

## **Amblyopia**

Amblyopia is the unilateral, or rarely bilateral, decrease in best corrected visual acuity (VA) caused by form vision deprivation and/or abnormal binocular interaction, for which there is no identifiable pathology of the eye or visual pathway.

### **Classification**

- **Strabismic** amblyopia results from abnormal binocular interaction where there is continued monocular suppression of the deviating eye.
- **Anisometropic** amblyopia is caused by a difference in refractive error between the eyes and may result from a difference of as little as 1 dioptre. The more ametropic eye receives a blurred image, in a mild form of visual deprivation. It is frequently associated with microstrabismus and may co-exist with strabismic amblyopia.
- **Stimulus deprivation** amblyopia results from vision deprivation. It may be unilateral or bilateral and is typically caused by opacities in the media (e.g. cataract: ) or ptosis that covers the pupil.
- **Bilateral ametropic** amblyopia results from high symmetrical refractive errors, usually hypermetropia.
- **Meridional** amblyopia results from image blur in one meridian. It can be unilateral or bilateral and is caused by uncorrected astigmatism (usually  $>1$  D) persisting beyond the period of emmetropization in early childhood.

### **Diagnosis**

In the absence of an organic lesion, a difference in best corrected VA of two Snellen lines or more (or  $>1$  log unit) is indicative of amblyopia. VA in amblyopia is usually better when reading single letters than letters in a row. This 'crowding' phenomenon occurs to a certain extent in normal individuals but is more marked in amblyopes and must be taken into account when testing preverbal children.

### **Treatment**

It is essential to examine the fundi to diagnose any visible organic disease prior to commencing treatment for amblyopia. Organic disease and amblyopia may co-exist and a trial of patching may still be indicated in the presence of organic disease. If acuity does not respond to treatment, investigations such as electrophysiology or imaging should be reconsidered. The sensitive period during which acuity of an amblyopic eye can be improved is usually up to 7–8 years in strabismic amblyopia and may be longer (into the teens) for anisometropic amblyopia where good binocular function is present.

- **Occlusion** of the normal eye, to encourage use of the amblyopic eye, is the most effective treatment. The regimen, fulltime or part-time, depends on the age of the patient and the density of amblyopia.

- The younger the patient, the more rapid the likely improvement but the greater the risk of inducing amblyopia in the normal eye. It is therefore very important to monitor VA regularly in both eyes during treatment.
- The better the VA at the start of occlusion, the shorter the duration required, although there is wide variation between patients.
- If there has been no improvement after 6 months of effective occlusion, further treatment is unlikely to be fruitful.
- Poor compliance is the single greatest barrier to improvement and must be monitored.
- **Penalization**, in which vision in the normal eye is blurred with atropine, is an alternative method. It may work best in the treatment of mild–moderate amblyopia (6/24 or better), especially when due to anisometropic hypermetropia. Patch occlusion is likely to produce a quicker response than atropine, which has conventionally been reserved for use when compliance with patch occlusion is poor. It also creates less of a psychosocial problem than patching, especially in the school-going child.

### ***New technologies***

Therapies involving video games are characterized by higher compliance, avoiding dissociation and optimizing binocularity. They offer promise.