



## Complete Summary

---

### GUIDELINE TITLE

Esotropia and exotropia.

### BIBLIOGRAPHIC SOURCE(S)

American Academy of Ophthalmology Pediatric Ophthalmology Panel. Esotropia and exotropia. San Francisco (CA): American Academy of Ophthalmology; 2002 Oct. 30 p. [118 references]

## COMPLETE SUMMARY CONTENT

SCOPE  
METHODOLOGY - including Rating Scheme and Cost Analysis  
RECOMMENDATIONS  
EVIDENCE SUPPORTING THE RECOMMENDATIONS  
BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS  
QUALIFYING STATEMENTS  
IMPLEMENTATION OF THE GUIDELINE  
INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT  
CATEGORIES  
IDENTIFYING INFORMATION AND AVAILABILITY

## SCOPE

### DISEASE/CONDITION(S)

- Esotropia
- Exotropia

### GUIDELINE CATEGORY

Diagnosis  
Evaluation  
Management  
Prevention  
Screening  
Treatment

### CLINICAL SPECIALTY

Family Practice  
Ophthalmology  
Pediatrics

## INTENDED USERS

Advanced Practice Nurses  
Allied Health Personnel  
Health Plans  
Nurses  
Physician Assistants  
Physicians

## GUIDELINE OBJECTIVE(S)

### Esotropia

The purposes of managing infantile and accommodative esotropias are as follows:

- To restore ocular alignment.
- To promote and maintain binocular vision (fusion, stereopsis).
- To restore normal oculo-facial relationships.
- To prevent or treat amblyopia (normalizing visual acuity).

The goals of the patient care process are as follows:

- Identify patients at risk for esotropia.
- Detect esotropia.
- Detect and treat amblyopia that may cause, or be caused by, esotropia.
- Treat the esotropia (align the visual axes) in order to achieve the following:
  - Relieve symptoms, including diplopia.
  - Restore normal oculo-facial relationships.
  - Minimize amblyopia.
  - Promote and maintain central and peripheral binocular vision.
  - Promote development of visual motor processing.
  - Minimize adverse effects of the disorder and its treatment.
- Monitor vision and ocular alignment.
- Educate the patient and parents/caregivers about the diagnosis and management of esotropia.
- Inform the primary health providers of the ocular status.

### Exotropia

The purposes of managing exotropia are as follows:

- To promote and maintain binocular vision (fusion, stereopsis).
- To restore ocular alignment.
- To restore normal oculo-facial relationships.
- To treat amblyopia (normalizing visual acuity) if present.
- To recognize associated neurodevelopmental syndromes that occur with constant infantile exotropia.

The goals of the patient care process are as follows:

- Identify patients at risk for exotropia.

- Detect exotropia.
- Detect and treat amblyopia that may cause, or be caused by, exotropia.
- Treat the exotropia (align the visual axes) in order to achieve the following:
  - Relieve symptoms, including diplopia, glare, and visual confusion.
  - Restore normal oculofacial relationships.
  - Promote and maintain central and peripheral binocular vision.
  - Promote development of visual motor processing.
  - Minimize adverse effects of the disorder and its treatment.
- Monitor vision and alignment.
- Educate the patient and parents/caregiver about the diagnosis and management of exotropia.
- Inform the primary health care providers of the ocular status.

#### TARGET POPULATION

- Individuals with esotropia
- Individuals with exotropia

#### INTERVENTIONS AND PRACTICES CONSIDERED

##### Esotropia

##### Diagnosis

1. History
2. Examination including ocular alignment, extraocular muscle function, nystagmus testing, sensory parameter testing, cycloplegic refraction, and fundoscopic examination

##### Treatment/Management

1. Correction of refractive errors
2. Bifocals
3. Prism therapy
4. Amblyopia treatment
5. Extraocular muscle surgery
6. Other methods including eye exercises, chemodenevation, and miotic agents
7. Follow-up evaluation
8. Counseling/referral

##### Exotropia

##### Diagnosis

1. History
2. Examination including ocular alignment, extraocular muscle function, sensory parameter testing, cycloplegic refraction, and fundoscopic examination

##### Treatment/Management

1. Correction of refractive status

2. Overcorrecting minus lens
3. Patching
4. Amblyopia treatment
5. Prism therapy
6. Convergence exercises for convergence insufficiency
7. Extraocular muscle surgery
8. Follow-up evaluation
9. Counseling/referral

#### MAJOR OUTCOMES CONSIDERED

- Re-establishment of ocular alignment
- Promotion of binocular vision
- Promotion of stereopsis
- Restoration of normal oculofacial relationships

## METHODOLOGY

#### METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

#### DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

In the process of updating and revising the original guideline, a detailed literature search of articles in the English language was conducted on the subject of esotropia and exotropia for the years 1996 to 2001.

#### NUMBER OF SOURCE DOCUMENTS

Not stated

#### METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

#### RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Strength of Evidence Ratings

Level I: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

Level II: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization
- Well-designed cohort or case-control analytic studies, preferably from more than one center

- Multiple-time series with or without the intervention

Level III: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization
- Expert opinion (e.g., preferred practice patterns panel consensus)

## METHODS USED TO ANALYZE THE EVIDENCE

Systematic Review

## DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The results of the literature search were reviewed by the Pediatric Ophthalmology Panel and used to prepare the recommendations, which they rated in two ways.

## METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

## DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The results of a literature search on the subject of esotropia and exotropia were reviewed by the Pediatric Ophthalmology Panel and used to prepare the recommendations, which they rated in two ways. The panel first rated each recommendation according to its importance to the care process. This "importance to the care process" rating represents care that the panel thought would improve the quality of the patient's care in a meaningful way. The panel also rated each recommendation on the strength of the evidence in the available literature to support the recommendation made.

## RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Ratings of importance to care process

- Level A, most important
- Level B, moderately important
- Level C, relevant, but not critical

## COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

## METHOD OF GUIDELINE VALIDATION

External Peer Review  
Internal Peer Review

## DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

These guidelines were reviewed by Council and approved by the Board of Trustees of the American Academy of Ophthalmology (September 2002). All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant and updated accordingly.

## RECOMMENDATIONS

### MAJOR RECOMMENDATIONS

Specific recommendations are followed by a rating that indicates the level of importance to the care process (A-C) and a strength of evidence rating (I-III), both of which are defined at the end of the "Major Recommendations" field.

#### Esotropia

##### Diagnosis

The examination of a patient who has childhood-onset strabismus includes all features of the comprehensive medical pediatric or adult eye evaluation with special attention to the sensory, motor, refractive, and accommodative functions.

##### History

- Demographic data [A: III]
- Documentation of identity of historian [B: III]
- The identity of pertinent health care providers [A: III]
- The chief complaint and reason for the eye evaluation, including date of onset and frequency of the deviation; which eye is deviated; the presence or absence of diplopia; previous use of glasses [A: III]
- Ocular history [A: III]
- Systemic history; birth weight; prenatal, perinatal, and postnatal medical factors that may be pertinent; past hospitalizations and operations; and general health and development [A: III]
- Review of systems [B: III]
- Family and social history, including eye conditions (strabismus, amblyopia, type of glasses, extraocular muscle surgery) and relevant systemic diseases [A: III]
- Current medications and allergies [A: III]

##### Examination

- Ocular alignment at distance and near [A: III]
- Extraocular muscle function (ductions and versions including incomitance, such as A and V patterns) [A: III]
- Nystagmus [A: III]
- Sensory parameters [A: III]

- Cycloplegic refraction [A:III]
- Fundoscopic examination [A:III]

## Management

All forms of esotropia should be considered for treatment. [A:III] Ocular alignment should be established as soon as possible to promote binocularity, prevent and treat amblyopia, and normalize the oculo-facial relationships especially in young children. [A:III] In all cases, correction of significant refractive error is the first treatment modality. [A:III] Children with significant amblyopia should be treated before esotropia surgery to increase the likelihood of binocularity. [A:III] Surgical correction of esotropia is recommended if optical correction does not align the eyes. [A:III] Extraocular muscle surgery should be postponed in children with small angles, monofixation syndrome, or variable angles of esotropia. [A:III] Detailed management recommendations are in the main body of the text of the original guideline document.

## Follow-up Evaluation

Until visual maturity is reached, at approximately 10 years of age, periodic evaluations are necessary. [A:III] After age 10 years, if the patient has been stable, evaluations are appropriate every 1 to 2 years thereafter. [A:III]

Follow-up evaluation includes:

- History with photo review, if available [A:III]
- Tolerance and side effects of therapy [A:III]
- Review of records [A:III]
- Documentation of the identity of the historian and level of child's cooperation with examination [B:III]
- Appearance, size, and frequency of deviation [A:III]
- Visual acuity and/or fixation pattern with correction of refractive error [A:III]
- Deviation at distance and near fixation with correction of refractive error [A:III]
- Observation of A or V patterns and/or oblique dysfunctions [A:III]
- Status of binocular vision [A:III]
- Refractive status [A:III]

In children with esotropia, hyperopia should be assessed using cycloplegia at least yearly; 4- to 6-month intervals may be necessary. [A:III] If the esotropia is not controlled with the current glasses, an additional cycloplegic refraction should be performed prior to concluding that there is a nonaccommodative etiologic component. [A:III] Compliance in wearing glasses should be monitored. [A:III]

The need for follow-up of children and infants with esotropia is based on the risk for amblyopia and loss of binocularity; children should be examined according to the guidelines in Table 1 below. [A:III]

## Provider

The interpretation of results, diagnosis, and management of disease, including surgical correction and follow-up, require the expert clinical training and experience of the ophthalmologist. [A: III]

### Counseling/Referral

Treatment plans are formulated in consultation with the patient, if appropriate, and parent/ caregiver, and the plans should be responsive to their expectations and preferences. [A: III] The ophthalmologist should discuss the findings of the evaluation with the patient (if appropriate) and parent/caregiver to enhance understanding of the disorder and to recruit them in a team effort for therapy. [A: III]

### Table. Eye Examination Guidelines for Children with Esotropia

Age (years): 0-1  
Follow-up Interval (months): 1-3  
Age (years): 1-5  
Follow-up Interval (months): 3-6  
Age (years): 5-10  
Follow-up Interval (months): 6-12

Note: The follow-up intervals were generated by panel consensus. More frequent visits may be necessary if amblyopia is present or if there is a recent deterioration of alignment.

### Exotropia

#### Diagnosis

The examination of a patient who has childhood-onset strabismus includes all features of the comprehensive pediatric or adult eye evaluation with particular attention to the sensory, motor, refractive and accommodative functions. Aspects of the evaluation that pertain to strabismus and require particular attention are detailed below.

#### History

- Demographic data [A: III]
- Documentation of identity of historian [B: III]
- The identity of pertinent health care providers [A: III]
- The chief complaint and reason for the eye evaluation, including date of onset and frequency of the deviation; which eye is deviated; the presence or absence of diplopia; previous use of glasses [A: III]
- Ocular history [A: III]
- Systemic history; birth weight; prenatal, perinatal, and postnatal medical factors that may be pertinent; past hospitalizations and operations; and general health and development [A: III]
- Review of systems [B: III]

- Family and social history, including eye conditions (strabismus, amblyopia, type of glasses, extraocular muscle surgery) and relevant systemic diseases [A: III]
- Current medications and allergies [A: III]

#### Examination

- Ocular alignment at distance and near [A: III]
- Extraocular muscle function, including A & V patterns [A: III]
- Sensory parameters [A: III]
- Cycloplegic refraction [A: III]
- Fundusoscopic examination [A: III]

#### Management

All forms of exotropia should be considered for treatment. [A: III] In most cases, ocular alignment should be re-established as soon as possible, especially in young children, if the deviation is manifest a large percentage of the time. [A: III] Specific management recommendations are in the main body of the text of the original guideline document.

#### Follow-up Evaluation

Until visual maturity is reached at approximately 10 years of age, periodic evaluations are necessary. [A: III] After age 10, if the patient has been stable, evaluations are appropriate every one to two years thereafter. [A: III]

Follow-up evaluation includes:

- History with photo review, if available [A: III]
- Tolerance and side effects of therapy [A: III]
- Review of records [A: III]
- Documentation of the identity of the historian and level of child's cooperation with examination [B: III]
- Appearance, size, and frequency of deviation [A: III]
- Visual acuity and/or fixation pattern with correction of refractive error [A: III]
- Deviation at distance and near fixation with correction of refractive error [A: III]
- Observation of A or V patterns and/or oblique dysfunctions [A: III]
- Status of binocular vision [A: III]
- Refractive status [A: III]

#### Provider

The interpretation of results, diagnosis, and management of disease, including surgical correction and follow-up, require the expert clinical training and experience of the ophthalmologist. [A: III]

#### Counseling/Referral

Treatment plans are formulated in consultation with the patient, if appropriate, and parent/ caregiver, and the plans should be responsive to their expectations and preferences. [A: III] The ophthalmologist should discuss the findings of the evaluation with the patient, if appropriate, and the parent/caregiver to enhance understanding of the disorder and to recruit them in a team effort for therapy. [A: III]

### Definitions

Importance to the care process:

Level A: defined as most important

Level B: defined as moderately important

Level C: defined as relevant but not critical

Strength of evidence:

Level I: Includes evidence obtained from at least one properly conducted, well-designed randomized controlled trial. It could include meta-analyses of randomized controlled trials.

Level II: Includes evidence obtained from the following:

- Well-designed controlled trials without randomization
- Well-designed cohort or case-control analytic studies, preferably from more than one center
- Multiple-time series with or without the intervention

Level III: Includes evidence obtained from one of the following:

- Descriptive studies
- Case reports
- Reports of expert committees/organization
- Expert opinion (e.g., preferred practice patterns panel consensus)

### CLINICAL ALGORITHM(S)

None provided

## EVIDENCE SUPPORTING THE RECOMMENDATIONS

### TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for selected recommendations (see "Major Recommendations").

## BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

### POTENTIAL BENEFITS

#### Esotropia

- The potential benefits of treatment for esotropia include maximizing binocular vision and normal visual acuity in each eye. If binocularity is achieved, the number of surgical procedures over a lifetime and overall cost to society may be reduced. Binocular vision is advantageous for most career and athletic activities as well as for activities of daily life. In addition, ocular alignment at any age enhances social interactions by normalizing oculofacial relationships as well as eye contact. The significance of normal ocular alignment for the development of a positive self-image and social eye contact cannot be overemphasized and the appearance of crossed eyes also reduces job opportunities.
- Diagnosis and treatment of significant hyperopia and hyperopic anisometropia decreases the incidence of accommodative esotropia.

#### Exotropia

Potential benefits of treatment for exotropia include maintaining or improving binocularity including peripheral vision; minimizing symptoms; restoring oculofacial relationships; and improving social interactions. Binocular vision is advantageous for most career and athletic activities as well as for activities of daily life. The significance of normal ocular alignment for the development of a positive self-image and social eye contact cannot be overemphasized; the appearance of misaligned (drifting) eyes impairs self-image and social interactions, and it reduces job opportunities.

### POTENTIAL HARMS

#### Esotropia

- Disadvantages of bifocals include the following:
  - Expense (flat top add is least expensive)
  - Difficulty in visual adaptation/optical distortion
  - Added weight of glasses (flat top add is lightest)
  - Appearance
  - Cost and effort of stepwise bifocal reduction
  - Inability to wear contact lenses in the absence of near correction
- Disadvantages of chemodenervation include the frequent need for more than one injection and iatrogenic, temporary ptosis, which may increase the risk for amblyopia. Such a delay in obtaining ocular alignment may be disadvantageous in an infant with a rapidly developing visual system.
- Although sometimes effective, miotic agents are less desirable than using corrective lenses because of a risk of adverse systemic side effects such as diarrhea, asthma, and/or increased salivation and perspiration as well as increased risk associated with the administration of general anesthesia.

#### Exotropia

- Overcorrecting minus lens therapy may not be well tolerated visually by some young patients.
- Prolonged use of prisms may cause an undesirable reduction in fusional vergence amplitudes. Exotropic patients with a high AC/A ratio are at risk for a surgical overcorrection (consecutive esotropia), especially at near. The use of base-in Fresnel prisms to neutralize the exodeviation preoperatively may be helpful in identifying this group of patients who are at risk for a surgical overcorrection.

## QUALIFYING STATEMENTS

### QUALIFYING STATEMENTS

- Preferred Practice Patterns provide guidance for the pattern of practice, not for the care of a particular individual. While they should generally meet the needs of most patients, they cannot possibly best meet the needs of all patients. Adherence to these Preferred Practice Patterns will not ensure a successful outcome in every situation. These practice patterns should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed at obtaining the best results. It may be necessary to approach different patients' needs in different ways. The physician must make the ultimate judgment about the propriety of the care of a particular patient in light of all of the circumstances presented by that patient. The American Academy of Ophthalmology is available to assist members in resolving ethical dilemmas that arise in the course of ophthalmic practice.
- Preferred Practice Patterns are not medical standards to be adhered to in all individual situations. The Academy specifically disclaims any and all liability for injury or other damages of any kind, from negligence or otherwise, for any and all claims that may arise out of the use of any recommendations or other information contained herein.

## IMPLEMENTATION OF THE GUIDELINE

### DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

## INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

### IOM CARE NEED

Getting Better  
Living with Illness  
Staying Healthy

### IOM DOMAIN

Effectiveness  
Patient-centeredness

## IDENTIFYING INFORMATION AND AVAILABILITY

### BIBLIOGRAPHIC SOURCE(S)

American Academy of Ophthalmology Pediatric Ophthalmology Panel. Esotropia and exotropia. San Francisco (CA): American Academy of Ophthalmology; 2002 Oct. 30 p. [118 references]

### ADAPTATION

Not applicable: The guideline was not adapted from another source.

### DATE RELEASED

1992 Feb (revised 2002 Oct)

### GUIDELINE DEVELOPER(S)

American Academy of Ophthalmology - Medical Specialty Society

### SOURCE(S) OF FUNDING

American Academy of Ophthalmology

### GUIDELINE COMMITTEE

Pediatric Ophthalmology Panel; Preferred Practice Patterns Committee

### COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

Members of the Pediatric Ophthalmology Panel: J. Bronwyn Bateman, MD, Chair; Linda M. Christmann, MD; Stuart R. Dankner, MD; Arlene V. Drack, MD; Sheryl M. Handler, MD; Lawrence Tychsens, MD; Argye Hillis, PhD, Methodologist; Philip G. Itkin, MD, American Academy of Pediatrics Representative; Theodore G. Ganiats, MD, American Academy of Family Physicians Representative

Members of the Preferred Practice Patterns Committee: Joseph Caprioli, MD, Chair; J. Bronwyn Bateman, MD; Emily Y. Chew, MD; Douglas E. Gaasterland, MD; Sid Mandelbaum, MD; Samuel Masket, MD; Alice Y. Matoba, MD; Oliver D. Schein, MD

### FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

No proprietary interests were disclosed by members of the Preferred Practice Patterns Pediatric Ophthalmology Panel for the past 3 years up to and including June 2002 for product, investment, or consulting services regarding the equipment, process, or products presented or competing equipment, process, or products presented.

### GUIDELINE STATUS

This is the current release of the guideline.

It updates a previous version: Esotropia. San Francisco (CA): American Academy of Ophthalmology (AAO); 1997 Sep. 23 p.

This document is valid for 5 years from the date released unless superseded by a revision. All Preferred Practice Patterns are reviewed by their parent panel annually or earlier if developments warrant.

#### GUIDELINE AVAILABILITY

Electronic copies: Available from the [American Academy of Ophthalmology \(AAO\) Web site](#).

Print copies: Available from American Academy of Ophthalmology, P.O. Box 7424, San Francisco, CA 94120-7424; telephone, (415) 561-8540.

#### AVAILABILITY OF COMPANION DOCUMENTS

None available

#### PATIENT RESOURCES

None available

#### NGC STATUS

This summary was completed by ECRI on December 1, 1998. The information was verified by the guideline developer on January 11, 1999. This summary was updated on March 12, 2003. The updated information was verified by the guideline developer on April 2, 2003.

#### COPYRIGHT STATEMENT

This NGC summary is based on the original guideline, which is subject to the guideline developer's copyright restrictions. For permission to reproduce or use this guideline, contact Mario Reynoso at [mreynoso@aao.org](mailto:mreynoso@aao.org).

© 1998-2004 National Guideline Clearinghouse

Date Modified: 11/15/2004

FIRSTGOV

