching, boring, superficial, deep-seated or migrainous.

   Objectively the eyes frequently have a typical appearance. The continued state of irritation and congestion brings about an unhealthy condition of conjunctiva and lids with a characteristic look, watery, suffered, and bleary.

2. **Headache** is one of the common symptoms of asthenopia which occurs in a multitude of varieties. It may be localized around the region of eyes; it may be frontal, temporal or occipital or the pain may extend down the neck or even into the arms. It may remain limited to any part, being associated with a tender area in the vertex or temple, but as a rule

   when thus limited, it occurs as a brow ache over the neighbourhood of the eyes.

   It varies widely in nature. Sometimes it is superficial and resembles a cutaneous hyperaesthesia. Sometimes it is deep-seated and boring or full and throbbing. It may be dull and heavy ache difficult to describe or localize accurately or it may be neuralgic in nature, sharp, shooting and lancinating. In its incidence it may be permanent or periodic or it may come at quite irregular intervals

3. **Visual symptoms** are intermittent in nature. In small refractive errors the defect may be compensated completely by the patient and the vision remains good. Visual symptoms arise in periods of unusual strain or temporary deterioration of general health and vitality, when fatigue comes on and visual acuity fails. This is especially seen in those who use the eyes much for reading or studying small objects over long periods, while fine sewing, the cinema, motor driving, or any relaxation or employment which calls for a high degree of visual acuity combined with attention and anxiety. Here the ciliary muscles give up any attempt to focus and the image becomes indistinct, or the ocular muscles slip back into their condition of rest and diplopia results

4. **Other general symptoms of eye strain** are of more uncertain status. Digestive upsets like dyspepsia, nausea, vague nervous disorders such as dizziness, insomnia and depression and many other symptoms have all in the past been variously attributed to eye strain

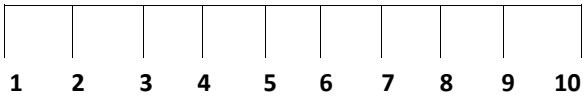
MANAGEMENT OF ASTHENOPIA

Management includes management of the cause of asthenopia. Refraction, checking near point of convergence and accommodation and orthoptic work up is essential in each patient of asthenopia.

GRADING OF ASTHENOPIA

A major difficulty in quantifying asthenopia is the lack of standardized instruments for assessment. The study was conducted on patients with refractive asthenopia and a questionnaire with 22 questions was prepared to assess the severity of asthenopia and habits of patients which may have caused the condition. The pain was graded according to VAS scale. Other symptoms were assessed by grading according to their severity

Head ache-VAS scale



Pain grading

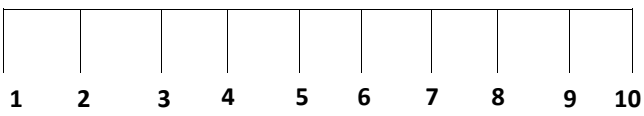


Table 1-Grading of vision

..	Grade 0	Grade 1	Grade 2	Grade 3	Grade 4	Grade 5
Distant vision	6/6	6/6-6/9	6/9-6/12	6/12-6/18	6/18-6/24	6/24-6/36
Near vision	N6	N6-N8	N8-N10	N10-N12	N12-N18	N18-N36

Table 2-Grading of other Asthenopic symptoms

SYMPTOM	GRADE 0	GRADE 1	GRADE 2	GRADE 3
1.Watering of eyes	No lacrimation	Watering after reading for 30 minutes-1 hour	Watering after reading for 10 -30 minutes	Watering on looking at the book
2.Styes	Absent	Frequency-once a month/no of styes at a time is one/both	Frequency-once in two week/no of styes at a time is two/both	Frequency-3-4 per month/no of styes at a time is more than two/both
3.Other associated complaints	Absent	Mild	Moderate	Severe

Methodology

Objective

To study the combined effect of Yashti Lodhra sekam and Netra vyayama in comparison with standard allopathic management in asthenopia

Materials and methods

Patients fulfilling the diagnostic criteria attending the OPD and IPD of Salakyatantra department, Govt Ayurveda College Hospital, Tripunithura were randomly selected irrespective of race, religion, caste, sex, etc.

Inclusion criteria

Patients with or without spectacles having asthenopic symptoms having diminished vision(myopia, hypermetropia, astigmatism or presbyopia), headache, pain in and around eyes, watering, photophobia, frequent rubbing of eyelids, recurrent styes, tiredness of eyes, redness of eyes, heaviness of eyelids, sleepiness in the age group 5-40 years with written informed consent (consent of minors will be taken from their parents/guardian)

Study frame :

Randomization method : simple random sampling by lottery method

Control : group 1 (spectacle only group)

Study period :18 months

Duration of treatment : 3 months

Duration of intervention : 2 months

Follow up : 1 month

No of groups : 4

Sample size : 15 patients in each group(total 60)

Study setting : Salakyatantra OPD Govt ayurveda college, Tripunithura

The study design was a randomized controlled clinical trial with concurrent control and the patients were selected as per inclusion and exclusion criteria. The study period was 18 months and there were 4 groups with 15 patients each hence the total sample size was 60. The sampling was done as simple random sampling by lottery method and the study setting was Govt Ayurveda College Hospital Tripunithura.

Intervention

The patients in all four groups were subjected to refraction subjectively and objectively and possible correction was noted. After that the patients in group 1 were given the best correction with spectacles. In group 2, [4]sekam with [5]yashti lodhra kwatham was given twice daily, i.e, at 8 am and 5 pm for two months. The patients in group 3 were given a set of eye exercise twice daily for 2 months. The patients in group 4 were given both eye exercise and sekam twice daily for 2 months

Table 3-Eye exercise schedule for Group 3 and Group 4 patients

Eye exercise	Frequency	Duration
1.Palming	Twice daily-7 am and 5 pm and according to the need	20 counts
2.Blinking	Twice daily-7 am and 5 pm and according to the need	20 counts
3.Sunbath	Twice daily-6.30am and 5.30 pm	3 minutes
4.Eye bath	After sunning	20 blinks
5.Eye movements	Twice daily-7 am & 5 pm	18 times
Exercise 1		18 times
Exercise 2		20 times
Exercise 3		12 times
Exercise 4		
6.Neck movements	Twice daily-7am and 5pm	12 times
Exercise 1		12 times
Exercise 2		10 times
Exercise 3		
7.Shoulder movements	Twice daily-7am and 5pm	25 times
Exercise 1		25 times
Exercise 2		
8.Bar swinging	Twice daily-7am and 5pm	10 times
9.Candle fixation	Once daily-8 pm	50 times
10.Candle light reading	Once daily-8 pm	5 minutes

Assessment

The subjective and objective parameters were recorded using a suitable grading pattern every 15 days for 2 months (i.e. 15th, 30th, 45th and 60th days). And follow ups were taken on 15th and 30th day (i.e.75th and 90th days) after treatment

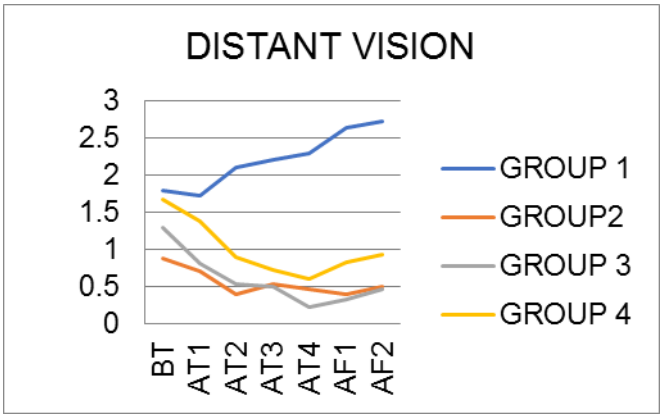
Statistical analysis

The data gathered based on the above observation were subjected to statistical analysis. The percentage of relief was calculated with the help of the mean before treatment and mean after treatment. Paired t-test was applied for parametric data to analyze the effect of the therapy before treatment, after treatment and after follow-ups in all the four groups and the groups were compared with Anova test and its post hoc Tukey Kramer test was done for after treatment and after follow up analysis

Wilcoxon signed rank test was carried out for all non-parametric data to analyze the effect of therapy before treatment, after treatment and after follow-ups in all the four groups and the groups were compared with Kruskal Wallis test and its post hoc Dunn's test was done for the assessment of effect after treatment and after follow up

On comparing the four groups, we can see that in group1 after treatment(AT4), the unaided vision worsened by 27.77% which is statistically highly significant (p< 0.001) and after follow-up (AF2), it again worsened by 51.833% which is also statistically highly significant (p<0.001). In group2 after treatment (AT4), the unaided vision improved by 47.94% which is statistically insignificant (p> 0.05) and after follow up (AF2), the improvement was 44.25% (p< 0.05) which means the improvement in vision by sekam is statistically insignificant. In group3 after treatment (AT4), the unaided vision improved by 82.3% which is statistically highly significant (p<0.001) and after follow-up (AF2), the improvement was by 64.6% (p<0.001) which means the improvement in vision by eye exercise is statistically highly significant. In group 4 after treatment (AT4), the unaided vision improved by 64.07% which is statistically significant (p<0.01) and after follow-up (AF2), the improvement was by 41.92% (p<0.01)which means the improvement in vision by eye exercise with sekam is statistically significant

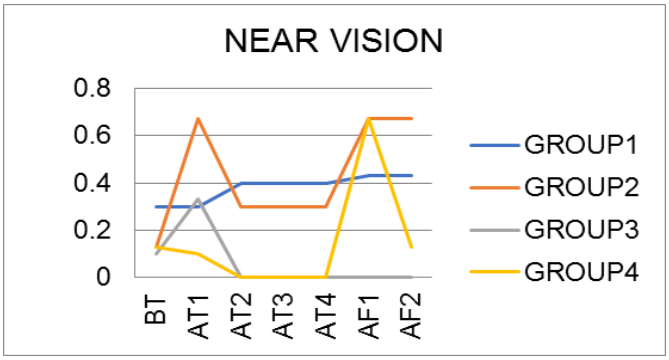
Graph (1) shows the effect of treatment on distant vision



Near vision

On comparing the four groups we can see that in group1 after treatment (AT4), the unaided near vision worsened by 33.33% which is statistically insignificant (p> 0.05) and after follow-up (AF2), it worsened by 43.33% which is also statistically insignificant (p> 0.05). In group 2 after treatment (AT4), the near vision improved by 75.187% which is statistically insignificant (p> 0.05) and after follow up (AF2), the improvement was by 0% (p> 0.05) which means the improvement in vision by sekam is statistically insignificant. In group 3 after treatment (AT4), the near vision improved by 100% which is statistically significant (p< 0.05) and after follow-up (AF2), the improvement is by 100% (p< 0.05), which means the improvement in vision by eye exercise is statistically significant. In group 4 after treatment (AT4), the unaided vision improved by 100% which is statistically insignificant (p>0.05), and after follow-up (AF2), the improvement was by 0% (p> 0.05), which means the improvement in vision by eye exercise with sekam is statistically insignificant

Graph (2) shows the effect of treatment on near vision

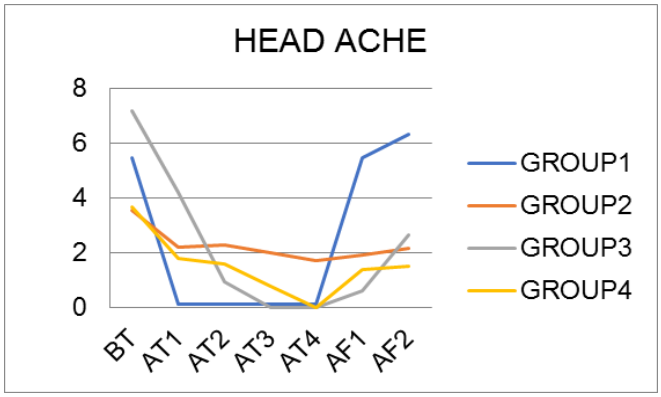


Headache

On comparing the four groups we can see that in group1 after treatment (AT4), the headache improved by 97.62% which is statistically significant(p<0.01).

and after follow-up (AF2), it worsened by -15.33% which is statistically insignificant (p> 0.05), In group 2 after treatment, the headache improved by 81.14% which is statistically significant (p< 0.01), and after follow up (AF2), the improvement was by 60.85% (p< 0.01) which means the improvement in headache by sekam is statistically significant. In group 3 after treatment (AT4), the head ache improved by 100% which is statistically significant (p> 0.01), and after follow up (AF2), the improvement is by 62.92% (p> 0.01), which means the improvement in headache by eye exercise is statistically significant. In group 4 after treatment (AT4), the headache improved by 100% which is statistically significant (p< 0.05), and after follow up (AF2), the improvement was by 73.92% (p< 0.05), which means the improvement in vision by eye exercise with sekam is statistically significant.

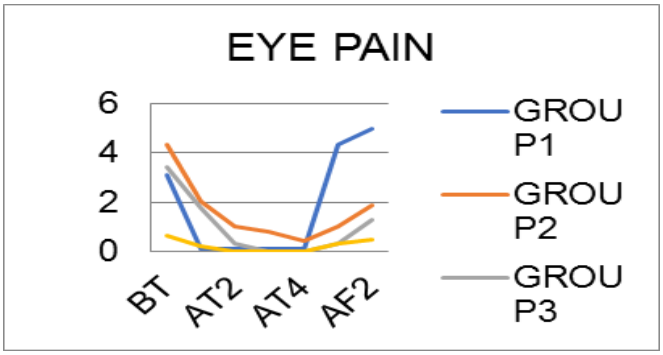
Graph (3) shows the effect of treatment on headaches



Eye pain

On comparing the four groups, we can see that in group1 after treatment (AT4), the eye pain improved by 96.77% which is statistically significant (p<0.01) and after follow-up (AF2), it worsened by 60% which is statistically significant (p<0.05) In group 2 after treatment, the headache improved by 90.76% which is statistically highly significant (p<0.001) and after follow up (AF2), the improvement is by 56.88% (p<0.01)which means the improvement in eye pain by sekam is statistically significant. In group 3 after treatment (AT4), the eye pain improved by 100% which is statistically significant (p<0.01) and after ingfollow-up (AF2), the improvement is by 62.94% (p<0.01), which means the improvement in eye pain by eye exercise is statistically significant. In group 4 after treatment (AT4), the headache improved by 100% which is statistically insignificant (p>0.05) and after follow-up (AF2), the improvement is by 47.62 % (p>0.05), which means the improvement in eye pain by combined eye exercise and sekam is statistically insignificant

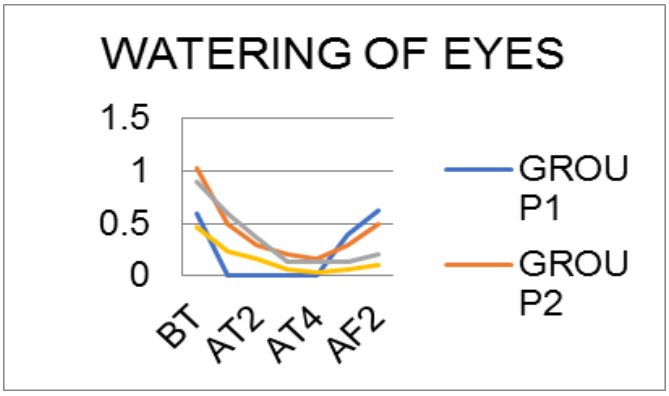
Graph (4) shows the effect of treatment on eye pain



Watering

On comparing the four groups, we can see that in group1 after treatment (AT4), the watering improved by 100% which is statistically highly significant (p<0.01) and after follow -up (AF2), it worsened by -15% which is statistically insignificant (p>0.05), In group 2 after treatment, the watering improved by 83.83% which is statistically highly significant (p<0.001) and after follow up (AF2), the improvement was by 51.55% (p<0.01) which means the improvement in eye pain by sekam is statistically significant. In group 3 after treatment (AT4), the watering improved by 85.86% which is statistically significant (p<0.01), and after follow up (AF2), the improvement is by 77.78% (p<0.01), which means the improvement in watering by eye exercise is statistically significant. In group 4 after treatment (AT4), the watering improved by 93.62% which is statistically significant (p<0.01) and after follow-up (AF2), the improvement was by 78.72% (p>0.05), which means the improvement in watering by combined eye exercise and sekam is statistically significant

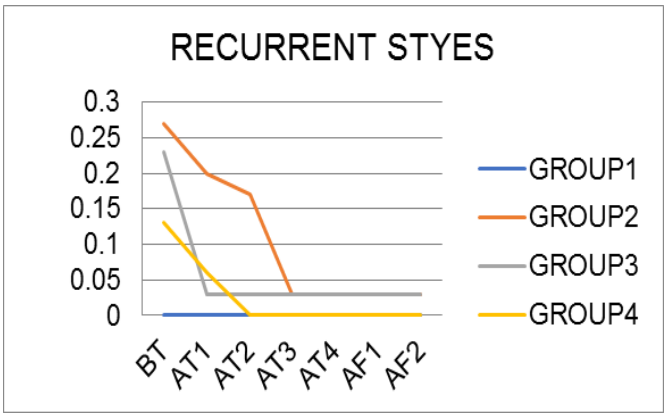
Graph (5) shows the effect of treatment on watering of eyes



Styes

On comparing the four groups, we can see that in group 1, there were 0 patients with stye before and after treatment. In group 2 after treatment, the recurrent styes improved by 87.62% which is statistically insignificant (p> 0.05) and after follow -up (AF2), the improvement is by 87.62% (p> 0.05) which means the improvement in recurrent styes by sekam is statistically insignificant. In group 3 after treatment (AT4), the recurrent styes improves by 86.96% which is statistically insignificant (p> 0.05) and after follow-up (AF2), the improvement is by 86.96% (p>0.05), which means the improvement in styes by eye exercise is statistically insignificant. In group 4 after treatment (AT4), the styes improved by 100% which is statistically significant (p> 0.05), and after following-up (AF2), the improvement is by 100% (p> 0.05), which means the improvement in recurrent styes by combined eye exercise and sekam is statistically significant

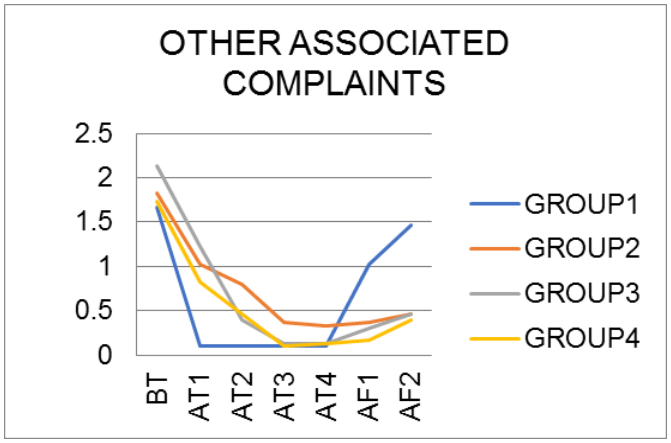
Graph (6) shows the effect of treatment on recurrent styes



Other associated complaints

On comparing the four groups, we can see that in group1 after treatment (AT4), the other associated complaints improved by 94.1% which is statistically highly significant ($p<0.001$), and after following-up (AF2), the improvement reduced to 11.97 which is statistically significant ($p<0.05$). In group2 after treatment (AT4), the other associated complaints improved by 47.94% which is statistically highly significant ($p<0.001$) and after follow-up (AF2), the improvement is by 44.25% ($p<0.001$) which means the improvement in other associated complaints by sekam is statistically highly significant. In group 3 after treatment (AT4), the other associated complaints improved by 93.9% which is statistically highly significant ($p<0.001$) and after follow-up (AF2), the improvement is by 77.93% ($p<0.001$) which means the improvement in other associated complaints by eye exercise is statistically highly significant. In group 4 after treatment (AT4), the other associated complaints improved by 94.85% which is statistically highly significant ($p<0.001$) and after follow-up (AF2), the improvement was by 76.88% ($p<0.001$) which means the improvement in other associated complaints by eye exercise with sekam is statistically significant

Graph (7) shows the effect of treatment on other associated complaints



PARAMETRIC VALUES

A-Scan

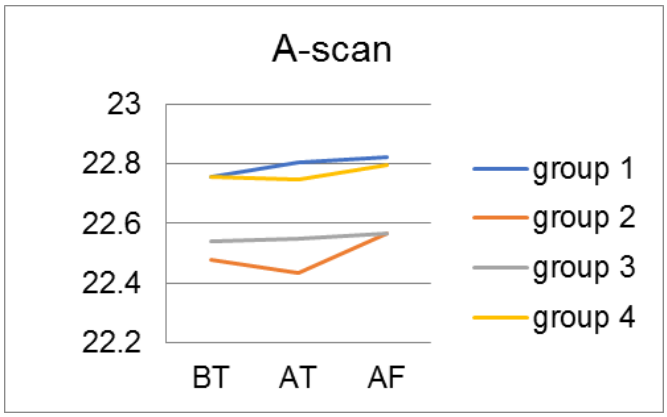
In group 1, the difference in the A-scan before and after treatment (-0.0035%) was statistically insignificant, and the after-follow value(-0.0011%) was also insignificant.

In group 2, the difference in A-scan before and after treatment (0.00178%) was statistically insignificant ($p> 0.05$) and after follow value (0.8857%) was also insignificant

In group 3, the difference in A-scan before and after treatment (-0.00035%) was statistically insignificant ($p> 0.05$) and after the follow-up value (-0.0011%) was also insignificant.

In group 4, the difference in A-scan before and after treatment (0.00527%) was statistically insignificant ($p>0.05$) and after follow value (0.00527%) was also insignificant

Graph (8) shows the effect of treatment on A-scan



Auto refraction

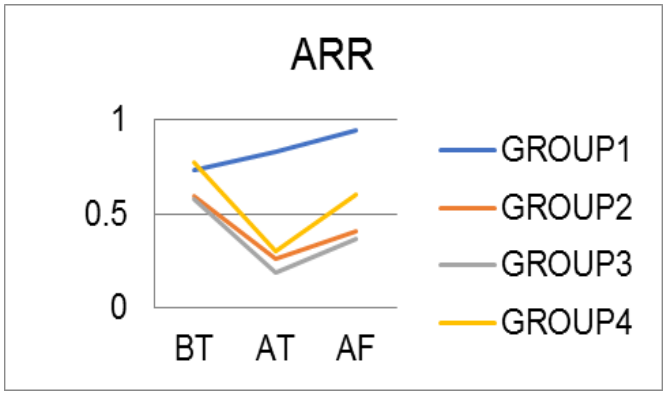
In group 1 after treatment, the ARR values worsened by -10.96% ($p<0.01$) and after follow up the worsening was -26.92% ($p<0.01$)

In group 2 after treatment, the ARR values improved by 70.97% ($p<0.05$) and after follow-up the improvement was 31.11% ($p<0.01$)

In group 3 after treatment, the ARR values improved by 66.67% ($p<0.05$) and after follow-up the improvement was 33.33% ($p<0.01$)

In group 4 after treatment, the ARR values improved by 54.9% ($p<0.05$) and after follow-up the improvement was 30.29% ($p<0.01$)

Graph (9) shows the effect of treatment on ARR

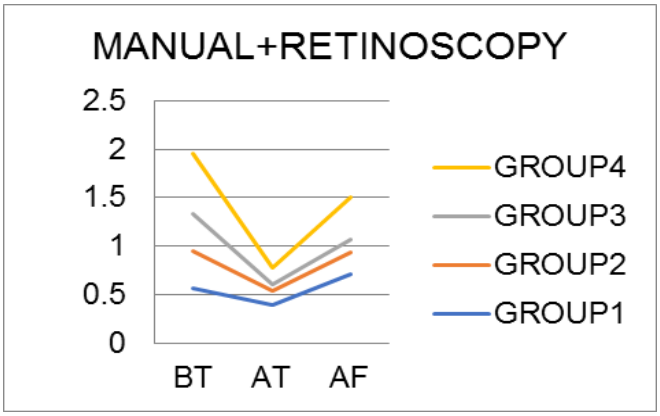


Retinoscopy + manual correction

In group 1, the worsening of power by retinoscopy and manual refraction (-5.72%) was statistically significant ($p<0.05$). In the follow-up period also the worsening of power (-26.88%) was statistically significant ($p<0.05$)

In group 2, the improvement of power by retinoscopy and manual refraction (61.79%) was statistically significant ($p<0.05$). In the follow-up period also the improvement in power (42.46%) was statistically significant ($p<0.05$)

Graph (10) shows the effect of treatment on Retinoscopy + manual correction



Discussion

MODE OF ACTION OF EYE EXERCISE

The chief dosha kopa in asthenopia is that of vata. The treatment of Vata includes [7]sukhaseelata which is nothing but physical and mental relaxation. The eye exercises are meant for the relaxation of the eye and mind. Hence eye exercises can bring vata samanatwam. Also, pranayama which is commonly hailed as a relaxation technique aims at the control of vata. Hence the relaxation techniques pacify vata and so the eye exercises are also useful in vata samanam.

The mode of action of exercise is by relieving the developed strain and vata kopa by relaxation technique. If the stress of the patient increases, he would have to increase the frequency and duration of treatment and thus bring sampraptivighatana. When the vata is passified the other doshas cannot act by themselves as the chief factor in asthenopia and refractive errors are vata. The other lame doshas will lay silently and when the patient stops exercising or not doing it proportional to his strain, the vata kopa will return and associate with other doshas resulting in samprapti and hence leading to asthenopia and refractive errors

MODE OF ACTION OF SEKAM

Though there is no authentic study regarding the mode of action of sekam, the probable mode of absorption of the aushadha will be through the eyelid skin and its small blood vessels and from there to the required part of the eye according to the concentration gradient and its special properties. The height, width and temperature of the stream should be optimum to get maximum benefits.

The yoga yashti lodhra kashayam is predominantly [9]madhura rasam,laghu snigda guna, seetha veeryam, madhura vipakam, and vatapitha haram. The visesha gunas of the yoga are mainly chaksusya, netrarogahara and balyam. The chakshusya prabhava of the yoga will also be helpful. The yoga is predominantly vata-pitha hara with some kapha samanatvam due to lodhra. The yoga has balyam and netra roga hara properties also. Hence it will be beneficial in asthenopia and also all refractive errors and presbyopia The chakshusya property will help improve vision and the netra rogahara, balyam and soolahara properties will help remove asthenopic symptoms

Conclusion

Asthenopia can be considered as purva rupa of timira. The chief dosha involved is vata and the patalas affected are the first and second abhyantara patalas. So the chief involved dhatus are rasa, rakta and mamsa. Painful loss of vision is included in sarvakshi gata roga. Asthenopia cannot be considered as among them because they include diseases which are asukari causing sudden loss of vision in a few days. But asthenopia and refractive errors are gradual in progression and as the RE progresses the asthenopic symptoms gradually decrease which is not the case with sarvakshi roga.

Eye exercises can be incorporated into Ayurveda as it follows ayurvedic principles. Eye exercise helps remove asthenopia and improve vision. But once the exercise is stopped, the strain and visual symptoms return and hence it is better to continue it as a dinacharya in those susceptable to asthenopia. Also, exercise needs to be popularized and applied for other causes of diminished vision like refractive errors and amblyopia. Sekam can also relieve eye strain, but visual improvement is limited with yashti lodhra sekam when compared to exercise.

Eye exercise and sekam provide statistically significant relief for asthenopic symptoms and there is no significant difference between the effectiveness of these two in relieving those symptoms. Though the relief obtained for asthenopia is similar for exercise and sekam, in headache and vision sekam provides a more sustained effect. For eye pain and watering more sustained relief is obtained with eye exercise. Hence if we combine sekam and eye exercise, though the total relief is like that when each is done individually, we can obtain a more sustained relief with the combination.

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