QUICK REFERENCE GUIDE

Care of the Patient with Strabismus: Esotropia and Exotropia

American Optometric Association

A. DESCRIPTION AND CLASSIFICATION

Strabismus is a manifest deviation of the primary lines of sight of 1 prism diopter (PD) or more. This misalignment of the eyes can be classified as to:

- ❑ Direction (convergent, divergent, or vertical)
- ❑ Deviation equal or varying with the direction of gaze (comitant or incomitant)
- ❑ Frequency (constant or intermittent)
- ❑ Laterality (unilateral or alternating)
- ❑ Time of onset (congenital or acquired)
- ❑ Size (large, small, or intermediate)
- ❑ Involvement of accommodative system (accommodative or nonaccommodative)
- ❑ State of vergence system (convergence insufficiency or divergence excess, divergence insufficiency or convergence excess, basic esotropia or basic exotropia)

B. RISK FACTORS

- ❑ Family history of strabismus, especially siblings
- ❑ Uncorrected hyperopia and/or high accommodative-convergence/accommodation (AC/A) ratio
- ❑ Unilateral cataract in infants or young children
- ❑ Multiple handicaps (e.g., Down's syndrome, cerebral palsy, and craniofacial dysostosis, such as Apert-Crouzon syndrome)

C. COMMON SIGNS, SYMPTOMS, AND COMPLICATIONS

Table l lists the signs, symptoms, and complications of various forms of esotropia and exotropia.

D. EARLY DETECTION AND PREVENTION

Most types of strabismus cannot be prevented. However, some forms of accommodative esotropia may be avoided through the early detection and correction of significant hyperopia.

Infants and children suspected of having strabismus should be examined immediately. The prognosis for achieving normal binocular vision is significantly improved if treatment is not delayed.

E. EVALUATION

The evaluation of a patient with strabismus may include, but not be limited to:

1. Patient History

- ❑ General and eye health history
- ❑ Probable time and nature of onset of strabismus
- ❑ Deviating eye and frequency of deviation
- ❑ Change in size of deviation
- ❑ Family history of strabismus
- ❑ Presence or absence of diplopia and other visual symptoms
- ❑ Evidence of neurologic, systemic, or developmental disorders
- ❑ Prior treatment and results

NOTE: This Quick Reference Guide should be used in conjunction with the Optometric Clinical Practice Guideline on Care of the Patient with Strabismus (Reviewed 2004). It provides summary information and is not intended to stand alone in assisting the clinician in making patient care decisions.

Published by:
American Optometric Association • 243 N. Lindbergh Blvd. • St. Louis, MO 63141

2. Ocular Examination

- ❑ Visual acuity
- ❑ Ocular motor deviation
- ❑ Monocular fixation
- ❑ Extraocular muscle function
- ❑ Sensorimotor fusion
- ❑ Accommodation (amplitude, facility and response)
- ❑ Refraction (cycloplegic and noncycloplegic)
- ❑ Ocular health assessment

F. MANAGEMENT

I. Basis for Treatment

Treatment of strabismus is directed toward four goals:

- ❑ Obtaining normal visual acuity in each eye
- ❑ Obtaining and/or improving fusion
- ❑ Eliminating any associated sensory adaptations
- ❑ Obtaining a favorable functional appearance of eye alignment

2. Available Treatment Options

- ❑ Optical correction (full or partial)
- ❑ Added lens power
- ❑ Prisms
- ❑ Active vision therapy
- ❑ Pharmacological agents
- ❑ Extraocular muscle surgery
- ❑ Chemodenervation

Table 2 provides an overview of the evaluation, management, and treatment options best suited for each type of strabismus. Indications for and specific types of treatment may need to be individualized for each patient.

3. Patient Education

Patients and/or parents should be provided information about:

- ❑ Nature of condition and risks of developing amblyopia and impaired binocular depth perception
- ❑ Importance of timely examination and management to reduce the risk for loss of vision and fusion and the development of other related symptoms
- ❑ Prognosis and advantages and disadvantages of various modes of treatment.

4. Prognosis and Followup

The prognosis for treatment of strabismus varies depending on many factors including the specific type and nature of the condition, age at onset, and the presence or absence of fusion and amblyopia. Patient compliance with the prescribed treatment is also crucial to success of any treatment plan.

Followup evaluations are needed to assess the patient's response to therapy and to alter or adjust treatment as necessary. The schedule of followup visits (Table 2) depends upon the patient's condition and associated circumstances. These evaluations should include but are not limited to:

- ❑ Patient history
- ❑ Visual acuity
- ❑ Characteristics of strabismus at distance and near
- ❑ Fusion status
- ❑ Extraocular muscle function
- ❑ Refraction
- ❑ Tolerance, efficacy, and side effects of therapy.

TABLE 1

Common Signs, Symptoms and Complications

Condition	Signs, Symptoms, and Complications
Accommodative Esotropia ❑ Occurs in children with previously normal binocular vision ❑ Due totally or partly to either uncorrected hyperopia and/or a high AC/A ratio ❑ May be precipitated by a febrile illness	❑ Small to moderate (generally 10-35 PD), often variable, angle of deviation which occurs more frequently at near ❑ Average amount of hyperopia is 4.75D for normal AC/A ratios and 2.25D for high AC/A ratios ❑ May have minimal refractive error and esotropia only at near ❑ May report diplopia or closure of one eye during near work ❑ Complications include amblyopia, suppression, and anomalous correspondence
Acute Esotropia or Exotropia ❑ Develops suddenly at any age in persons with previously normal binocular vision ❑ May result from underlying disease process	❑ Esotropia may be associated with decompensated heterophoria, late-onset accommodative esotropia, abducens nerve palsy, divergence paralysis/divergence insufficiency, or acute acquired comitant esotropia ❑ Exotropia is usually associated with decompensated exophoria or acquired ocularmotor nerve palsy
Consecutive Esotropia or Exotropia ❑ Occurs after surgical over-correction of an exodeviation or esodeviation	❑ Consecutive esotropia, usually constant and unilateral, is frequently associated with other oculomotor anomalies (e.g., vertical or cyclo deviations) ❑ Spontaneous consecutive exotropia may be related to a sensory deficit, weak binocular function, or excessive hyperopic refractive error (>4.50D) ❑ Complications include amblyopia, loss of stereopsis, and reduced potential for normal binocular vision
Infantile or Early-acquired Esotropia or Exotropia ❑ Begins in neurologically normal children during the first six months of life ❑ May be associated with other neurological syndromes or defects	❑ Infantile esotropia may be associated with a large-angle, constant esotropia (generally 40-60PD), low hyperopia, amblyopia, and ocular motility disorders ❑ Limited potential for normal binocular vision and good stereopsis ❑ Infantile exotropia usually exhibits a large, constant deviation (generally 30-80PD) with associated ocular motility disorders ❑ Rarely amblyopiogenic because of alternating fixation pattern, but provides limited potential for normal binocular vision and good stereopsis
Intermittent Exotropia ❑ Occurs at any age in persons with previously normal binocular vision	❑ Variable periods of strabismus and of normal binocular alignment with good stereopsis (≥60 seconds of arc when fusing) ❑ Significant deviation at one or more fixation distances, becoming more apparent when patient is fatigued, or after prolonged dissociation ❑ Minimal or no amblyopia ❑ Reduced positive fusional vergence amplitudes and facility ❑ Reports of discomfort during or following prolonged visual activity, closing one eye in bright sunlight ❑ Diplopia or suppression ❑ Associated accommodative dysfunction
Mechanical Esotropia or Exotropia ❑ Occurs at any age in persons with previously normal binocular vision ❑ Caused by a mechanical restriction or a physical obstruction of the extraocular muscles or adjacent structures	❑ Minimal esotropia or exotropia in primary position ❑ Increased deviation in right or left gaze ❑ Restricted horizontal versions and ductions ❑ Frequent compensatory head turns ❑ Absence of amblyopia
Microtropia ❑ Occurs in children under 3 years of age ❑ Results from a primary sensory deficit or treatment of a larger angle esotropia or exotropia ❑ May occur idiopathically or secondary to anisometropia	❑ Constant and usually unilateral esotropia or exotropia of <10PD ❑ May exhibit amblyopia, eccentric fixation, anomalous correspondence, deficient stereopsis, and anisometropia
Sensory Esotropia or Exotropia ❑ Esotropia occurs most frequently in persons <5 years of age; exotropia predominates in persons >5 years of age ❑ Results from a unilateral decrease in vision that limits or disrupts sensory fusion (e.g., uncorrected anisometropia, unilateral cataract, trauma)	❑ Constant unilateral esotropia or exotropia ❑ High degrees of anisometropia ❑ Vertical deviations associated with overaction of oblique muscles ❑ Complications include amblyopia, loss of stereopsis, and limited potential for normal binocular vision

TABLE 2*

Frequency and Composition of Evaluation and Management Visits for Esotropia and Exotropia

Type of Patient	Frequency of Evaluation**	Treatment Options	Management Plan
Accommodative esotropia	<6 years: every 4-6 mo 6-10 years: every 6-12 mo ≥11 years: every 12 mo	Optical correction Vision therapy	Provide refractive correction; treat any amblyopia; use added plus at near if needed to facilitate fusion; prescribe vision therapy to develop/enhance normal sensory and motor fusion.
Acute esotropia and exotropia	Every 3-12 months	Prisms Vision therapy Surgery	Use prisms to eliminate diplopia and re-establish binocular vision; prescribe vision therapy; in stable deviations over 20-25 PD, consult with ophthalmologist regarding extraocular muscle surgery.
Consecutive esotropia and exotropia	Variable, depending on etiology	Optical correction Prisms Vision therapy Surgery	Provide refractive correction; prescribe prism and/or vision therapy to prevent amblyopia, eliminate diplopia, and establish normal sensory fusion, if applicable.
Infantile or early-acquired esotropia or exotropia	<2 years: every 3 mo 2-5 years: every 4-6 mo 6-10 years: every 12 mo ≥11 years: every 12-24 mo	Optical correction Prisms Vision therapy Surgery	Provide refractive correction; treat any amblyopia; use prism to establish normal sensory fusion, if applicable; consult with ophthalmologist regarding extraocular muscle surgery.
Intermittent exotropia	<5 years: every 4-6 mo 5-10 years: every 6-12 mo ≥11 years: every 12-24 mo	Optical correction Prisms Vision therapy Surgery	Provide refractive correction; use added minus lens power or base-in prism if needed to facilitate fusion; prescribe vision therapy; if deviation persists or increases, consult with ophthalmologist regarding extraocular muscle surgery.
Mechanical esotropia or exotropia	Variable, depending on etiology	Prisms Surgery	No therapy if strabismus is not present in the primary position of gaze and no diplopia. Consider prisms and/or surgery to treat head turn.
Microtopia	Every 3-12 months	Optical correction Prisms Vision therapy	Provide refractive correction; treat any amblyopia; prescribe vision therapy and/or prism to establish bifoveal fusion, if applicable.
Sensory esotropia or exotropia	Every 3-12 months	Optical correction Prisms Vision therapy Surgery	Consult with ophthalmologist regarding treatment of any underlying ophthalmic disease; provide refractive correction; treat any amblyopia; prescribe vision therapy and/or prism, if applicable; if deviation persists or increases, consult with ophthalmologist regarding extraocular muscle surgery.

* Adapted from Figure 2 in the Optometric Clinical Practice Guideline on Care of the Patient with Strabismus: Esotropia and Exotropia

** Vision therapy would require additional visits.