Asthenopia

Introduction

Asthenopia, commonly known as eyestrain (as-the-no-pia: fatigue of eyes) is caused mainly due to prolonged near work, leading to fatigue of eyes.

The strain thrown on eyes is similar to that imposed on leg muscles in a long forced march. And if our physical condition or environmental factors are not conducive to rapid recovery, symptoms of distress are produced.

Types

Asthenopia can be divided into two types:

1. Accomodative asthenopia, which is due to strain on ciliary muscles. This is the most common form.
2. Muscular asthenopia: This is caused due to weakness of extra ocular muscles. It is commonly seen in squints and nerve palsies.

Clinically it is easy to differentiate between these two types in most of the cases. In case of doubt, a simple patch test will help. Patch one eye for several hours, if symptoms persists, it is due to accommodative stress. On resting one eye if the symptoms are relieved, it is due to muscular incompetence.

Causes

1. Uncorrected refractive errors: Mainly seen with hypermetropia & astigmatism.

In hyperopes accommodation is already compromised & strain is put on ciliary muscles during prolonged near work. If the refractive error goes uncorrected we can have:
   a) Temporary failure of ciliary muscle leading to blurring of vision.
   b) Excessive spasm of accommodation, leading to artificial myopia.

In astigmatism, continuous strain is thrown on the accommodation in the attempt to see clearly.

This is particularly so in cases of small astigmatic errors, as patient gets clear vision on accommodation & this increases his tendency to further accommodate. Thus the most severe symptoms come with a visual acuity of 6/6. Of these, most...
cases are of hypermetropic astigmatism.

2. Uncorrected presbyopia: Computer professionals, tailors, beedi workers, weavers are some of the occupations that can lead to a premature presbyopia or at least the need for a mild plus correction to relieve the strain caused by the long hours of near work.

3. Prolonged near work in people with no refractive errors, can also cause some degree of eyestrain. This can be attributed to dry eye.

4. Inadequate illumination: This is one major cause of asthenopia in children. We have to check if they are reading in a well lighted room. Watching computer screens, televisions etc., in decreased background illumination, will increase the contrast of visual display.

5. Muscular imbalance, aniseikonia

6. Retinal problems

7. Using CRT monitors: Cathod ray monitors, both for television & computer screens with a refresh rate <70 Hz, cause strain due to flickering images. That is where LCD monitors have an advantage.

**Computer Vision Syndrome**

This is one important cause of asthenopia. This describes a group of eye & vision related problems that result from prolonged computer use.

When we concentrate on the computer, we tend to blink less. This is an involuntary action & the eyes tend to get dry. The tear film stability decreases, eyes get itchy & red. Concentrating at a short working distance also tends to cause varying degrees of ciliary spasm. This further increases the eye strain & causes pain in & around the eyes.

Improper sitting position during work with bending forwards to get clear screen images, aggravates the problems of headache, neck pain & backache.

Various factors in the working environment also are responsible for the increased frequency of cases of CVS today.

- Inadequate lighting in the room
- Improper angulation of the monitor screen
- Dust on the screen, causes more glare
- Increased air conditioning/ direct air blowing from fan
- Decreased hydration: Busy working hours leads to decreased drinking of water, that increases dry eye.
Symptoms

Symptoms range from mild discomfort to severe headaches. They can be divided as:

External - Caused by manually holding open the eyelids. Blinks interfere with acquiring visual information while reading & are thus reduced during use of computers. This leads to,

- Tired, dry eyes
- Watering
- Burning sensation
- Redness, itching

Internal - Induced by accommodation & convergence

- Frequent styes
- Pain in & around the eyes
- Headache
- Neck pain
- Twitching around the eye (Myokymia)

Examination

History: Ask for any history of use of glasses

- Occupation history,
- Duration of work
- Illumination in the work place

Local Examination

- Check lids, tear film
- Corneal clarity: Any corneal opacity can increase the glare from computer monitors.
- Refraction: It is important to do a cycloplegic refraction in all these cases.
- Fundus examination.

Prevention:

Correction of refractive errors:

Special attention should be paid to small degrees of astigmatism & hyperopia, if the patient is symptomatic.

Frequent blinking:

This keeps the tear film level & helps prevent dryness. Adequate tears will decrease the occurrence of burning & itching.

In Computer Vision Syndrome

- Maintain a good posture
- Keep the screen at an angle of 20 degrees
- Avoid direct light falling on the screen
- Clean the monitor of dust
- Take short breaks at regular intervals
- Use antiglare protector for screen or eyes as is comfortable

20-20-20 RULE: This is a simple way of remembering when to give rest to your eyes & how.

This can be applied to all professions involved in prolonged near work.

Every 20 minutes take a break for 20 seconds & shift your focus from the screen to objects that are at a distance of 20 feet or more or give a slight massage to the eyes.

Treatment

1. Corrective spectacles
2. Eye lubrication: Frequent use of tear substitutes is advised.
3. Anti reflective coating over screens/glasses.
4. Eye exercises: There are a variety of eye exercises that relieve the eye strain.
   a) Palming: Warm palms & then cup them over closed eyes, fingers overlapping at forehead, for 2 minutes
   b) Near-far focus: Keep thumb or pencil 15 cm from the nose. Focus on tip of the pencil for some time then change the focus to an object 3 meters away. Repeat 10-20 times.
   c) Close eyes tightly for few seconds in between work.
   d) Massage: Circular motions over the eyes with gentle pressure for few minutes with tip of ring finger, especially after use of lubricants, gives great relaxation to the eyes.

5. Medications:

Herbal:

There are a few herbal topical drops that are supposed to be helpful in decreasing asthenopia. They contain extracts of tulasi, neem, pudina, bhringraj, dhatriphala etc.

Astaxanthin:

This is a carotenoid that is 10 times more potent than beta-carotenoids & 500 times more than vitamin E.

Studies reveal that 5-6 mg of astaxanthin per day for one month, decreases symptoms of eye fatigue by 54%.

Astaxanthin is also helpful in macular degenerations.
It also helps build immunity.

**Black current seed oil:**

They come as 500mg gels.

Each contains 17% gammalinolenic acid & 10 iu of tocopherol.

2-4gels per day in divided doses is recommended for asthenopia management.

These drugs have not been US FDA approved.

**Conclusion**

Asthenopia is a very common condition we come across in everyday practice, but most go undiagnosed or inadequately treated.

The obvious refractive errors are always taken care of, but the counseling required in these cases, are not adequately given to the patients.

A few tips about supplementation of carotenoids in the diet & eye exercises with few changes in the working conditions, will go a long way to relieve the patient of tired eyes.

**References**


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