

## Care of the Patient with Myopia



American Optometric Association

### A. DESCRIPTION AND CLASSIFICATION

Myopia, or nearsightedness, is a refractive condition in which the light entering the nonaccommodated eye is focused in front of the retina resulting in blurred distance vision.

Classification of myopia, by clinical entity, described in Table 1, includes:

- Simple myopia
- Nocturnal myopia
- Pseudomyopia
- Degenerative (pathological) myopia
- Induced (acquired) myopia

Myopia may also be classified by:

- Degree (i.e., low [ $<3.00$  D]), medium [ $3.00$  D- $6.00$  D]), or high [ $>6.00$  D])
- Age of onset (i.e., congenital [present at birth and persisting through infancy], youth-onset [ $<20$  years of age], early adult-onset [ $20$ - $40$  years of age], late adult-onset [ $>40$  years of age])

### B. RISK FACTORS

- Family history of myopia
- Presence of myopia on noncycloplegic retinoscopy in infancy, decreasing to emmetropia before entry into school
- Refractive error of emmetropia to  $0.50$  D of hyperopia (in children and young adults)
- Against-the-rule-astigmatism

- Decreased accommodative function or nearpoint esophoria
- Substantial amount of near work on a regular basis
- Steep corneal curvature or high axial length to corneal radius ratio
- Conditions temporarily obscuring the retina from clear imagery during infancy

### C. COMMON SIGNS, SYMPTOMS, AND COMPLICATIONS

The most common signs and symptoms of myopia are reduced unaided distance visual acuity and blurred distance vision. Persons with myopia are more likely to have retinal detachment and glaucoma. Table 1 summarizes the signs, symptoms and complications of myopia.

### D. EARLY DETECTION AND PREVENTION

Myopia can be detected by visual acuity testing, retinoscopy, autorefraction or photorefraction during vision screening or clinical examination. However, screenings do not substitute for a comprehensive eye and vision examination since these tests alone cannot distinguish among the types of myopia.

There is no universally accepted method of preventing myopia. However, some clinicians identify nearpoint vision stress as a possible contributor to the development of simple myopia.

**NOTE:** This Quick Reference Guide should be used in conjunction with the Optometric Clinical Practice Guideline on Care of the Patient with Myopia (2006). 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**

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## E. EVALUATION

The evaluation of patients with signs and symptoms suggestive of myopia or patients diagnosed with myopia includes all areas of a comprehensive adult or pediatric eye and vision examination with particular emphasis on the following areas:

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### 1. Patient History

- Nature of presenting problem and chief complaint
- Visual, ocular and general health history
- Developmental and family history
- Medication usage and medication allergies
- Vocational and avocational vision requirements

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### 2. Ocular Examination

- Visual acuity (distance and near)
- Refraction (static/cycloplegic retinoscopy, subjective refraction, autorefraction)
- Ocular motility, binocular vision and accommodation (age-appropriate testing)
- Ocular health assessment and systemic health screening (evaluation of anterior and posterior segments of the eye and adnexa, measurement of intraocular pressure)

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### 3. Supplemental Testing

- Fundus photography
- A- and B-scan ultrasonography
- Visual fields
- Tests (e.g., fasting blood sugar) to identify causes of induced myopia

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## F. MANAGEMENT

Table 2 (adapted from Figure 2 in the Guideline) provides an overview of the treatment and management of patients with myopia.

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### 1. Basis for Treatment

The goals for management of myopia are clear, comfortable, efficient binocular vision and good ocular health. Management strategies for simple myopia include:

- Myopia correction – restoring clear vision at distance with optical correction
- Myopia control – attempts to slow the progression of myopia
- Myopia reduction – lessening dependence on spectacles or contact lenses

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### 2. Available Treatment Options

- Optical correction – spectacles and/or contact lenses
- Medical (pharmaceutical) – cycloplegic agents
- Vision therapy – for associated accommodative or vergence dysfunctions
- Orthokeratology – programmed fitting of rigid contact lenses
- Refractive surgery – radial keratotomy (RK), photorefractive keratectomy (PRK), automated lamellar keratomileusis (ALK), laser in situ keratomileusis (LASIK)

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### 3. Patient Education

The clinician should educate the patient according to the type, onset and degree of myopia. Parents should be informed about options available for myopia correction, possible myopia control or myopia reduction in children. Information about the frequency of wearing spectacles or contact lenses and the importance of regular follow-up care should be provided.

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### 4. Prognosis and Followup

Prognosis for treatment of myopia is generally very good, but it depends on the type and severity of the condition and patient compliance with the prescribed treatment. The frequency and composition of follow-up visits for the various forms of myopia are summarized in Table 2.

**TABLE 1\***

**Clinical Classification of Myopia**

Type of Myopia	Description	Etiology	Signs, Symptoms and Complications
Simple myopia	<p>Most common form of myopia</p> <p>Normal eye other than it is either too long for its optical power, or too optically powerful for its axial length</p> <p>Generally less than 6 D; degree of myopia may differ between the two eyes (anisometropic myopia)</p> <p>Increases in severity during childhood, slows down or stops progressing in teenage years, decreases beginning about age 45</p>	<p>Inheritance</p> <p>Significant amounts of near work</p>	<p>Constant blurred distance vision</p> <p>Reduced unaided distance visual acuity</p> <p>Retinal detachment</p> <p>Glaucoma</p>
Nocturnal myopia	<p>Occurs primarily as an increased accommodative response associated with low levels of light</p>	<p>Significant levels of dark focus of accommodation</p>	<p>Blurred distance vision in dim illumination or dark conditions only</p> <p>Difficulty driving at night</p> <p>Reduced unaided distance visual acuity</p>
Pseudomyopia	<p>Patient appears to have myopia due to an inappropriate accommodative response</p> <p>Result of an increase in ocular refractive power due to overstimulation of accommodation</p> <p>Generally occurs in younger patients performing excessive amounts of near work</p>	<p>Accommodative disorder</p> <p>High exophoria</p> <p>Cholinergic agonist agents</p>	<p>Transient blurred distance vision with greater blur after near work</p> <p>Asthenopic symptoms</p> <p>Reduced unaided distance visual acuity</p> <p>Significantly more minus power on manifest refraction than on cycloplegic refraction</p> <p>Variations in visual acuity and retinoscopic reflex</p> <p>Changes in pupil diameter</p> <p>Fluctuations in accommodation</p>
Degenerative myopia	<p>High degree of myopia associated with degenerative changes in posterior segment of eye</p>	<p>Inheritance</p> <p>Retinopathy of prematurity</p> <p>Interruption of light passing through ocular media</p> <p>Unknown</p>	<p>Constant and considerable blur at distance</p> <p>Flashes of light or floaters</p> <p>History of vision loss and use of low vision services and devices</p> <p>Reduced unaided distance visual acuity</p> <p>Decrease in best corrected visual acuity</p> <p>Changes in visual fields</p> <p>Retinal detachment</p> <p>Vitreous liquification and posterior vitreous detachment</p> <p>Glaucoma</p> <p>Posterior staphyloma</p> <p>Lattice degeneration</p> <p>Thinning of the retinal pigment epithelium</p> <p>Breaks in Bruch's membrane and choriocapillaris</p> <p>Fuchs' spots in macular area</p>
Induced myopia	<p>Acquired myopia that is often temporary and reversible</p>	<p>Age-related nuclear cataracts</p> <p>Exposure to sulfonamides and other pharmaceutical agents</p> <p>Significant variability in blood sugar level</p>	<p>Transient to constant blurred distance vision depending on particular causative agent</p> <p>Asthenopic symptoms</p> <p>Reduced distance visual acuity</p> <p>Nuclear sclerosis of crystalline lens</p>

**TABLE 2\***

**Frequency and Composition of Evaluation and Management Visits for Myopia**

Type of Patient	Number of Evaluation Visits	Treatment Options	Frequency of Followup Visits	Composition of Followup Evaluations				Management Plan
				Visual Acuity	Refraction	Accommodation/Vergence Testing	Ocular Health Evaluation	
Simple myopia	1	Myopia correction; optical correction, vision therapy	Children: annually Adults: every 2 yr or p.r.n.	Each visit	Each visit	Each visit	Each visit	Prescribe refractive correction; provide or refer patient for vision therapy; patient education.
		Possible myopia control: optical correction, vision therapy	Every 6 mo	Each visit	Each visit	Each visit	Contact lens: anterior segment each visit, posterior segment annually, Bifocals: annually	Prescribe refractive correction; provide or refer patient for vision therapy; recommend vision hygiene improvement; patient education.
		Myopia reduction; orthokeratology, refractive surgery	Variable, depending on method of myopia reduction	Each visit	Each visit	Annually	Anterior segment: each visit, Posterior segment: annually	Provide or refer patient for orthokeratology; refer patient for refractive surgery; patient education.
Nocturnal myopia	1-2	Optical correction	3-4 wk after dispensing of prescription, then annually	Each visit	Annually or p.r.n.	Annually	Annually	Prescribe refractive correction for nighttime seeing; patient education.
Pseudo-myopia	1-2	Optical correction, pharmaceuticals, vision therapy	Every 1-4 wk until accommodative excess is eliminated, then annually	Each visit	Each visit	Annually or p.r.n.	Annually	Prescribe refractive correction; reduce accommodative response with vision therapy; prescribe cycloplegic agents to eliminate accommodative spasm; prevent pseudomyopia with plus lenses; patient education.
Degenerative myopia	1-2	Optical correction	Annually or more frequently, depending on retinal and ocular changes	Each visit	Annually or p.r.n.	Annually or p.r.n.	Each visit	Prescribe refractive correction; provide or refer for appropriate treatment for retinal complications; patient education.
Induced myopia	1-2	Variable, depending on inducing agent or condition	Variable, depending on inducing agent or condition	Each visit	Each visit	Variable, depending on inducing agent or condition	Variable, depending on inducing agent or condition	Identify inducing agent; prevent further exposure to causative agent; refer to appropriate practitioner for additional testing and treatment; patient education

p.r.n. = as necessary

\*Adapted from Figure 2 in the Optometric Clinical Practice Guideline on Care of the Patient with Myopia.