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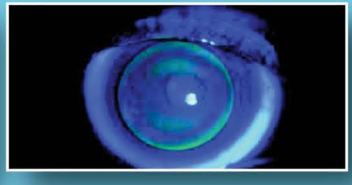
5th Edition

Textbook of Contact Lenses









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CHAPTER 3

Contact Lenses: Indications

Prescribing and fitting contact lenses have become an integral part of today's comprehensive ophthalmology practice. Majority of the people are using contact lenses for cosmetic purposes. Other reasons for wearing contact lenses include occupational preferences, sports and therapeutic uses. Their growing importance makes it appropriate to inquire into the origins and development of these valuable ophthalmic resources.

In the author's survey of 4000 cases, two-thirds were females and one-third cases were males. Sixty percent of the lenses were cosmetic and 40% optical where visual acuity was better with contact lenses than with the glasses. The ratio of the cosmetic to optical contact lens fittings in males was 1:2 and in females 2:1.

For the group as a whole the order of magnitude was as follows, in terms of indications (Table 3.1).

With extensive use of contact lenses, fitters must have a clear concept of contact lens superiority for various indications. Unthinkingly fitting contact lenses for each and every optical problem can only cause trouble. This chapter clarifies the advantage of contact lenses in various indications. Before fitting, the patient must be properly classified.

OPTICAL

- *Myopia:* As compared to glasses, contact lenses are better because of larger image, better transmission, little marginal aberration, larger field, brighter perception, avoidance of rim interference, etc. (Fig. 3.1). In myopia contact

Table 3.1 Indications of contact lens

	Percentage
Myopia	72.0
Aphakia	13.8
Keratoconus	5.0
Corneal opacities	4.0
Anisometropia	1.6
High regular astigmatism	1.4
Hyperopia	1.2
Mixed astigmatism	0.8
Albinism	0.2

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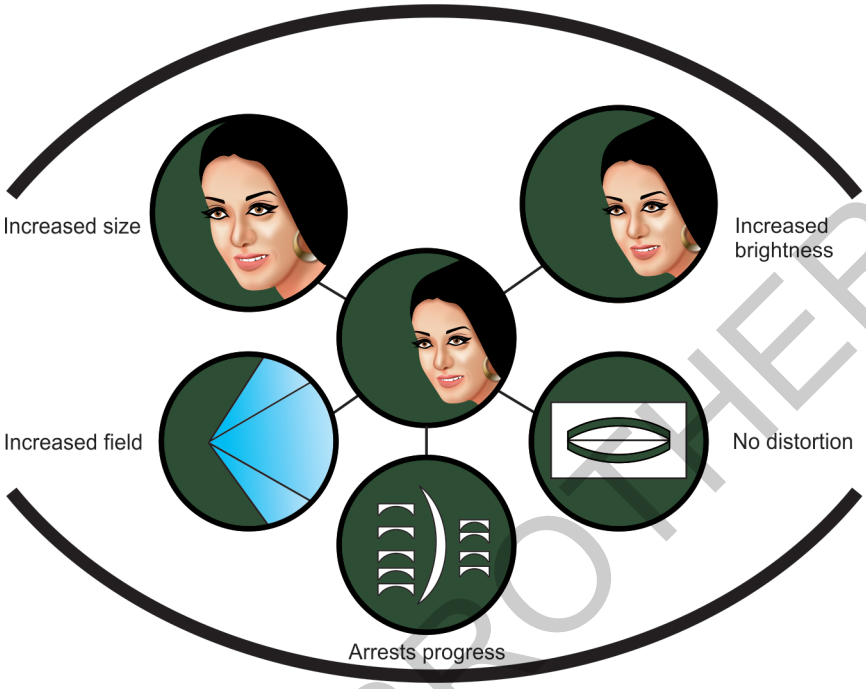

Fig. 3.1 Advantages of contact lenses over glasses in myopia

lenses are a little superior to glasses as contact lenses may affect the axial length. Before giving contact lenses the error of over-correction usual in myopia may be excluded. The author has found a decrease in myopia in 77% cases after 3 years of lens wear.

- *Hyperopia:* Optically better corrected with contact lenses due to larger field, less marginal aberrations, better transmission, brighter image, little rim interference and exerts less accommodation and less convergence compared to spectacles (Fig. 3.2). There is more convergence in spectacles due to base out prisms which the eye faces during convergence.
- *Astigmatism:* A corneal lens fills up the irregularities of the astigmatic surface; the irregular surface of the cornea is thus replaced by regular surface of contact lens. Even with a regular cornea the author found that 6.4% cases of astigmatism improve only with contact lenses.
- *Presbyopia:* A hyperope exerts less accommodation with contact lenses: minor presbyopic correction in hyperopia can therefore be delayed for a few years with contact lenses. The reverse is true for myopia; with contact lenses presbyopia will be precipitated in pre-presbyopic age.
- *Keratoconus and irregular astigmatism:* The mode of action while using the contact lenses is the same as in regular astigmatism. The contact lens has no effect on the basic course of the disease.
- *Aphakia:* Contact lenses are better due to smaller magnification (7% compared to 25% in spectacles), wider field, lesser marginal aberration, absence of Jack

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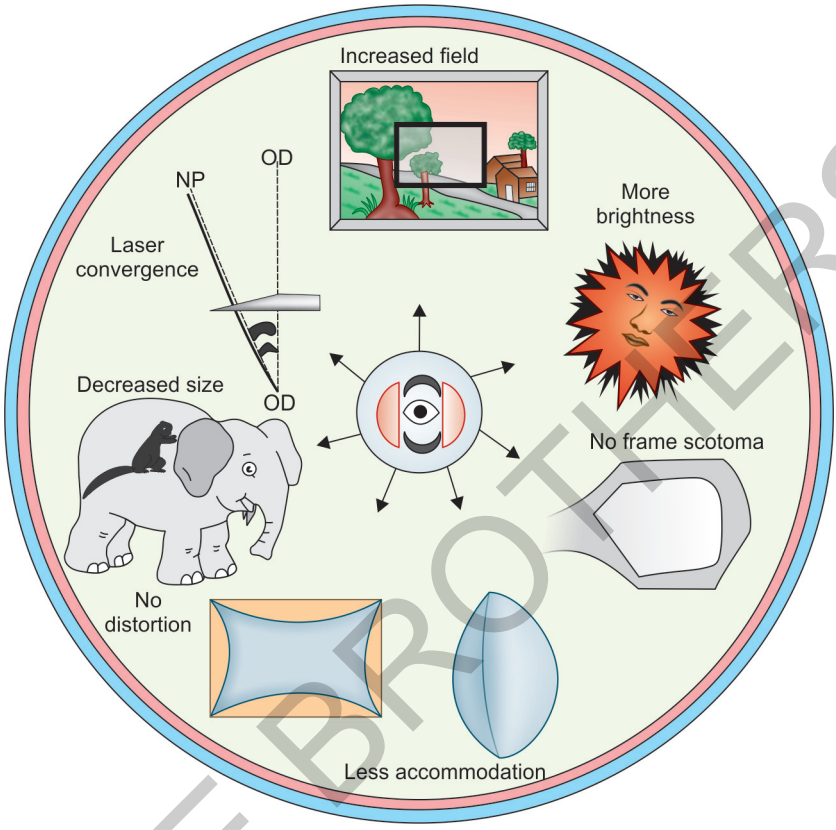

Fig. 3.2 Advantages of contact lenses over glasses in hyperopia

in box phenomenon, more transmission, brighter field, lesser convergence, and better chances of binocularity compared to correction by spectacles.

- *Anisometropia and aniseikonia:* These anomalies of refractive origin are best corrected by contact lenses which bring the image size of defective eye nearer to an emmetropic eye. This helps to establish binocularity. Vertical prism imbalance of anisometropic glasses during up and down gaze is avoided. Contact lens also provides a large field, and a brighter and clearer image due to absence of aberration.
- *Albinism:* Contact lenses are better as they correct the associated myopia and astigmatism, and are also better for the same reasons as in high myopia and astigmatism. Transmission may be retarded through a darker contact lens. Lenses with opaque scleral part and lenses with multiple holes in optical area are a better aid.
- *Aniridia:* Contact lens better corrects the associated ametropia. Transmission may be reduced through darker tint or painted iris lenses. There is immediate improvement in photophobia.

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- *Nystagmus:* Contact lenses improve performance through better correction of the associated refractive anomaly and also decrease the amplitude of nystagmus.

THERAPEUTIC

Soft lenses and flush fitting shells have been found useful in the following diseases:

- Corneal burns
- Indolent ulcers
- Bullous keratopathy
- Stevens-Johnson syndrome
- Neuroparalytic keratitis
- Exposure keratitis
- Corneal edema
- Corneal graft
- Pemphigus
- Keratoconjunctivitis Sicca
- Descemetocele
- Trichiasis
- Symblepharon (a scleral shell is given after cutting adhesions)
- Leaking wounds
- Small traumatic corneal wounds
- Recurrent erosions
- Dry eyes.

In recent years, soft lenses are gaining ground over rigid lenses, the later however remain superior in providing better visual activity.

Sauflon, Permalens and Bausch and Lomb soft lenses have also been used for therapeutic purposes. The author has reported excellent results with soft lenses in (a) Desiccating diseases like pemphigus, keratoconjunctivitis sicca and Stevens-Johnsons syndrome. Preservative free artificial tears are used with the soft lenses for a week or two (b) Neuroparalytic cornea after 5th nerve lesions, keratoplasty, corneal herpes and acid or alkali burns in which soft lenses afford excellent protection, (c) Bullous keratopathy in which 5% hypertonic saline is used with the soft lenses, (d) Medication like pilocarpine and iododeoxyuridine therapy has been found to be more efficacious when the medicines were incorporated in or instilled over the soft lenses, (e) In symblepharon after operation to avoid adhesions and to protect cornea. The author has also reported good results in epithelial dystrophies with recurrent erosions, indolent ulcers, bullous keratopathy, dry eyes in early stages, herpetic exposure and neuroparalytic keratitis and post-operatively in lid surgery, leaking wounds and post-operative indolent filamentary keratitis. Soft lenses are routinely fitted in operation theater in all cases of photorefractive keratectomy (PRK), phototherapeutic keratectomy (PTK) and collagen cross linking (CXL) of an ectatic cornea.

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COSMETIC

- Unsightly corneas or eyeballs can be hidden by the painted or tinted contact lens. A deformed eye with useful vision is corrected by a painted lens with clear pupil, which bears the optical correction.
  Prosthetic: Here contact lenses may be:
  - *Scleral* when it may be used as
    - Prosthetic haptic with clear optic or vice versa
    - Occlusion of pupil as in complicated cataract with retinal dysfunctions or clear pupil as in aniridia.
    - Partial prosthetic in partial aniridia and peripheral corneal opacities.
    - Ptosis props
    - Orbital prosthesis
  - *Corneal*: Extra limbal corneal lenses for anirdia
- *Actors:* Natural color of the iris can be covered by using iris painted soft contact lenses which may be blue, light gray or green.

OCCUPATIONAL

- *Temperature variation:* Fogging of spectacles is avoided while shifting from cold or hot and humid temperature as contact lenses are at same temperature as the body.
- News casters and television actors are enabled to avoid reflection that occurs with spectacles.
- *Sports:* Contact lenses have an advantage because of better performance due to wider field, better optics and lesser hazards of serious injury compared to spectacles.

DIAGNOSTIC

Contact lenses are used in the following instruments where they are used to neutralize cornea to pick-up its potentials, or as marker.

- *Gonioscopy*: This is to see angle, and to operate on angle in infantile glaucoma (Fig. 3.3).
- *Fundoscopy*: Has a high minus central lens, which neutralizes the cornea so that fundus can be viewed directly. It is much more comfortable if soft lens is placed underneath.
- *Electrodiagnostic procedure*: Electrode incorporation is used in the lens to pick potentials at the corneal plane. Gold, silver or platinum wires can be used. Scleral lens with electrode or electrode sandwiched between two soft lenses are used in electroretinography and its finer components like early receptor and oscillation potentials.

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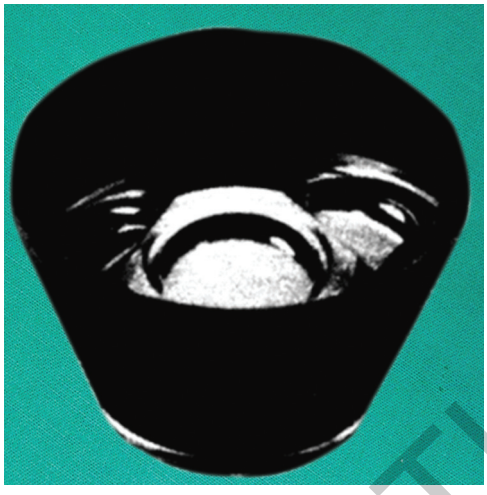

Fig. 3.3 Gonioscope

RESEARCH

Contact lens may be used in research for:

- Stimulating accommodation with minus lenses.
- Relaxing accommodation with positive lenses.
- Noting the eye movements by seeing movements of reflected light from a mirror attached to the front surface of scleral lens.
- Temperature measurements
  - By implanting thermostat through a haptic lens. This is a small ceramic device which creates different electrical potentials with changes in temperature.
  - It is also done by noting changes in color of heat sensitive crystals laminated within the contact lens.
- Measurement of lid pressure through planting a transducer on the front surface of haptic lens.
- Getting a stabilized retinal image through a scleral lens, used to neutralize small involuntary movements of the eye.
- Study of surface tension after alternation of lens parameters.
- Experimental studies on animals for occlusion, hemianopic effects to stimulate or relax accommodation and protection of the eye under anesthesia.

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Textbook of
Contact Lenses

Salient Features

- Provides a nice coverage of the basic understanding of contact lens fitting as well as the latest updates in the field of contact lens practice
- Contains a detailed although to-the-point information about the indications, fitting methodology of both soft and rigid gas permeable lenses, care and maintenance, and complications related to contact lenses
- Discusses the handling special situations with contact lens in specific chapters
- Aims at providing information to the contact lens practitioners in their day-to-day practice
- It is also meant for the postgraduate students who are pursuing their career in ophthalmology.



Rajesh Sinha is presently working as an Additional Professor, Department of Ophthalmology in Cornea, Lens and Refractive Surgery Services, Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences (AIIMS), New Delhi, India. He has done MD in Ophthalmology from AIIMS; then did DNB, FIACLE, FRCS and a Fellowship at University of Washington, USA.

He has 224 publications to his name; 109 are in indexed journals; 80 in non-indexed journals and 37 chapters in various textbooks. He has been invited to present more than 100 scientific papers and instruction courses, both national and international. He has conducted many instruction courses on contact lenses in various conferences.

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He has many publications in peer-reviewed journals and many textbooks to his name. He has more than 40 years of experience in fitting various types of contact lenses in different ocular conditions. He has developed his own guidelines for fitting rigid gas permeable contact lenses, which is very useful in day-to-day practice. He has presented many instruction courses and guided many who have become established contact lens practitioners' practicing in various parts of the country. For his contributions in the field of medicine, the Government of India conferred him with the prestigious *Padma Shri* award.

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