

# Contact lenses in the treatment of corneal and ocular surface diseases

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## Summary

Beyond correcting refractive errors, contact lenses (CLs) play a crucial role in managing corneal and ocular surface diseases. Rigid gas-permeable, hybrid, and scleral lenses are the gold standard for corneal ectasias, correcting irregular astigmatism. In severe surface disorders, like dry eye or Stevens–Johnson syndrome, scleral lenses provide essential hydration and protection. Soft bandage lenses are widely used to accelerate healing following injuries or surgeries, such as corneal cross-linking. Additionally, specialised CLs are employed for myopia control (soft dual-focus lenses) and prosthetic rehabilitation. Thus, CLs serve as a versatile therapeutic tool for restoring vision and maintaining corneal integrity in various pathologies.

## Keywords:

contact lenses, ocular surface, ocular surface diseases, ocular surface treatment, cornea, tear film

## INTRODUCTION

The cornea and tear film are crucial for proper vision function but are highly susceptible to environmental factors, trauma, and pathologies. While pharmacological and surgical interventions are standard, contact lenses (CLs) have emerged as a vital therapeutic tool beyond refractive error correction. Therapeutic CLs act as a mechanical barrier, support epithelial healing, reduce pain, and correct irregular astigmatism. The aim of this study is to review the current literature regarding the indications, mechanisms of action, and efficacy of various contact lens modalities – including soft bandage, rigid gas permeable (RGP), and scleral lenses – in the management of ocular surface diseases.

## METHODS

A comprehensive literature review was conducted to evaluate the therapeutic application of contact lenses in ocular surface and corneal diseases. The analysis included peer-reviewed articles and clinical studies published between 1972 and 2025. The search strategy utilized keywords such as "therapeutic contact lenses," "scleral lenses," "bandage lenses," and "ocular surface management." The study assessed the clinical efficacy of rigid (RGP, scleral) and soft (hydrogel, SiH) lenses in pain reduction (e.g., recurrent erosions), post-surgical re-epithelialization, and visual rehabilitation in corneal irregularities (keratoconus, PMD). Additionally, the role of orthokeratology in myopia control and emerging technologies, such as drug-eluting lenses and biosensors, were investigated.

## RESULTS

Silicone-hydrogel (SiH) and rigid lenses are essential therapeutic tools. Rigid modalities (RGP, hybrid, scleral) provide visual rehabilitation in corneal ectasias (e.g., keratoconus) by masking irregularities. In severe ocular surface disorders like Stevens-Johnson syndrome, scleral lenses offer

superior protection and hydration (liquid bandage effect). SiH bandage lenses effectively promote healing and pain relief post-trauma or surgery (e.g., CXL). Beyond optics, applications include orthokeratology for myopia control and emerging roles as biosensors and drug-delivery platforms.

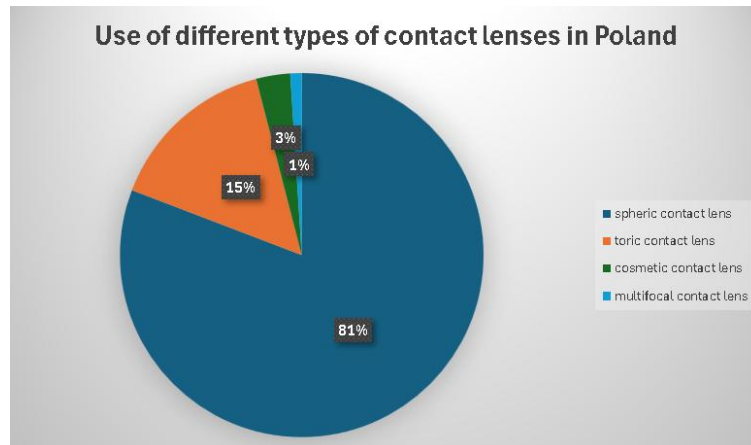


Figure. 1. use of different types of contact lenses in Poland

Table 1. Anterior ocular surface disorders considering the type of CL recommended for their therapy

Lp.	Disorder/Disease/Refractive Error	Recommended CL Type	Additional Information
1	<b>Keratoconus</b> (Stages I–II)	RGPCl, Scleral/Mini-scleral, HCL	Fill corneal irregularities, creating a smooth optical surface and improving vision
2	<b>Keratoconus</b> (Stages III–IV)	Scleral / Mini-scleral	Good centering at the site of the change, lens adapted to irregularities, high comfort due to lens resting on the sclera
3	<b>Pellucid Marginal Degeneration (PMD)</b>	RGPCl, Scleral/Mini-scleral	Very effective because they bypass the deformation zone and high effectiveness in improving vision
4	<b>Corneal Irregularities</b> (e.g., post-surgery)	HCL, Scleral/Mini-scleral, RGPCl, Bandage CL	Filling irregularities which improves patient's vision
5	<b>Aphakia</b>	RGPCl, SiH	High powers, replace the missing crystalline lens, SiH used for unilateral aphakia, also in children or temporarily before lens implantation surgery
6	<b>High Irregular Astigmatism</b>	Scleral/Mini-scleral, RGPCl, or HCL	Create a smooth optical surface correcting astigmatism
7	<b>Dry Eye Syndrome (DES / ZSO)</b>	Scleral/Mini-scleral, SiH, Hydrogel	Scleral CLs protect, moisturize, and provide relief in severe symptoms, while other types (rigid, SiH, hydrogel) may be used depending on severity
8	<b>Stevens-Johnson Syndrome (SJS)</b>	Scleral/Mini-scleral (in PROSE system)	Alleviate symptoms, protect the ocular surface, improve vision in case of conjunctival scarring and tear film disorder
9	<b>Sjögren's Syndrome, Mucous</b>	<i>Scleral/Mini-scleral (in PROSE system), SiH</i>	Large diameter lenses, low/medium water content, to help with severe dry eye syndrome and blurred vision
10	<b>Mucous Membrane Pemphigoid (MMP)</b>		
11	<b>Neurotrophic Keratopathy</b>	Scleral/Mini-scleral	Used to provide mechanical protection of the cornea, support regeneration, and protect against further damage

12	<b>Exposure Keratopathy</b>	RGPCl, Bandage (SiH), Scleral/Mini-scleral	Used to prevent corneal drying caused by insufficient eyelid closure and to provide protection
13	<b>Bullous Keratopathy</b>	SiH, Hydrogel, Multifocal RGPCl	RGPCl used for refractive effect, Scleral for pain relief and healing support, SiH for regeneration support, pain relief, and protection
14	<b>Myopia</b>	HCL, Post-graft RGPCl, Bandage (SiH), Scleral/Mini-scleral	Used overnight for temporary corneal reshaping, correcting myopia, and slowing its progression
15	<b>Post Corneal Transplant</b>	Bandage (SiH), Scleral/Mini-scleral	HCL, RGPCl, Scleral are used to correct irregular astigmatism and bypass the transplant zone, as well as SiH bandage CLs to accelerate healing
16	<b>Minor Injuries / Epithelial Healing</b>	SiH, Scleral/Mini-scleral	Thin and high water content, to accelerate regeneration and pain relief, and Scleral lenses as a stable bandage for larger injuries
17	<b>Chemical or Thermal Burns</b>	SiH	Depending on the injury area: small area small diameter CLs, large area large diameter CLs
18	<b>Corneal Perforation</b>	Prosthetic CL, Scleral/Mini-scleral	High water content and large diameter, relief and support healing
19	<b>Pterygium</b>	Prosthetic CL, Scleral/Mini-scleral	Used for protection or aesthetic improvement

## CONCLUSIONS

Contact lenses have evolved from simple refractive devices into essential therapeutic tools in modern ophthalmic practice. While soft lenses remain the primary choice for standard refractive errors, rigid and scleral lenses are indispensable for visual rehabilitation in corneal ectasias (e.g., keratoconus, PMD) and the management of severe ocular surface diseases (e.g., Stevens-Johnson syndrome, dry eye), often providing the only means of functional vision. The clinical utility of CLs is further expanded by their role in post-surgical healing (bandage lenses), myopia control, and emerging innovations such as biosensors and drug-delivery systems. Continuous advancements in materials and design confirm that contact lenses are a critical, versatile modality for restoring visual function and maintaining ocular surface integrity.

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