Convergence Insufficiency

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convergence Insufficiency?

Inability to obtain and/or maintain adequate binocular convergence for any length of time

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It is the most common cause of ocular asthenopia.

Unit of measurement

Clinical measurement – Prism Diopter

The amount of convergence is calculated by using

the formula: 1/d × IPD

Where **d** is the distance and

IPD is interpupillary distance.

Thus, a 6-cm IPD requires 6 dioptres of convergence for a fixation distance of 1 m.

Aetiology

Primary or idiopathic

Refractive errors:

High hyperopes (>5D) usually make no effort to accommodate and there is deficient accommodative convergence.

Myopes may not need accommodation and thus lack accommodative convergence.

- Full convex spherical correction
- Presbyopia
- Muscle imbalances
- Consecutive convergence insufficiency
- Other factors: Wide IPD, Delayed or inadequate functional development, general debility, overwork.

Clinical Features

Exophoria greater at near than at distance(N>D)

More in desk workers.

Asthenopia

Not satisfied with glasses.

Intermittent crossed diplopia

A receded near point of convergence

Reduced positive fusional vergence at near

Low AC/A ratio

Little or no lag of accommodation

Blurred vision and crowding of words while reading

If untreated, in some cases, can lead to an outward eye turn that comes and goes**intermittent exotropia**

Diagnosis

Near point convergence > 10 cm.

Difficulty in attaining 30 degree of convergence on synoptophore.

Prism convergence is low but prism divergence is normal.

Rule out combined accommodation insufficiency and convergence insufficiency.

Differential diagnosis

Convergence paralysis:

- Total lack of ability to overcome any amount of base out prism.
- A Convergence impulse will lead to pupillary constriction but no convergence as compared to pupillary constriction along with convergence to some extent and later pupillary dilatation when convergence can no longer be maintained.

Accommodation effort syndrome:

- Esophoria at near
- 3D test: convergence insufficiency is helped whereas accommodative effort syndrome will break into a tropia.
- Convex lenses worsen convergence insufficiency whereas it helps accommodative effort syndrome.

Treatment

Excellent prognosis.

Children: Treat when fusional vergence is poor and showing signs of exotropia.

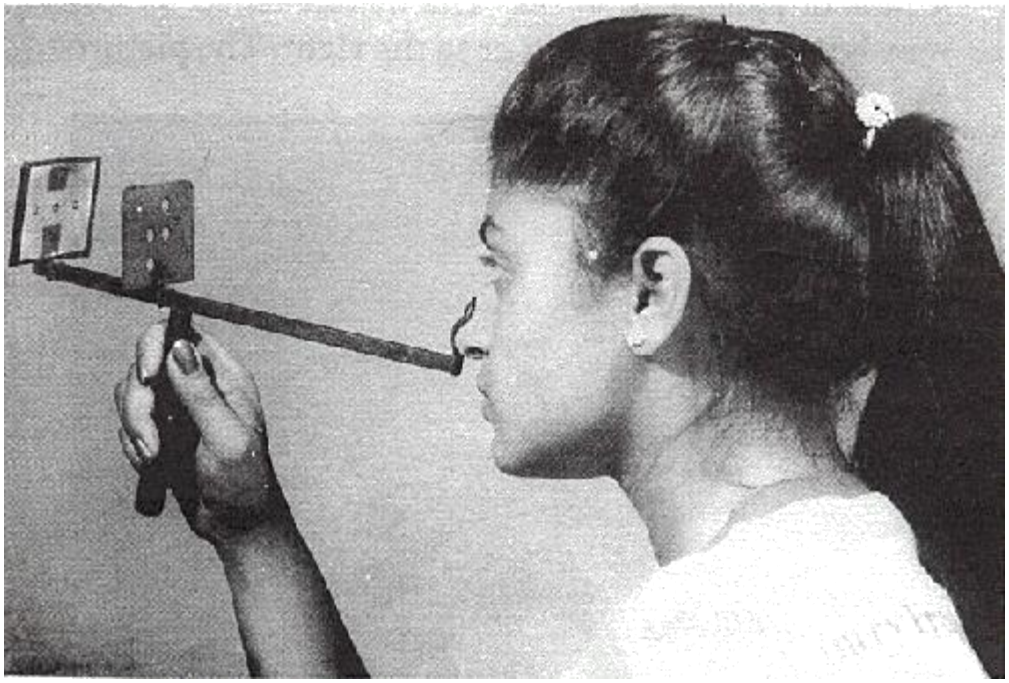
Adults: Treat when symptomatic.

Optical treatment:

- Myopics should be given FULL correction.
- Hypermetropics should be given UNDERcorrection.

Orthoptic treatment:

- Exercises to improve near point convergence.
  - Advancement exercise
  - Jump convergence exercise
- Exercises to increase amplitude of fusional convergence.
  - Convergence exercise with prisms
  - Exercise using Synaptophore
  - Convergence card
  - Physiologic Diplopia exercise using stereogram
  - Exercise using diploscope



Voluntary convergence training

- Proper understanding of procedure and cooperation is needed.
- Explain physiological diplopia
- Maintain physiological diplopia for as long as possible and bring in the finger as soon as diplopia is lost.

Three approaches

Relieving symptoms

Base in prism

Plus reading glasses

Divergence exercises

Improving convergence

Brock string

Aperture rule trainer

Pencil push ups

Increase amplitude of fusional convergence

Synoptophore

Exercise

Physiological diplopia exercise using stereogram

Diploscope

Training of voluntary convergence

Prism therapy:

Base –in prism reading glasses or bifocals with prism in the lower segment are useful as relieving prism

Relieving prisms and bifocals should be prescribed cautiously in young age

Surgical treatment

As a last resort, when all other measures fail.

When it is associated with large exophoria at near.

Medial muscle resection can be performed in one or both eyes.