

## **Childhood Esotropia**

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The exact cause of strabismus is unknown in most cases. Hereditary influence is certain.

Mostly, the extra-ocular muscles and the eye itself are perfectly normal. Cause of the strabismus is located in unidentified higher centers in the CNS.

### **The childhood esotropia falls in two main groups.**

[A] Essential Infantile Esotropia

[B] Accommodative Esotropia

Both have their subgroups

### **[A] Essential Infantile Esotropia [EIE]**

This term refers to esotropes in infants under 6 month.

Besides EIE there are others which may be seen in infants at this age and have to be differentiated from the true EIE.

#### *Essential Infantile Esotropia Characteristics*

Seen within a few months of life, has alternate esodeviation

Refraction average for age Amblyopia uncommon.

Good vision in both Eyes.

Limitation of Abduction with cross fixation.

Inferior oblique and superior Rectus over action common

#### *Differential diagnosis*

[i] Nystagmus blocking syndrome:-Nystagmus, a Null Zone with wide Esotropia and

Frequent Amblyopia.

Which is rare EIE

D-D-Early on set Accommodative Esotropia and EIE

[ii] The point of differentiation are presence of High Hypermetropia and a high AC:A ratio ( More convergence for near vision than for distant vision.)

[iii] Duane Retraction Syndrome

Uncommon strabismus produced due to congenital absence of 6th. Cr. Nerve and the Abducent Nuclei. . narrowing of the palpebral aperture and retraction of the globe present in Duane Not seen in EIE

## **[B] Accommodative Esotropia**

Normal relationship between accommodation and convergence develops between 18 to 36 months age.

A Normal relationship is invariably missing in Accommodative Esotropia  
Dissociation of A and C

*Capacity to dissociate accommodation and convergence within limits is crucial for a normal binocular stereoscopic vision.*

**In Plus One Dioptre Error**

At 1 meter the eyes converge 1. meter angle but accommodates 2. diopters to see it clearly. The child may continue to make such adjustment until a severe illness, fear or fatigue precipitates Esotropia

*Not all Hypermetropes* - not all children with hypermetropia develop accommodative esotropia .As hypermetropia increases, chances of strabismus and amblyopia also increases..

*AC/A ratio*

Relation between accommodation and convergence expressed as  
Accommodative convergence [AC] Accommodation expressed [as A] - AC/A is variable .Generally accepted to be 3 to 1

*High AC:A Ratio*

When a unit of accommodation produces more convergence than the average ratio. This may lead to esotropia which is more for near than for distance even with full refractive correction

## **Three Types of Accommodative Esotropia**

**[i] Full Accommodative Esotropia:-**

That Esotropia which is fully corrected by an accurate and complete hypermetropic correction .

**[ii] High AC:A ratio Esotropia \_**

That Esotropia which has a definite greater convergence for near than for distance

**[iii] Partially accommodative esotropia**

Even full hypermetropic correction reduces the angle of deviation but does not eliminate it. These children are initially fully accommodative, but breakdown of motor fusion produce secondary changes.

## **Principles of Management of Childhood Strabismus**

*Three steps*

[a] Refractive error correction

[b] Amblyopia management

[c] surgery

### **[a] Refractive Error**

Refractive error in children is best corrected under the effects of Atropine ointment Thrice a day for 3 days prior to retinoscopy...

### **[b] Amblyopia.**

The cause of Amblyopia is cortical suppression .Unilateral strabismus under the age of 5 yrs invariably develop Amblyopia of the deviating eye. Small angle strabismus are more likely to initiate Amblyopia  
Refractive correction of the Amblyopic eye and Occlusion of the fixing eye is the most effective way to counter Amblyopia.

*Total occlusions* is the most effective but the child must be seen weekly or else the occluded eye may turn Amblyopic.

*Alternate occlusion*, few hours occlusion and penalization by drug are all tried .What ever method is working must be continued till vision equalizes. This may mean up to the age of 8 yrs or so.

### **[c] Surgical management of Childhood Esotropia**

#### **Caution!**

*Incidence of scleral perforation*, a sight threatening complication has been reported to be at least 3% of strabismus procedure (Morris et el 1990).

#### **Medial rectus recession**

Recession of 1 mm produces 3.5 to 4 Prism 1.75 to 2 degree correction .En block technique of Halve stone provided a little more correction . (About 5 Prism/mm in my hands). Extent of recession of M.R is important .

M. R. Recession

Usually 5.5 to 6 mm from the point of insertion or 11 to 11.5 mm from the corneal limbus is receded.

#### **Lateral Rectus**

lateral rectus resection is not very productive but 1 to 1.5 Prism correction per mm is possible .The muscle could be safely resected as much as 12 mm providing 6 to 6.5 degrees of correction.

#### **Inferior oblique weakening procedure**

Is in four grades according to the extent of over action to be corrected. Many surgeons follow one mode of surgery what ever is the grade of deviation

### **[A]Management of Essential Infantile Esotropia**

Essentially surgery on Horizontal muscles Inf. Oblique and superior rectus .Surgery taken in two sittings.

For Divergent Vertical Deviation the superior rectus is weakened by receding 10-12 mm..

## **[B] Management of Accommodative Esotropia**

When surgery is required main muscles to be treated are the four Horizontal recti. Their correction values per mm are same as described earlier

## **Management of Fully Accommodative Esotropia**

Refractive Error -

Meticulous correction of both spherical and cylindrical errors is all that is required .

*Any error above +2.D should be corrected*

Full prescription in younger children, should strictly be adhered to till a stable good binocular single vision has been established usually till the age of 8 yrs.

## **MANAGEMENT OF ESOTROPIA WITH HIGH AC:A RATIO**

[A] Optical

[B] Pharmacological

[C] Surgical

[A] **Optical** with distant correction near correction of about +2.5 eliminates need for accommodation (and hence the drive to converge) while reading Bifocals for children will fail unless the bifocal line transects the pupil, as occurs in "executive-style" bifocals.

[B]. **Pharmacological** Management: of High AC/A

Has a restricted role of dissociating convergence and accommodation

Phospholin Iodide and Pilocarpine drops are used with aim some times

[C] **Surgical** Management of High AC/A Esotropia

Recession of each medial rectus muscle is the most commonly performed surgical procedure. Lateral rectus resection could augment the result where needed

## **Management of Partially Accommodative Esotropia**

Include amblyopia therapy, Refractive error correction as well as surgery

## **Prognosis of Childhood Esotropia**

Fully Accommodative Esotropes have good prognosis when attended to early and with careful refractive correction

## **Prognosis in High AC/A**

In high AC/A esotropes, the outlook is good following Near correction with surgical treatment. Children , straight for distance have better prognosis for developing good- quality stereopsis.

## **Prognosis in partially accommodates**

Partially accommodative Esotropes have poor chances of gaining Binocular vision. Cosmetic correction is usually the aim.