binocular vision.[135] Fresnel plastic prisms may also be used for preoperative prismatic adaptation to establish the full angle on which to base extraocular muscle surgery.[118] The Prism Adaptation Study investigated the role of preoperative membrane (Fresnel) prisms to determine the maximum angle of the strabismus for surgical planning and to estimate fusional potential. Rates of surgical success, defined as a horizontal deviation of 8 prism diopters or less (measured with the simultaneous prism and cover test at distance fixation), were highest (90%) among those participants who responded to prisms (i.e., showed evidence of sensory fusion) and underwent extraocular muscle surgery for the adapted (larger) angle of esotropia.[117, 118] However, because prism-adapted patients received greater amounts of surgery on average, it is possible that increasing surgical dosage for patients with potential for fusion without prism adaptation would have produced similar results. Fresnel prisms can cause blurred vision that some children find objectionable, which can cause poor compliance with eyeglasses. In addition, Fresnel prism use requires re-evaluation (additional office visits), and it may be unacceptable to children not otherwise wearing eyeglasses. For these reasons, prism adaptation is used selectively.

Amblyopia Treatment

Amblyopia treatment is typically initiated before surgical treatment of strabismus. The esotropia may increase or decrease with the treatment of amblyopia[126] (see Amblyopia PPP[23]). Surgical treatment of esotropia in the presence of moderate to severe amblyopia has a lower success rate than in the presence of mild or no amblyopia.[110]

Extraocular Muscle Surgery

Children with esotropia should undergo surgical correction if eyeglasses and amblyopia management are insufficient to align the eyes,[119] and strabismus surgery should be performed only when more conservative methods have failed or are unlikely to be of benefit. Surgery is rarely justified if the primary objective is to eliminate eyeglasses. Except for acquired symptomatic deviations, small-angle deviations of less than 12 prism diopters at distance or near are not usually considered for surgery.

Although some binocular vision and stereopsis can be restored after surgical alignment in many patients with infantile esotropia,[76, 136] achieving high-grade stereopsis is rare.[74, 75, 77] In contrast, the quality of stereopsis appears to be improved by prompt surgical realignment in patients with decompensated nonaccommdative or partially accommodative esotropia.[75, 119, 137]

Most patients with infantile esotropia receive surgical intervention during childhood. One study reported that esotropia is most likely to recur during the first year after surgery, but the risk of developing a consecutive exotropia steadily increases for at least 10 years.[138] Achieving binocular alignment early in life (before age 2 years) to within 10 prism diopters of orthotropia increases the likelihood of achieving binocularity[74, 75, 111-113] and may decrease the risk for the development of dissociated vertical deviation.[139]

Whether or not there is surgical realignment of infantile esotropia, many affected children subsequently develop other motility problems, such as latent nystagmus, dissociated strabismus, and inferior oblique muscle overaction.[140, 141] The presence of amblyopia[110] or nystagmus[142] is associated with an increased rate of requiring reoperation. In one study, infantile esotropia recurred postoperatively on an accommodative basis in 50% of patients and correlated with the magnitude of the hyperopia.[79]

Extraocular muscle surgery is usually performed for the maximum distance angle of deviation when the individual is wearing full hyperopic correction; however, some surgeons use the maximum near deviation. For patients with a distance-near disparity (high AC/A ratio [i.e., 10 prism diopters or greater[129]]), bilateral medial rectus recession usually reduces the AC/A ratio,[143] decreasing the need for bifocals by reducing the esodeviation at near fixation.[130] The higher the preoperative AC/A ratio, the greater the chance for postoperative normalization (i.e., restoring a more normal pattern of accommodative vergence)[129] and improving binocularity.[130] Prism adaptation for the near angle,[144] augmentation of the recession over amounts done with a normal AC/A ratio,[145] or posterior