

## Care of the Contact Lens Patient



American Optometric Association

### A. DESCRIPTION AND CLASSIFICATION

Contact lenses (CLs) are used primarily to neutralize refractive errors, as an alternative to vision correction by spectacles or refractive surgery. They are applicable for most forms of refractive error and are both safe and effective for most patients. Of the many factors that help determine whether a patient is a good candidate for CLs, the most important is motivation to succeed.

#### Indications for prescribing contact lenses are:

##### ❑ **Cosmetic**

- Refractive error: anisometropia, myopia, hyperopia, regular astigmatism
- Prosthetic use

##### ❑ **Therapeutic**

- Myopia management: reduction (i.e., orthokeratology) and maintenance
- Aphakia
- Keratoconus
- Corneal irregularity secondary to trauma, disease, surgery
- Bandage
- Occlusion
- Treatment of accommodative esotropia or convergence excess

### B. RISK FACTORS

Because CLs are in intimate contact with the anterior ocular surface, great care should be taken in

the prescription and application of CLs, and in the supervision of the patients who wear them.

Several factors could limit a patient's suitability for CL wear and are indications for caution:

##### ❑ **Ocular Considerations**

- Active anterior segment disease, especially infection
- Acne rosacea
- Dry eye possibly associated with Sjögren syndrome secondary to rheumatoid arthritis, lupus, thyroid disease
- Atopic dermatitis
- Active filtering blebs
- Decreased corneal sensitivity
- Presence of only one visually useful eye

##### ❑ **Systemic Considerations**

- Diabetes mellitus
- Immunosuppression

##### ❑ **Noncompliant Patients**

- Inability to care for CLs or failure to present periodically for professional care
- Noncompliance with appropriate CL care and general hygiene

### C. EVALUATION

The evaluation of patients seeking ophthalmic care to optimize visual acuity with CLs includes all areas of a comprehensive adult or pediatric eye and vision

NOTE: This Quick Reference Guide should be used in conjunction with the Optometric Clinical Practice Guideline on Care of the Contact Lens Patient (April 26, 2000). It provides summary information and is not intended to stand alone in assisting the clinician in making patient care decisions.

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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, autorefractometry)
- Ocular motility, binocular vision and accommodation (age-appropriate testing)
- Ocular health assessment (evaluation of anterior segment and tear layer, evaluation of posterior segment of the eye and adnexa, baseline quantification of corneal curvature, abnormalities of the ocular and lid surfaces)

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### 3. Contact Lens Fitting

The clinician's goal is to design a CL from a physiologically adequate material that will have minimal mechanical impact on the corneal surface while providing the required optical correction. A diagnostic evaluation of trial lenses allows clinicians and patients to gain a better perspective on anticipated performance, including both optical and physical/physiological tolerance. CL fitting involves the following aspects:

- Consideration of Different Types of CLs
  - Table 1 provides information on fitting the different types of CLs
- Determination of Optical Power
  - CL optical power may be optimized by over-refraction of diagnostic or initial rigid gas permeable or hydrogel CLs *in situ*, and by consideration of binocular vision requirements
  - CL optical power may also be calculated by taking into account both the vertex distance of the manifest refraction and potential lacrimal lens power

- Special Design Features
  - Lenticular edge modification
  - Prism and truncation
  - Fenestrations
  - Blending
- Special Concerns
  - Presbyopia
  - Dry eye
  - Extended wear

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## D. MANAGEMENT

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### 1. Basis for Treatment

Contact lens care is directed toward ten goals:

- Optimizing visual acuity
- Neutralizing refractive error, ametropia, or minimizing distortion
- Managing or reducing myopia
- Enhancing fields of vision in hyperopia and aphakia
- Reducing or eliminating aniseikonia and prismatic effects in anisometropia
- Managing binocular vision problems, especially accommodative esotropia and convergence excess
- Optically smoothing an anterior corneal surface made irregular by disease, trauma, or surgery
- Performing as an ophthalmic bandage following corneal trauma or refractive corneal surgery
- Treating diplopia and amblyopia by occlusion
- Improving cosmetic and prosthetic effects

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### 2. Available Treatment Options

- Hydrogel Lenses
  - Spherical hydrogel CLs are indicated for the correction of myopia and hyperopia when astigmatism is limited to <1.00 diopter and tears are sufficient
  - Toric hydrogel lenses are indicated for cosmetic correction of refractive error including visually significant astigmatism
- Rigid Lenses
  - Rigid gas permeable (or rarely, non-gas permeable PMMA) corneal CLs are indicated in cases of regular or irregular astigmatism of the corneal surface.

**T A B L E 1**

**Strategies for Contact Lens Fitting**

Type of CL	Determination	Selection	Cautions	Lens Availability
Spherical Rigid Lenses	<p>A sodium fluorescein dye is usually used to fit a RGP BCOR to show alignment with the corneal surface at a TD that will either position the CL under the upper lid or cause it to ride within the palpebral aperture to enhance tolerance and allow a large optical zone.</p> <p>The posterior peripheral curve system should be designed to lift the edge of the CL gently off the corneal surface.</p>	<p>Begin with the previously measured corneal curvature values as an initial guide.</p> <p>The more spherical the Ks, the more likely the optimum RGP CL BCOR will be slightly flatter than the flat K.</p> <p>The more astigmatic the Ks, the more likely it is that the appropriate base curve will be close to the mean K.</p> <p>The flatter, more myopic, or more astigmatic the cornea, the larger the TD is required to achieve an optimum CL/cornea relationship.</p> <p>A TD of about 9.0 mm is a good starting point.</p>	<p>Non-gas permeable PMMA rigid CLS are seldom provided to new wearers because of the physiological need of the cornea for anterior surface oxygenation.</p> <p>Changes in BCOR will directly affect the optical power of the CL/eye system and will require direct optical power compensation.</p> <p>RGPs that ride low on the patient’s cornea and move minimally should be avoided to minimize lens binding and further complications.</p>	Rigid gas permeable CLs are provided in either custom or stock designs.
Toric Rigid Lenses	<p>Bitoric RGPs of either spherical or cylindrical power effect design are useful in optimizing vision and mechanical fit in cases of regular or occasionally irregular corneal astigmatism.</p> <p>Front-surface toric RGPs are prescribed for residual astigmatism.</p>	<p>BCOR/TD/peripheral curve systems should be chosen for proper mechanical fit.</p> <p>Back-surface toric designs may occasionally be appropriate.</p> <p>Front surface toric optics should be prescribed with the astigmatic axis stabilized by the use of prism and/or truncation.</p>	Application of toric rigid CLs often requires more experience and expertise.	Many manufacturing laboratories offer consultation in fitting the more complicated cases.

Legend: BCOR = back central optic radius or base curve; TC = total diameter; mm- millimeters; HVID = horizontal visible iris diameter; CL = contact lens; PMMA – “hard” polymethyl methacrylate; RGP = rigid gas permeable; K = quantification value of corneal curvature.

**T A B L E 2**

**Complications of Contact Lens Wear**

Site	Noninfectious Complications	Infectious Complications
Eyelids	Toxicity Allergy Ptosis Meibomian gland dysfunction	Blepharitis
Conjunctiva	Injection Edema Staining Giant papillary conjunctivitis	Bacterial conjunctivitis Viral conjunctivitis
Cornea (all layers)	Hypoxia Superficial corneal pannus Abrasion Intracorneal hemorrhages Distortion and warpage Solution reactions Corneal infiltrates Epithelial “staining” Edema 3/9 staining Superior epithelial arcuate lesion Foreign body track Dimple veil Infiltration Blebs Neovascularization Polymegethism	Microbial corneal infections  Amoebic <i>Acanthamoeba</i>  Bacterial Gram – <i>Pseudomonas aeruginosa</i> Gram + <i>Staphylococcus aureus</i> Gram + <i>Staphylococcus epidermidis</i>  Fungal  Viral adenovirus herpes simplex virus

**T A B L E 3**

**Optometric Management of Contact Lens Complications  
Clinical Grading of Severity of Complication**

Grade	Interpretation	Management
0	Normal: no tissue changes observed	No action required; routine clinical progress evaluation suggested
1 (minimal)	Trace: minimal if any tissue changes	Minimal, if any, changes in CL wear/care suggested; observation encouraged
2 (mild)	Definite tissue changes observed	Initiate clinical measures to address complication; observe clinical response
3 (moderate)	Modest tissue changes; ocular damage possible	Decrease or discontinue CL wear and treat complication; restart CL wear with appropriate changes in wear/care when complication is successfully reversed; provide professional supervision
4 (severe)	Ocular damage probable	Discontinue CL wear and treat complication appropriately; consider risk/benefit ratio of restarting CL wear in the future

- Rigid gas permeable CLs are indicated for patients with corneal grafts or previous superficial pannus.
  - Scleral rigid CLs may be indicated in management of keratoconus or other diseases such as ocular cicatricial pemphigoid or Stevens-Johnson Syndrome.
- Hybrid and Silicone Lenses
- A combination of a rigid CL over a hydrogel CL (piggyback), non-hydrogel flexible materials, or Softperm™ may be indicated in rare cases of regular or irregular corneal astigmatism (including keratoconus) or aphakia.

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### 3. Management of Complications

Complications that can threaten vision and persist after CL removal are rare. Inconvenience, minor physiological and allergic problems, and interruptions in wear are commonplace. Masquerade syndromes should always be considered. Table 2 provides a list of non-infectious and infectious complications that can occur.

The majority of complications encountered with daily CL wear are manageable by discontinuing the use of the CLs. Extending CL wear through one or more sleep cycles appears to increase both the prevalence and severity of all complications. Precautions for avoiding their occurrence are:

- Maintaining CL care and hygiene
- Using “disposable” CLs
- Restricting CL use to daily wear, not extended or continuous wear
- Treating underlying lid disease
- Avoiding spread of infection

Table 3 (adapted from Table 5 in the Guideline) provides a summary of the optometric management of CL complications.

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### 4. Patient Education

Patient education should be discussed with and given to the patient in writing and documented in the patient record. In dispensing the CL to the patient, the clinician should:

- Verify that all parameters of the lenses are as ordered
- Ensure that the lenses meet established ANSI standards
- Confirm the performance of the CLs on the patient’s eyes
- Train the patient or guardian in lens care, maintenance, and handling
- Provide education on proper hygiene, and compliance with CL care techniques
- Stress appropriate followup care under professional supervision

Certain circumstances suggest the patient give formal informed consent before the clinician provides CLs:

- Patients whose clinical situations suggest increased risk of ocular infection, inflammation, or other complication, but who insist on cosmetic CL fitting
- Patients with presbyopia who desire the prescription of monovision CLs to indicate their full awareness of the risks, benefits, and visual limitations of this form of correction
- Patients who elect extended CL wear, because of increased risk of complications

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### 5. Progress Evaluations

Progress evaluations, important for proper management of the CL patient, should occur as follows:

- During initial weeks and months to allow any necessary mechanical or optical refinements in lens prescription(s); to monitor adaptation and minimize ocular complications, and to reinforce appropriate CL care
- Every 6-12 months for healthy patients wearing cosmetic CLs
- Every 3-4 months (or more frequently) for patients who may be at risk for ocular compromise during CL wear
- Whenever the patient experiences an unexpected problem in vision or ocular condition
- Emergency services should be available 24 hours a day, every day of the year

Progress evaluations should follow the SOAP format:

- Subjective history
- Objective clinical findings
- Assessment of situation
- Plan for management

Progress evaluations should include the following testing as appropriate:

- Visual acuities and over-refraction results

- Confrontation tests
- Gross observation of eyes and adnexa
- Biomicroscopic evaluation of the lenses on the eyes and the anterior ocular segments (often with assistance of diagnostic dyes)
- Keratometry or videokeratography/topography to evaluate corneal surface
- Additional examinations as indicated

**T A B L E 1**

### Strategies for Contact Lens Fitting

Type of CL	Determination	Selection	Cautions	Lens Availability
Spherical Hydrogel Lenses	<p>Appropriate base curve and diameter of a lens are determined by clinical observation of a diagnostic lens on the eye.</p> <p>Perfect centration is not necessary as long as full corneal coverage is achieved.</p> <p>Observations should occur after a minimum of 5-15 minutes wear for “equilibration” of the lens material to the ocular environment.</p>	<p>Initial selection of a diagnostic lens can be guided by the recommended parameters from the manufacturer’s fitting guide.</p> <p>A steeper or flatter than normal corneal curvature or a larger or smaller than normal HVID should alert the clinician to observe more carefully the <i>in situ</i> mechanics of a diagnostic CL to rule out the need for alternative parameters.</p>	<p>When adequate fit is not achievable with one manufacturer’s lens, an alternative with different parameters may be considered.</p> <p>A change in BCOR usually does not affect the optical power of a thin low-minus hydrogel, provided the back surface still drapes the anterior eye. Such a change, however, might decrease the effective power of a plus-powered hydrogel lens.</p>	In 1-3 “base curves” or BCOR and 1 or 2 TD (Both measurements in mm)
Toric Hydrogel Lenses	The astigmatic axis of the CL cylinder should be prescribed as close as possible to the patient’s astigmatic axis, after accounting for the estimated rotation of the lens on the eye.	<p>A good physical fit should be achieved by selection of the appropriate base curve and TD.</p> <p>The refractive astigmatic axis is stabilized by prism, truncation, superior/inferior thin zones, or a combination of methods.</p>	The optical power of the patient’s astigmatism can often be undercorrected without compromise to visual acuity, which may result in less visual disturbance caused by any alignment variability or misrotation	In both stock (limited parameters) and custom prescriptions from many manufacturers

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