DISTANCE ESO-DEVIATION OR VERGENCE INSUFFICIENCY

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Training and experience make us think of eso-deviations as either partly or completely refractive in origin due to hypermetropia or an abnormal AC/A ratio. This is particularly so in children where nearly all eso-deviations are larger for near. An eso-deviation which is greater for distance or only present for distance seems a contradiction, so if we find one we at first think we have made a mistake.

However, it is now usually conceded that distance eso-deviations do exist and they are included in the classifications of squint. So we find divergence insufficiency along with divergence excess, convergence excess and convergence insufficiency. This makes for a tidy classification even if there seems a lack of conviction in most of the texts. Furthermore, these distance eso-deviations are not simply divergence insufficiencies.

Clinical Features

The typical picture is of a latent or manifest eso-deviation which is present for distance viewing. As the eyes converge to follow an object which is brought closer to the patient, a point is reached where there is no deviation at all, and this may be called the neutral point or crossing distance. At distances closer than this, there is an exo-deviation and in some patients this is accompanied by an obvious convergence weakness. A crossing distance may be found by moving a light towards the patient with a Maddox Rod in front of one eye.

The crossing distance is influenced by accommodation and in young patients, it is closer to the patient when an effort of accommodation is made, but in elderly patients, accommodation had little effect probably because of presbyopia. Also, in young patients, the crossing distance is much closer than in elderly - in the 0-10 age group it is about 20cm., in 31-40, about 30cm. and in 61-70, it is about 55cm.

The distance deviation also changes if the patient focuses distance optotypes when wearing full spectacle correction. In a few patients, the eso-deviation increases but in more, there is a small decrease in the eso-deviation, an 'exo-movement' which suggests a visually determined focusing mechanism.

In some patients, a small vertical deviation is present as well as the horizontal deviation.

The condition is not associated with any particular refractive error; most patients are emmetropic, but both hypermetropia and myopia may occur. Patients with some degree of anisometropic amblyopia often have a distance eso-deviation.

Incidence

The condition occurs in patients of all ages and both sexes from infancy to old age. Phorias are commoner than tropias.

Many infants present with an esotropia which seems to be due to hypermetropia and is controlled by glasses without operation. Later in life, some of these children show a typical distance eso-deviation, suggesting that this is the basic deviation which is masked in early life by an overlying accommodative element which disappears as the child grows older. Elderly patients commonly present with diplopia of sudden onset due to distance eso-deviation. Presumably the diplopia is caused by breakdown of a compensatory mechanism.

Symptoms

At all ages, distance eso-deviation is a basic oculomotor imbalance, probably due to a lag of the vergence mechanism. The patient has a long-standing adjustment to this disorder and symptoms are subtle unless this adjustment breaks down. Even so, small deviations can cause quite worrying symptoms.

Diplopia itself is not always present. Typically, it is not present for near and usually occurs only for a fairly long distance. It is often present only intermittently, is more common in elderly than in young patients and may be precipitated by illness, injury or emotional upset.

In younger patients, there is discomfort for distance vision with blurring or a difficulty in focusing, especially on moving objects. Activity involving continuous re-focusing of the eyes is especially difficult e.g. driving a car or working from a blackboard. Ball games are a problem to these children, especially if a change in direction is involved and the ball is small.

Parental despair is made worse because these children, when reading, hold the book at their neutral point for comfort. As this is often very close, they are thought to be myopic, which is seldom the case.

At all ages photophobia is almost universal in these patients; perhaps glare increases the difficulty in focusing.

Management

If a distance eso-deviation needs surgery, resection of the lateral rectus seems the surgical procedure of choice. If a recession of the medial rectus is also performed, it should be small.

In children with esotropia, if convergence cannot be maintained right up to the nose, then bilateral recession of the medial recti may cause gross weakness of convergence post-operatively.

If diplopia is present, then base-out prisms may give relief, correcting half to two-thirds of the deviation. They are not as effective in young patients because these patients continually change focus from distance to near, but after the onset of presbyopia, there is less of a problem. Correction of any small vertical deviation with a prism also helps.

Correction of any refractive error is usually helpful and in children, successful treatment of any amblyopia usually lessens the eso-deviation.

Convergence exercises will improve the convergence weakness common in the condition and usually improve the whole condition as well. Orthoptists should be able to devise some good convergence/divergence exercises.

Comment

Distance eso-deviation is the cause of many cases of diplopia which cannot otherwise be explained. In particular, the onset of horizontal diplopia for distance in an elderly patient is not necessarily due to a palsy of the divergence centre, if such a centre exists, nor is it always due to bilateral palsy of the lateral recti muscles. It is more likely due to the breakdown of an old distance eso-deviation.

The existence of distance eso-deviation strongly suggests that divergence is an active and not a passive function. It further suggests that convergence and divergence are complex, closely related functions, or rather, part of one vergence function mediated at mid-brain level, but under cortical control. A visual input drives this vergence mechanism and if one eye is amblyopic, or if binocular function is weak, a lag in the vergence mechanism is likely. A vergence insufficiency may also develop because of dis-function at another level.

Summary

The condition of distance eso-deviation is described. This is characterised by an eso-deviation which is present only for distance or is greater for distance than for near viewing. There is also a crossing distance or neutral point close to the patient where the deviation disappears and closer than this there is an exo-deviation. In many patients, there is also a convergence weakness. The condition occurs at all ages, phorias being more common than tropias. Management may need correction of refractive error, base-out prisms or surgery.

The condition seems due to a vergence insufficiency, not just a weakness of divergence.