

Concomitant esotropia

A manifest convergent misalignment of the eye(s) in which the measured angle of esodeviation is nearly constant in all fields of gaze at distance fixation. It may be 1° , 2° (most commonly due to poor vision), or consecutive (after surgery for an exodeviation).

1° esotropias are classified as accommodative or non-accommodative.

As with all strabismus, the assessment should include refraction, full ophthalmic examination, and if appropriate addressing of amblyopic risk (consider age). It is essential to detect/ rule out underlying pathology (e.g. intraocular tumour or cataract).

Accommodative esotropia

Accommodation and convergence are neurologically linked. The AC:A ratio is a measure of accommodative convergence per unit of accommodation and varies between individuals. Young, uncorrected hypermetropes accommodate to see clearly but may develop esotropia through convergent drive, particularly at near if they have a high AC:A ratio.

Accommodative esotropia usually presents between 1 and 5y of age. It may be refractive or non-refractive. If there is a refractive element, spectacles improve alignment.

The non-refractive group often have an abnormally high AC:A ratio. There may, however, be overlap between these groups.

Refractive: fully accommodative esotropia

Esotropia fully corrected for distance and near by hypermetropic (usually +2 to +7D) correction; normal AC:A ratio; normal BSV if corrected; often intermittent initially (e.g. with fatigue, illness).

Treatment

Full hypermetropic correction; allow time for spectacle adaptation (the period over which vision improves in an amblyopic eye after onset of refractive correction, usually about 12wk); treat any associated amblyopia.

Refractive: partially accommodative esotropia

Esotropia only partially corrected by full hypermetropic correction; BSV absent or limited with ARC; +/- bilateral IO overaction.

Treatment

Full hypermetropic correction; treat amblyopia; consider surgery if potential for BSV or for cosmesis (if cosmetically unacceptable despite glasses).

Non-refractive: convergence excess esotropia

Esotropia for near due to high AC:A ratio; ortho-/ esophoric for distance; Low BSV for near, normal BSV for distance; usually hypermetropic.

Treatment

Treat any associated hypermetropia or amblyopia; consider orthoptic exercises,

executive bifocal glasses, surgery (bilateral MR recession and/ or posterior fixation sutures), or miotics.

Non- accommodative esotropia

The commonest esotropia is non-accommodative 'infantile esotropia' (congenital esotropia). Other non-accommodative esotropias usually present later, i.e. after 6mo of age.

Infantile esotropia

Esotropia presenting before 6mo, large angle ($>30\Delta$), alternating fixation (so low risk of amblyopia), and poor BSV potential. The following features often indicate congenital or infantile failure of binocularity development (but are not exclusively seen in infantile esotropia):

- *DVD (dissociated vertical deviation)*: an incomitant tendency for an occluded eye to elevate and extort, which resolves on uncovering.
- *LN (latent nystagmus)*: a horizontal, conjugate jerk nystagmus apparent upon occluding one eye, with fast phase away from covered eye (ACE)
- *IOOA (inferior oblique overaction)*: a hyperdeviation in adduction, greatest in the field of the IO.

Treatment

- Treat any associated amblyopia (e.g. occlusion of better eye, if not freely alternating); correct hypermetropia if $>2D$. Surgery aims for ocular alignment. Timing of surgery for infantile esotropia is a common dilemma. There are arguments for and against early surgery (≤ 12 mo or younger, definitions vary), as follows:

• For:

- increase chance of BSV.
- Reduced DVD and IOOA.
- Improved chance of lasting alignment.
- Proceeding without stable Prim Cover Test (pct) does not affect outcome.

• Against:

- Less accurate preoperative measurements (PCT).
- increase risk of GA.
- BSV from early Sx is poor quality, clinically/ functionally not important.
- BSV can be achieved even after late surgery.
- The timing of surgery is informed by customized prioritization of objectives after discussion with parents; binocularity, cosmesis, GA safety, etc.
- 1° or 2° surgery for significant IOOA may be required or surgical treatment of DVD.

Other non- accommodative esotropias

- **Basic esotropia**: constant esotropia for near and distance after 6th m ; treat surgically.

- **Near esotropia (non- accommodative convergence excess):** esotropia for near, ortho-/ esophoria for distance but with normal AC:A ratio. *Treatment*, if any, is surgical ($MR > LR$).
- **Distance esotropia (divergence insufficiency):** esophoria (or small esotropia) for near, larger esotropia for distance; associated with poor fusional divergence. NB Exclude bilateral 6th n palsies. Treat with orthoptic exercises initially.
- **Cyclic esotropia— rare, periodic** (e.g. *alternate days*): may proceed to constant esotropia.
- **Nystagmus blockage syndrome and Cianca syndrome:** have considerable overlap and are used to describe large angle infantile onset esotropia, nystagmus increasing on abduction, head turn towards the fixing eye.

Secondary esotropias

Esotropia may arise 2° to decrease VA, and thus full ocular examination is vital in all cases. Some esotropic syndromes may arise 2° to intracranial pathology.

- **Sensory deprivation:** 2° to unilateral/ bilateral decrease VA.
- **Divergence paralysis:** 2° to tumor, trauma, or stroke. Unlike a bilateral 6th n palsy, the esodeviation remains constant or even decreases on lateral gaze.
- **Convergence spasm:** usually intermittent and associated with blurred vision (pseudomyopia due to associated accommodation) and pupillary miosis. If encouraged, ductions (in the absence of miosis) will be normal. In children, upper midbrain pathology must be excluded; however, this condition is often non-organic in origin. Attempt treatment with cycloplegia.