

Accommodative esotropia

Near vision involves both accommodation and convergence.

Accommodation is the process by which the eye focuses on a near target, by altering the curvature of the crystalline lens. Simultaneously, the eyes converge, in order to fixate bifoveally on the target. Both accommodation and convergence are quantitatively related to the proximity of the target and have a fairly constant relationship to each other (AC/A ratio) as described previously.

Abnormalities of the AC/A ratio are an important cause of certain types of esotropia.

Refractive accommodative esotropia

In this type of accommodative esotropia, the AC/A ratio is normal and esotropia is a physiological response to excessive hypermetropia, usually between +2.00 and +7.00 D. The considerable degree of accommodation required to focus clearly on even a distant target is accompanied by a proportionate amount of convergence, which is beyond the patient's fusional divergence amplitude. It cannot therefore be controlled and a manifest convergent squint results. The magnitude of the deviation varies little (usually $<10 \Delta$) between distance and near. The deviation typically presents at the age of 18 months to 3 years (range 6 months to 7 years).

- **Fully accommodative esotropia** is characterized by hypermetropia with esotropia when the refractive error is uncorrected. The deviation is eliminated and BSV is present at all distances following optical correction of hypermetropia . This may occasionally be seen in a baby .
- **Partially accommodative esotropia** is reduced but not eliminated by full correction of hypermetropia .

Amblyopia is frequent as well as bilateral congenital superior oblique weakness. Most cases show suppression of the squinting eye although ARC may occur, but of lower grade than in microtropia.

Non-refractive accommodative esotropia

In this type of accommodative esotropia the AC/A ratio is high so that a unit increase of accommodation is accompanied by a disproportionately large

increase in convergence. This occurs independently of refractive error, although hypermetropia frequently coexists. Subtypes are :

- **Convergence excess**

- High AC/A ratio due to increased accommodative convergence (accommodation is normal, convergence is increased).
- Normal near point of accommodation.
- Straight eyes with BSV for distance .
- Esotropia for near, usually with suppression .
- Straight eyes through bifocals .

- **Hypoaccommodative convergence excess**

- High AC/A ratio due to decreased accommodation (accommodation is weak, necessitating increased effort, which produces over-convergence).
- Remote near point of accommodation.
- Straight eyes with BSV for distance.
- Esotropia for near, usually with suppression.

Treatment

- **Correction of refractive error is the initial treatment.**

- In children under the age of 6 years, the full cycloplegic hypermetropic refraction should be prescribed, In the child with fully accommodative refractive esotropia this will control the deviation for both near and distance.
- After the age of 8 years, refraction should be performed without cycloplegia and the maximal amount of ‘plus’ that can be tolerated (manifest hypermetropia) prescribed.
- For convergence excess esotropia bifocals may be prescribed to relieve accommodation (and thereby accommodative convergence), The minimum ‘add’ required is prescribed.
- The most satisfactory form of bifocals is the executive type in which the intersection crosses the lower border of the pupil. The strength of the lower segment should be gradually reduced and eliminated by the early teenage years.

- Bifocals are also used in hypoaccommodative esotropia where the AC/A ratio is not overly excessive and there is a reasonable chance of discarding bifocal correction with time.
- At higher levels surgery is the better long-term option. The ultimate prognosis for complete withdrawal of spectacles is related to the magnitude of the AC/A ratio and to the degree of hypermetropia and associated astigmatism. Spectacles may be needed only for close work.
- **Surgery** is aimed at restoring or improving BSV, or at improving the appearance of the squint and so the child's social functioning. It should be considered only if spectacles do not fully correct the deviation and after every attempt has been made to treat amblyopia.
- Bilateral medial rectus recessions are performed in patients in whom the deviation for near is greater than that for distance.
- If there is no significant difference between distance and near measurements and equal vision in both eyes, some perform unilateral medial rectus recession combined with lateral rectus resection, whereas others prefer bilateral medial rectus recessions.
- In patients with residual amblyopia, surgery is usually performed on the amblyopic eye.
- In partially accommodative esotropia, surgery to improve appearance is best delayed until requested by the child. This avoids early consecutive exotropia. It should aim to correct only the residual squint present with glasses.
- The usual first procedure for convergence excess esotropia is recession of both medial rectus muscles. This relies on fusion to prevent a distance exotropia; a few patients become divergent after surgery and need a further procedure.