

# Clinical study of ocular causes of headache

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## Abstract

**Background:** Headache is the commonest symptom associated with eye - strain. It may be localized to the immediate neighborhood of the eyes or may become generalized. It varies widely in nature. Sometimes it is superficial and resembles a cutaneous hyperesthesia, sometimes deep -seated and boring or full and throbbing; it may be a dull and heavy ache difficult to describe or to localize accurately, or it may be neuralgic in nature, sharp, shooting and lancinating

**Methodology:** Patients who showed positive features for ocular causes of headache were included in the present study. A proforma was prepared to have a systemic record of each case. Such hundred patients have been studied and evaluated with respect to age, sex, occupation, ext. Each of these patients were studied by taking a detailed history and performing meticulous systemic and ocular examination, consisting of detailed study of globe and adnexa

**Results:** The major cause of eye-strain is refractive error (61.85%). Accommodation insufficiency (12.37%) and convergence insufficiency (7.22%) are equally important. Aniseikonia, although not measured with eikonometer, was interpreted from anisometropia present (5.15%).

**Conclusion:** The overall tally is showing greater number than the total number of eye-strain cases because more than one cause of eye strain may be present in some patient etc astigmatism with accommodation insufficiency.

**Key Words:** Accommodation, Ocular Causes, Headache.

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Received Date: 17/01/2018 Revised Date: 21/02/2018 Accepted Date: 01/03/2018

DOI: <https://doi.org/10.26611/1009531>

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Accessed Date:  
07 March 2018

## INTRODUCTION

When headache is attributable an ocular cause, the history and examination will usually suggest an ocular origin, eg., correlation of the pain with the use of the eyes or evident physical signs of ocular disease. Pain of ocular origin usually follows the distribution of first division of trigeminal nerve which supplies the eye, the orbit and forehead, but may spread, if severe, and cause painful reflex contraction of the ipsilateral frontal and occipital muscles.<sup>1</sup> Headache is the commonest symptom associated with eye - strain. It may be localised to the immediate neighbourhood of the eyes or may become generalised. It varies widely in nature. Sometimes it is superficial and resembles a cutaneous hyperaesthesia,

sometimes deep -seated and boring or full and throbbing; it may be a dull and heavy ache difficult to describe or to localise accurately, or it may be neuralgic in nature, sharp, shooting and lancinating. It may be permanent or periodic, or it may come on at quite irregular intervals. It may or may not be associated with the use of the eyes; usually it is so, and makes itself most evident in the evening after a day's work.<sup>2,3</sup> There may be ocular symptoms like pain, redness and watering, blurred vision and occasionally diplopia. Headaches associated with eye strain are virtually never associated with other systemic symptoms, such as nausea and vomiting. Also it virtually never awakens the individual during the night. If such symptoms are present, a search for other causes should be made for. Usually, organic causes of headache will become obvious. In other individuals, headache will appear to be psychogenic in nature.<sup>4</sup> The visual factors causing eye strain are those which induce muscular fatigue and eye-strain is itself essentially muscle -strain. The strain may arise from over action of ciliary muscle or extra-ocular muscles or both. Lancaster (1932) suggested that the strain lay, not in the total expenditure of muscular effort, but in constantly shifting and changing adjustments of the intra and extra-ocular musculature in futile groping after a more satisfactory but unattainable ideal. The 'illumination', not only its quantity and quality

but its distribution has a direct bearing on the incidence of headache. It depends also on the nature of the work and with the fineness in detail required in the work in hand.<sup>5</sup> The performance of certain visual tasks may also give rise to headache, for example those which repeatedly involve looking rapidly from a distant to a near object. The repetition of looking up and down as occurs when visiting a picture gallery may cause the so-called 'academy headache'. This is consistent with the fact that vertical ocular movements are much less commonly employed than lateral movements. Fine work which has to be performed too near to the eyes or in an awkward ocular position may cause headache. Also lack of contrast and constant movement of the object of attention necessitates close attention and constant, rapid adjustments respectively and hence can induce headache.<sup>7,8</sup>

### MATERIAL AND METHODS

The present study includes evaluation of ocular causes of headache along with the characterisation of the headache in these cases. The cases studied for the same, presented themselves in the outpatient department or were admitted in the Ophthalmology ward or were referred to the department from various other medicine faculties for the complaints of headache or other ocular complaints in Teaching and General Hospital. The patients were selected at random. Patients who showed positive features for ocular causes of headache were included in the present study. A proforma was prepared to have a systemic record of each case. Such hundred patients have been studied and evaluated with respect to age, sex, occupation, ext. Each of these patients were studied by taking a detailed history and performing meticulous systemic and ocular examination, consisting of detailed study of globe and adnxa. Particular attention was paid to errors of refraction, convergence and accommodation anomalies, heterophoria, heterotropias and intra-ocular pressure elevation. In all the cases, slit lamp biomicroscopy was done. In ametropic cases, after recording visual acuity, retinoscopic examination was done. In suspected cases of convergence anomaly and all patients upto the age group of 14 years, near point of convergence was recorded with the help of R.A.F. ruler. Convergence range was recorded with the help of synaptophore.

Accommodation anomaly was recorded by noting the near visual acuity and also by noting the near point of accommodation, which was done by engraving a line of 3mmX0.2 mm on the back of a visiting card and bringing it nearer to the patient till it is blurred and thus measured. In cases of strabismus, cover test was done to note the type of squint. Heterophoria were further evaluated with Maddox wing and Maddox rod with tangent scale.

Heterotropia were further evaluated with prism and cover test and synaptophore. All cases were recorded the intra-ocular pressure with the help of Schiottz indentation tonometer. Some cases required appropriate further laboratory investigations and also opinion of other specialists of other medicine faculties. The study includes the incidence of percentages of headache of ocular origin with respect to age, sex, occupation. It also includes the percentages of various ocular causes inducing headache and characterisation of headache of ocular origin with respect to time and mode of onset, periodicity, nature of pain, its distribution, provoking and relieving factors.

### RESULTS

**Table 1: Age incidence of headache of ocular origin**

Age in years	No. of cases	Percentage
0-10	06	06%
11-20	31	31%
21-30	29	29%
31-40	10	10%
41-50	12	12%
51-60	5	5%
61-70	5	5%
71-100	2	2%

Maximum incidence is seen between 11-30 years. (60%) Lowest age recorded was 8 years and highest was 75 years. This is probably due to the fact that the factors contributing for eye-stra in are acting maximally in that age group. Goel B.S. *et al* found maximum cases 59.3% in age group of 6-20 yrs, followed by 38% in 21-40 yrs. Dr. Vasudeo Anand Rao, found higher incidence of 70% in 21-40 yrs.

**Table 2: Occupation-wise incidence of ocular cause of headache**

Occupation	No. of Cases	Percentage
Student	34	34%
Housewife	17	17%
Unskilled labourer	17	17%
Skilled worker	11	11%
Professional	16	16%
Ungrouped	5	05%

Students ranged anywhere from primary school to professional courses like medical, engineering etc. (35%). Professionals (16%) included doctors engineers, teachers chartered accountants etc. Skilled workers (11%) included tailors, goldsmiths etc. Unskilled workers (17%) included, farmer, coolies mechanics, etc. Unskilled individuals included those who are unable to perform any work because of age or because of their visual disability and hence were because of age or because of their visual disability and hence were dependent solely on others for their livelihood and also those who are living retired life (5%). Housewives compromised 17% of the study included. Incidence of various ocular lesions causing

headache Ocular cause No. of cases (109) Percentage Eye-strain 73 66.97% Intra-ocular inflammation 12 11.09% Raised IOP 9 08.25% Disease of external eye 14 12.84% and adnexa Iatrogenic 10.9% Eyestrain stands first amongst ocular cause of headache (66.97%) leaving behind the next common cause (i.e., Intra-ocular inflammation 11.09%). This is due to the fact that the incidence of refractive errors convergence insufficiency accommodation insufficiency etc. is quite high is general population when compare to other ocular lesions causing headache. The overall tally shows greater number than the total number of cases because more than one cause of headache may be found in the same patient.

**Table 3:** Relative incidence of various causes of eye-strain

Cause of eye-strain	No. of cases(97)	Percentage
Refractive errors	60	61.85%
Accommodation insufficiency	12	12.37%
Convergence insufficiency	7	7.22%
Heterophoria	9	9.28%
Heterotropia	4	4.12%
Aniseikonia	5	5.15%

The major cause of eye-strain is refractive error (61.85%). Accommodation insufficiency (12.37%) and convergence insufficiency (7.22%) are equally important. Aniseikonia, although not measured with eikonometer, was interpreted from anisometropia present (5.15%). The overall tally is showing greater number than the total number of eye-strain cases because more than one cause of eye strain may be present in some patient etc astigmatism with accommodation insufficiency. In such cases role of each cause inducing headache is difficult to measure and hence such cases have been included under both cases. Most often headache of ocular origin occurs during evening (53%) as eyestrain occurs predominantly is the evening time after a hard days work, when patient while relaxing, strains his eyes either by reading in improper illumination or watching.

**Table 4:** Nature of Pain in ocular headache

Nature of pain	No. of cases	Percentage
Boring	04	04%
Burning	10	10%
Pressure	12	12%
Throbbing	26	26%
Vague	48	48%

Maximum number of cases describe headache as vague type (48%), followed by throbbing and pressure type.

**Table 5:** Characteristics of Headache of ocular origin with respect to site of pain

Site of pain	No. of cases	Percentage
Periorbital	24	24%
One-sided	12	12%
Both sides	14	14%
Occipital	10	10%
Generalised	40	40%

Ocular headache with respect to site of pain is a subjective presentation and hence no conclusion can be drawn as regards to the site and cause of a headache Generalised headache (40%) was the commonest followed by Periorbital (24%). In majority of cases (66%) provoking factors like reading doing near work watching TV etc are present as most of cases of ocular headache are due to eye-strain.

## DISCUSSION

This study of ocular causes of headache has been done among 100 patients in Department of Ophthalmology, Teaching and General Hospital. Highest incidence of headache of ocular origin is in 11-20 age group i.e., 31 % and least above 71 years (2%). Headache of ocular origin is more common in males (58%) than in females (42%). Maximum incidence of headache of ocular origin is seen among students (34%). Eye-strain is the predominant cause (66.97%) of ocular headache-Refractive error is the most common cause (61.85%) while heterotropia (4.12%) is the least common. Hypermetropia (29.03%) is the most common type of refractive error while oblique astigmatism (9.68%) is the least common. Maximum number of causes ocular headache have insidious headache (70%) most patients experience headache in evening (53%). Most of times headache occurs intermittently (73%). Maximum patients experienced Generalised type of pain (40%). In 66% of cases, provoking factors are present which either induce headache or aggravate it. 49% of patients either donot have any specific relieving factor or their headache is not relieved by any measures 28% of patients find relief by giving rest to eyes 23% of patients get relief by taking analgesics. In a study conducted by Dr. Vasudev Ananda Rao, 84.6% had convergence insufficiency as a ocular cause of headache and in other study by Dr. K.Y. Narsimha murthy 55% had convergence insufficiency. In present study incidence is 7.22%. In a study done by Dr. James Kuruvilla and Dr. P.N. Srinivasa Rao (1978) the incidence of muscle imbalance in school children is 2.02%. Singh *et al* observed incidence of 0.19%.<sup>11</sup> Present study found the incidence to be 1 %.<sup>9,10</sup>

## CONCLUSION

To conclude, major cause of ocular headache is eye-strain, which is most often induced by refractive errors. Others rare causes like iridocyclitis, glaucoma etc. also contributed while dealing with a case of ocular headache. Awareness is also needed on part of patients suffering from headache to seek an ophthalmologist opinion at the earliest.

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Source of Support: None Declared  
Conflict of Interest: None Declared

