

# 2

## Indications, Contraindications, and Selection of Contact Lenses

**Claudia Assis Lima,  
Newton Kara-José,  
and Jason J. Nichols**

### **1. What are the principal indications for contact lens use?**

A thorough examination of each patient's history, medical conditions, expectations and responsibility, refractive needs, and response to trial fitting determines whether contact lenses are appropriate. The principal indications for contact lens fitting are as follows.

#### **Optical Indications**

Most contact lens wearers fall into this group. The great majority are myopic with or without astigmatism.

#### **Medical Indications**

##### **Keratoconus**

Keratoconus is a bilateral, but asymmetric, progressive thinning of the cornea. Such cases are generally fitted with rigid gas permeable contact lenses to correct myopia and irregular astigmatism resulting from the corneal irregularity and ectasia.<sup>1-3</sup> The contact lens does not inhibit the progression of the disease and is used only when the visual acuity obtained with glasses becomes unsatisfactory.<sup>3</sup>

##### **Irregular Astigmatism and/or Corneal Opacification**

Rigid contact lenses provide an excellent means of correcting irregular astigmatism associated with corneal opacification by eliminating the

aberrations and glare, leading to better visual acuity.<sup>4</sup> The fitting of a contact lens in these cases is almost always undertaken prior to considering corneal transplantation. For the most part, rigid gas permeable lenses provide better results, although hydrophilic lenses may have utility in selected cases.

### **Anisometropia**

Anisometropia exists when there is a difference in the refraction of generally more than two diopters between the two eyes. Uncorrected anisometropia in the infant may lead to amblyopia, especially when one eye is hypermetropic. In the adult, differences of greater than three diopters generally are not tolerated with spectacle correction. In such cases, a contact lens may be indicated in order to reduce the development of amblyopia and anisometropic aniseikonia.

### **Unilateral Aphakia**

Unilateral aphakia induces significant disparity in image size (aniseikonia). Anisometropic correction with glasses produces intolerable aniseikonia, with a difference in image size of approximately 30%. The contact lens diminishes the aniseikonic image difference to approximately 7%—a difference generally not perceptible to the visual cortex. This reduces the magnifying effect of the positive lens, permitting binocular vision.

### **Nystagmus**

When it is necessary to correct ametropia in patients with nystagmus, contact lenses offer advantages over glasses, because contact lenses follow the movement of the eye and, in many cases, permit better visual acuity.

### **After Refractive Surgery**

Patients with significant residual ametropia after surgery may have their ametropia corrected with a contact lens.<sup>5–7</sup> Contact lens fitting may be initiated 3 to 6 months after surgery. In most cases, rigid gas permeable lenses are appropriate, and a reverse-curve design is most commonly used.<sup>8</sup> Special care must be taken to consider the degree of corneal topography, vascularization (e.g., at keratotomy incisions), and the possibility of epithelial erosions.

### **After Penetrating Keratoplasty**

A contact lens is indicated in cases with large refractive errors, anisometropia, or irregular astigmatism after corneal transplantation.<sup>8–13</sup> Fitting is usually initiated no sooner than 3 months and often 6 to 12 months after surgery, and contact lenses are primarily used when there is persistent regular or irregular astigmatism after removal of the sutures.

### **Cosmesis**

Prosthetic, tinted lenses are often used in patients with a disfiguring corneal scar or an iris coloboma to improve the aesthetics of a nonseeing eye or to occlude an iris coloboma. Cosmetic lenses may also simply be used to alter the color of the eye.

### **Therapeutic Lenses**

Although every contact lens may be considered “therapeutic,” therapeutic lenses are those that are applied specifically for treatment of a corneal disease.<sup>10,14–17</sup>

## **2. What is the routine examination prior to contact lens use?**

Many factors determine whether a patient is a good candidate for the use of contact lenses. First, a detailed history and ocular examination are necessary prior to fitting a contact lens. The history collects information about the patient’s general medical health, ocular health, family history of eye disease, and previous use of contact lenses.

Motivation is one of the most important factors for the success of fitting. Patients with moderate to high refractive errors may be better candidates for contact lens wear than those with low degrees of refractive error. A good way to make this judgment is to evaluate the number of hours per day that the patient wears glasses. Patients who are minimally dependent on glasses in general have a low degree of success with contact lens fitting. Poorly motivated patients frequently may not care for their contact lenses adequately and may not adapt to the lenses, particularly rigid gas permeable lenses.

### **General Health**

#### **Allergies**

The patient should be questioned about allergies to medications, foods, and other substances. The allergic patient is more susceptible to adverse reactions to contact lenses and their maintenance products.<sup>18,19</sup>

#### **Diabetes**

In moderate or severe cases of diabetes, there is occasionally corneal hypesthesia, leading to a greater propensity for corneal erosion and infection. Diabetic patients are not candidates for extended-wear contact lens use.<sup>20</sup>

#### **Pregnancy and Menopause**

Pregnant women with water retention may be intolerant of a contact lens. In general, contact lens fitting should be avoided during preg-

nancy. Some patients in menopause may present significant changes in the quality and quantity of the lacrimal tear film that may cause contact lens intolerance.

### **Chronic Respiratory Disease**

Patients with chronic respiratory disease such as asthma, sinusitis, and other similar conditions may have difficulty in fitting a contact lens. During respiratory crises they may have conjunctival hyperemia, tearing, light sensitivity, and generalized discomfort that is aggravated by the use of contact lenses.

### **Psychological Conditions**

It is essential that the contact lens wearer be sufficiently responsible to follow medical instructions, including information about the duration of wear, contact lens maintenance, understanding of the signs and symptoms of contact lens-related problems, the risks of contact lens wear, and an understanding of when prompt assistance must be obtained.

### **Medication Use**

The contact lens wearer must be informed also of the medications, either topical or systemic (such as nasal decongestants, diuretics, benzodiazepines, immunosuppressants, etc.), that may alter the tear film and that may contraindicate or make difficult contact lens use.<sup>21</sup>

### **Ocular Health**

One must ask about the following issues:

1. Any previous ocular injury
2. Lid infection
3. Conjunctivitis
4. Cataract
5. Glaucoma (including family history)
6. Dry eye
7. Any surgery to the eye or ocular adnexa
8. Previous contact lens use
9. Medication intolerance

### **Contact Lens History**

The following contact lens information should be obtained:

1. Types of contact lens previously worn
2. Success and complications with previous lenses

3. Reasons for the use of contact lens (cosmetic, spectacle intolerance, aphakia, keratoconus, improvement of visual acuity)
4. Patient occupation (to determine if the patient is exposed to chemical products or works in a dirty or dusty environment)
5. Previous refractive correction
6. Sports and recreational activities

## Ophthalmic Examination

### Manifest Refraction

#### *Corneal Curvature*

The procedure most commonly employed is manual or automated keratometry, which measures the central corneal curvature. One may also use photokeratoscopy or computed topography.

#### *Biomicroscopy*

The biomicroscope is used to evaluate the lid, conjunctiva, tear film, cornea, iris, pupil, and anterior chamber.

#### *Tear Film Evaluation (See Chapter 5.)*

#### *Measurement of Palpebral Aperture Height*

The opening of the normal palpebral fissure ranges from 7 to 13 mm (average is approximately 10 mm). The size of the palpebral fissure may contribute to or detract substantially from stabilization of the lens, especially rigid gas permeable contact lenses. Measurement of the palpebral aperture height is done at the slit lamp, with the patient looking at the examiner's ear. It may be accomplished in the following ways:

- Noting in millimeters, with the help of a ruler, the distance between lids.
- Noting the position of the lid in relationship to the limbus, the lid at the limbus is annotated as zero; covering the corner, it is notated in millimeters of area covered (for example, +1, +2 mm), and if sclera is left exposed, it is noted as -1, -2 mm, etc.<sup>7</sup>

#### *Lid Tone*

Lids that are extremely tense or tight may alter the movement of the contact lens. There is no precise clinical method to measure lid tension. One can estimate lid tension by grasping the lid between the index finger and thumb and pulling it away from the globe. It can then be classified as loose or tight. Studies have found a relation among lid tension, palpebral aperture height, and contact lens fitting characteristics.<sup>22</sup>

#### *Blinking*

The examiner should evaluate the frequency and thoroughness of the blink. An incomplete blink may change the movement of the lens on the eye and the distribution of the tear film, with consequent desiccation of the cornea and/or conjunctiva and lens intolerance.<sup>23-27</sup> Normal frequency of blinking is 12 to 15 times per minute, which is increased

with head movement and is diminished during states of attention, such as reading, watching television, driving, and computer use.<sup>28,29</sup>

#### ***Corneal Diameter***

The average horizontal diameter is approximately 11.7 mm (varying generally between 11 and 12.5 mm).<sup>30,31</sup> The vertical diameter is approximately 1 mm less.<sup>31</sup> This is an important measurement in the determination of lens diameter.

#### ***Corneal Sensation***

Corneal sensation may be diminished in systemic diseases such as diabetes, intrinsic eye disease (herpes simplex keratitis, for example), pregnancy, the menstrual cycle, the use of topical or systemic medications, or as a result of corneal surgery.<sup>32–40</sup> Contact lens wear may also induce decreased corneal sensation.<sup>41–43</sup> Contact lens wearers with decreased corneal sensation may be more prone to corneal erosion and/or infection. Corneal sensation can be grossly evaluated using a wisp of cotton or, more precisely, with the esthesiometer of Cochet-Bonnet.<sup>44</sup>

### **3. What are the criteria for selecting candidate patients for the use of an extended wear hydrophilic lens?**

The choice of the appropriate patient for hydrogel extended wear is based on careful evaluation. Patients must be generally free of both systemic and ocular disease. Patients with a history of ocular infections or inflammation are not good candidates for the overnight wear of contact lenses. Although the overnight wear of contact lenses is convenient, it is necessary that patients are aware of the risk and responsibilities associated with this modality including:

1. Increased probability of complications, including infection such as corneal ulceration.<sup>45,46</sup>
2. The importance of good ocular and general health and strict adherence to regimens of contact lens care.
3. Attending a scheduled follow-up examination every 6 months.
4. Recognition of and immediate attention to the first symptoms of complications.
5. Removal of the lenses at the first sign of ocular irritation.

### **4. When should rigid gas permeable contact lenses be used?**

Rigid contact lenses are indicated in the following cases:

1. Regular astigmatism greater than one diopter
2. Irregular astigmatism
3. Patients with difficulty manipulating a hydrophilic contact lens
4. Postsurgical fits (e.g., post-refractive surgery, post-penetrating keratoplasty)
5. Corneal opacification
6. Myopia control

## 5. When should spherical hydrophilic contact lenses be used?

Hydrophilic contact lenses may be primarily indicated in the following situations:

1. Ametropia with minimum astigmatism
2. Rigid contact lens intolerance
3. Athletes
4. Infants with ocular pathologies such as aphakia
5. Patients with nystagmus
6. Excessively wide interpalpebral fissure
7. Patients with large iridectomies

## 6. What are the primary ocular contraindications to the use of contact lenses?

Before initiating any contact lens fitting for the purposes of optical correction, it is important to evaluate the patient's motivation, ocular needs, and ocular and medical history. Unmotivated patients tend not to adhere to the prescribed methods and care regimens for the contact lens, putting them at greater risk of complications.

### Contraindications

1. Any acute or subacute inflammation of the anterior segment of the eye
2. Acute and chronic ocular infections
3. Any eye disease affecting the cornea, conjunctiva, and lids (e.g., epithelial fragility, endothelial failure, dry eye, allergy, pinguecula, pterygium)
4. Corneal hypesthesia
5. Uncontrolled glaucoma
6. Vitreocorneal touch in aphakia
7. Psychological intolerance to the placement of a foreign body in the eye

All of these contraindications are relative. If any contraindication is eliminated, the patient can be reevaluated, remembering that a successful fitting is almost always based on a strong indication.

## 7. What are the general contraindications to the use of a contact lens for optical purposes?

1. Any systemic or allergic illness that affects the eye and may be exacerbated by the contact lens

2. Inability to follow the instructions for cleaning, storage, and asepsis of the contact lens
3. Poor personal hygiene (particularly hands and nails)
4. Inability to understand the risks associated with contact lens use
5. Low refractive error in a patient reluctant to use glasses
6. Immunosuppressed patients
7. The use of systemic medications that may cause changes in the quality of the tear film
8. Pregnancy, nursing, and menopause—circumstances that may be associated with contact lens intolerance and refractive instability. It may be better to wait until the end of pregnancy and lactation in order to fit a contact lens
9. Very old or very young patients who cannot manage insertion, removal, or contact lens care without assistance

### **8. What are the relative contraindications to the use of hydrophilic contact lenses?**

1. Poor vision secondary to uncorrected astigmatism
2. Problems with handling the contact lens (elderly patients or patients with Parkinson's disease, hemiplegia, or rheumatoid arthritis with hand malformations)
3. Exposure to unfavorable environments (extremely dry atmosphere, exposure to volatile chemicals, etc.)
4. Difficulty adhering to the prescribed regimen of contact lens care

### **9. What are the relative contraindications for the use of rigid contact lenses?**

1. Sports activities—rigid contact lenses may easily dislocate with abrupt movements
2. Discomfort of the rigid contact lenses
3. Sporadic use

### **10. What are the primary professional contraindications to the use of contact lenses for optical purposes?**

Such contraindications include:

1. Workers in polluted environments (e.g., mechanics, farm workers, bricklayers)
2. Environments with chemical products (e.g., insecticides, chemical fertilizers)
3. Exceedingly dry atmosphere
4. Handling of volatile materials



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