AMERICAN ACADEMY OF OPHTHALMOLOGY
The Eye M.D. Association

POLICY STATEMENT

Adult Strabismus Surgery

A Joint Statement of the American Association for Pediatric Ophthalmology and Strabismus and the American Academy of Ophthalmology

POLICY:
Strabismus is an abnormal condition. Adult strabismus surgery seeks to restore/reconstruct normal ocular alignment. Indications for surgical intervention in adult strabismus include:

1. **Diplopia**. Diplopia, which is the perception of the same image in two different visual directions, is debilitating. It causes a reduction of reading, driving, and vocational skills. Diplopia occurs when an adult has strabismus related to a medical or neurological condition, such as diabetes,[1] thyroid/Graves' disease,[2, 3] myasthenia gravis, brain tumor, head trauma, or stroke.[4, 5]

   Diplopia can develop in the adult who has had childhood strabismus. In children, misalignment is associated with suppression, in which an area of the visual field of the deviating eye is not recognized by the brain. This prevents diplopia in stable childhood-onset strabismus.[6] However, after the visual system has matured, the brain can no longer develop suppression. If the direction or amount of the misalignment changes, diplopia results.

   Restoration of ocular alignment often relieves diplopia, thereby allowing the patient to resume normal visually directed activities at home and at work.[1, 7, 20]

2. **Visual Confusion**. Visual confusion, the perception of two different images superimposed onto the same space, is also a symptom of ocular misalignment. This symptom can result from newly acquired strabismus or from change in the angle of strabismus in adults who had childhood strabismus.[8] Visual confusion is particularly debilitating when driving. The affected individual may describe a car "crossing over the center line and coming straight at me." Surgical correction or reduction of the ocular deviation will usually relieve visual confusion.

3. **Restoration of Binocular Vision**. If the eyes are not aligned, there is loss of binocular vision or fusion that lets us appreciate depth in three-dimensional space. Binocular vision can be restored by strabismus surgery. Even adults who had childhood strabismus can regain fusion following strabismus surgery.[1, 7, 9, 20]

4. **Intolerance of Prism Glasses or Patch**. A small degree of ocular misalignment may be treated with prism glasses. Prism glasses may relieve diplopia and visual confusion while restoring normal depth perception. This benefit occurs only while the prism glasses are being worn. Prism glasses compensate for but do not "cure" strabismus.

   If the size of the deviation is large, prism glasses are optically distorting and generally ill-supported by the patient and thus become impractical. Also, if the amount of ocular misalignment changes in different gazes (incomitant strabismus), prisms will not correct diplopia in those gazes because the degree of prismatic correction does not change when the eyes move. Most adult strabismus is incomitant, [7] and therefore not usually amenable to treatment with prism glasses.

Patching can relieve diplopia by blocking out the vision in one eye. However, this approach precludes all binocular function and limits peripheral field. Use of a patch is usually a temporizing measure until spontaneous resolution or definitive treatment (i.e., surgery) occurs.

5. **Restoration of Visual Field**. Peripheral vision is recognized as an important prerequisite for highway safety and other daily activities. Loss of visual field can be a contributing factor in motor vehicle accidents.[11-13] Adults who are esotropic (ocular deviation is toward the nose) have a reduced field of vision on the side of the deviated eye. Adult patients who had childhood esotropia have a significant expansion of the binocular visual field after surgical realignment of the eyes.[14, 15, 20]

6. **Elimination or Improvement of Abnormal Head Posture**. Strabismus in adults is frequently associated with a face turn or head tilt that permits the person to eliminate and/or reduce diplopia. The compensatory head position is frequently associated with neck muscle contractures that can be improved with eye muscle surgery. [20]

7. **Psychosocial Function/Vocational Status**. Strabismus can have a negative impact on an individual's employment opportunities, school performance, and self image. [16-19]

SUMMARY:

Adult strabismus results in visual and psychosocial disabilities. Affected individuals may not be offered appropriate surgical treatment because of misconceptions about adult strabismus. Successful strabismus surgery can relieve diplopia and visual confusion, restore or establish depth perception, expand the visual field, eliminate an abnormal head posture, and improve psychosocial function and employability.

Adults with strabismus should consult their ophthalmologist about the relative risks and benefits of surgery. Recommendations in this policy statement do not indicate an exclusive course for treatment or procedure to be followed. Alternative treatments that take into account individual circumstances may be appropriate.

REFERENCES:

1. Scott WE, Kutschke PJ, Lee WR. 20th Annual Frank Costenbader Lecture - Adult Strabismus. J Pediatr Ophthalmol Strabismus 1995; 32(6):348-352.

2. Hudson HL, Feldon SE. Late Hypercorrection of Hypotropia in Graves'. Ophthalmology: Predictive Factors. Ophthalmology 1992; 100:356-360.

3. Sprunger DT, Helveston EM. Progressive Overcorrection After Inferior Rectus Recession. J Pediatr Ophthalmol Strabismus 1993; 30:145-148.

4. Rosenbaum AL, Kushner RJ, Kirschen D. Vertical Rectus Muscle Transposition and Botulinum Toxin (Oculinum) to Medial Rectus for Abducens Palsy. Arch Ophthalmol 1989; 107:820-823.

5. Repka MX, Lam GC, Morrison NM. The Efficacy of Botulinum Neurotoxin A in the Treatment of Complete and Partially Recovered Sixth-Nerve Palsy. J Pediatr Ophthalmol Strabismus 1994; 31:79-83.

6. Parks MM. The Monofixation Syndrome. Trans Am Ophthalmol Soc 1969; 67:609-657.

7. Hertle RW. Clinical Characteristics of Surgically Treated Adult Strabismus. J Pediatr Ophthalmol Strabismus 1998; 35(3):138-145.

8. Rosenbaum AL. The Goal of Adult Strabismus Surgery Is Not Cosmetic. Arch Ophthalmol 1999; 117:250.

9. Kushner B., Morton G. Postoperative Binocularity in Adults with Long-Standing Strabismus. Ophthalmology 1992; 99:316-319.

10. Pratt-Johnson J. Fusion Ability Lost and Regained in Visual Adults. Graefes Arch Clinc Exp Ophthalmol 1988; 226:111-112.

11. Keltner JL, Johnson CA. Visual Function and Driving Safety. Arch Ophthalmol 1992; 110:1697-1698.

12. Johnson CA, Keltner JL. Incidence of Visual Field Loss in 20,000 Eyes and Its Relationship to Driving Performance. Arch Ophthalmol 1983; 101:371-375.

13. Szlyk JP, Alexander KR, Severing K, et al. Assessment of Driving Performance in Patients with Retinitis Pigmentosa. Arch Ophthalmol 1992; 110:1709-1713.

14. Wortham E, Greenwald M. Expanded Binocular Peripheral Visual Fields Following Surgery for Esotropia. J Pediatr Ophthalmol Strabismus 1989; 26:109-112.

15. Kushner BJ. Binocular Field Expansion in Adults After Surgery for Esotropia. Arch Ophthalmol 1994; 112:639-643.

16. Satterfield D, Keltner JL, Morrison TL. Psychosocial Aspects of Strabismus Study. Arch Ophthalmol 1993; 111:1100-1105.

17. Burke J, Leach C, Davis H. Psychosocial Implications of Strabismus Surgery in Adults. J Pediatr Ophthalmol Strabismus 1997; 34:159-164.

18. Coats DK, Paysse EA, Towler AJ, et al. Impact of Obvious Uncorrected Horizontal Strabismus on Ability to Obtain Employment. Ophthalmology 2000; 107:402-405.

19. Baker JD. The Value of Adult Strabismus Correction to the Patient. J AAPOS 2002; 6:136-40.

20. Mills MD, Coats DK, Donahue SP, et al. Strabismus Surgery for Adults: a Report by the American Academy of Ophthalmology. Ophthalmology 2004; 111:1255-62.

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