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The Contact Lenses (Soft, Hard, Orto). Literature Review

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The Contact Lenses (Soft, Hard, Orto). Literature Review

SUMMARY

The primary purpose of this final thesis is to investigate different types of contact lenses. The main groups of contact lenses that will be discussed in detail are soft contact lenses, hard contact lenses and orto contact lenses. The aim is to compare these groups of contact lenses and identify their main characteristics, indications for use, advantages, disadvantages and differences between them.

KEYWORDS

Contact lenses, soft contact lenses, hard contact lenses, orthokeratology, ortho-K contact lenses.

INTRODUCTION

There is a substantial global demand for contact lenses, with over 140 million people using them to safely and effectively correct their vision. (1) A valid prescription is required for all contact lenses, but with the availability of many new types of lenses, most patients can find comfortable options that provide clear vision. (2) Contact lenses can be distinguished by various parameters such as their wearing and disposal schedules, material composition, water content, oxygen permeability, and correction type of vision. (3) The types of available contact lenses, indications for their use, main characteristics, advantages, and disadvantages of them will be reviewed here.

LITERATURE SELECTION STRATEGY

Using primarily PubMed and UpToDate websites, a systematic review was conducted using the following keywords: contact lenses, soft contact lenses, hard contact lenses, orthokeratology, ortho-K contact lenses. Due to the small amount of studies and reports on keywords listed above, publications of all levels were considered. Articles were read in English; articles in other languages were included if an English abstract was available.

OVERWIEW OF CONTACT LENSES (SOFT, HARD, ORTO)

The purpose of contact lenses is to enhance vision by placing thin, curved, and transparent disks on the tear film that covers the cornea of the eyes. (4)

The same as eyeglasses, contact lenses address vision issues that arise due to refractive errors. Refractive errors occur when the shape of the eye impedes proper light focus on the retina, a light-sensitive tissue layer at the back of the eye, leading to a blurry image. (5)

The following refractive errors can be corrected using contact lenses to enhance vision: (4)

- myopia (nearsightedness)
- hyperopia (farsightedness)
- astigmatism (distorted vision)
- presbyopia (age-related changes in near vision)

Contact lenses can be broadly classified into two categories: soft contact lenses and hard contact lenses (specifically, rigid gas permeable or RGP lenses). (2)

SOFT CONTACT LENSES

Soft contact lenses introduction

More than 90 percent of prescribed contact lenses worldwide are soft contact lenses, also known as hydrophilic contact lenses, and are utilized to correct various refractive errors such as myopia, hyperopia, astigmatism (toric lenses), and presbyopia (multifocal lenses). However, some refractive errors caused by corneal distortions or keratoconus cannot be corrected by soft lenses. Oxygen-permeable, flexible plastics are used to make soft lenses to allow oxygen to reach the cornea. To avoid severe eye problems such as infectious keratitis, patients who wear soft lenses require regular follow-up care and must comply with lens care routines. Contact lens wear is the largest risk factor for microbial keratitis, and the most prevalent reason for patients to discontinue contact lens wear is lens awareness or dryness symptoms while wearing lenses. Insufficient visual acuity, allergic reactions, and difficulties handling lenses are other reasons. (3,6,7,8)

Soft contact lenses materials

Soft contact lenses are made from a variety of materials that differ in terms of their oxygen permeability, measured in Dk units (diffusion and solubility), depending on lens thickness. The higher the Dk/t value, the more breathable the lens is, and patients using such lenses experience less corneal edema during extended wear. Contact lens water content, varying from 20 to 70 percent, affects oxygen transmission to the cornea during lens use. Other factors that differ between soft lenses include weight, surface quality, ultraviolet absorption, and structural consistency or stiffness, known as modulus. Lenses with higher modulus values tend to feel stiffer, while those with lower modulus values are floppier when handled. (3,9)

The following classification system for soft lenses has been developed by the US Food and Drug Administration (FDA). (10)

Table 1: FDA classification of soft contact lens materials

FDA Lens Group	United States Adopted Name	Dk*	Water Content	Chemical composition
I	polymacon	7.5	36%	HEMA
non-ionic, low water	tetrafilcon	9.0	43.5%	HEMA, MMA, NVP
content	lotrafilcon A	140	24%	DMA, TRIS, siloxane
	lotrafilcon B	110	33%	DMA, TRIS, siloxane
	galyfilcon A	60	47%	Unpublished
II	omafilcon A	19.6	62%	HEMA, PC
non-ionic, high water	alphafilcon A	22.9	66%	HEMA, NVP
content	hilafilcon A	26.9	70%	HEMA, NVP
III	bufilcon A	16.0	45%	HEMA, DA, MAA
Ionic, low water	balafilcon A	99	36%	NVP, TPVC, NCVE, PBVC
content				
IV	ocufilcon D	19.7	55%	HEMA, MAA
Ionic, high water	etafilcon A	17.0	58%	HEMA, MAA
content	vifilcon A	16.0	55%	HEMA, PVP, MAA

HEMA	2-Hydroxyethyl methacrylate	NVP	N-vinyl pyrrolidone
DMA	*N,N*-dimethylacrylamide	PBVC	poly[dimethylsiloxyl] di [silylbutanol] bis[vinyl carbamate]
DA	diacetone acrylamide		
MMA	methyl methacrylate	PC	phosphorylcholine
MAA	methacrylic acid	TPVC	tris-(trimethylsiloxysilyl) propylvinyl carbamate
NCVE	*N*-carboxyl vinyl ester	TRIS	tris (hydroxylmethyl) aminomethane

* oxygen permeability ($x10^{-11}$)

Until 1996, 2-hydroxyethyl methacrylate (HEMA)-based polymer was the primary material used in all soft lenses, which is still used in some current lenses. In 1999, newer soft lens polymers, such as silicone-hydrogels (SiHy), were introduced to enhance oxygen permeability during lens wear, and are currently the most common material in newer lenses. Lenses that allow more oxygen to pass through are generally considered healthier, and clinical trials have demonstrated that the adverse effects of conventional hydrogel lenses on corneal physiology have mostly been resolved with the introduction of silicone hydrogels. (3,11,12,13,14,15)

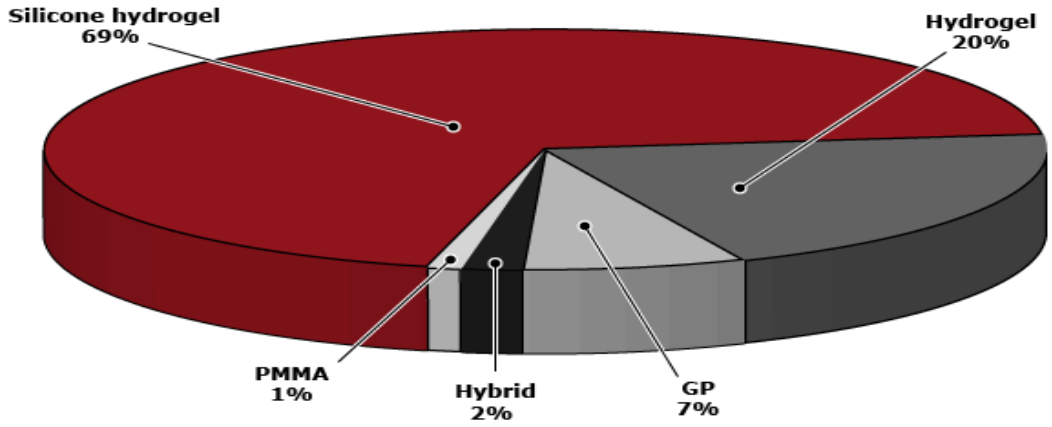

Figure 1: "Distribution of material classes used in fittings and refittings (3), PMMA: polymethyl methacrylate; GP: gas-permeable.

The advent of contact lenses with high oxygen permeability has enhanced the tolerance and safety of extended lens wear. However, soft lens materials offer a favourable environment for microbial growth, highlighting the need of patients instructions and education in proper use and care of lenses. Non-compliance with lens care techniques may result in discomfort, allergic reactions, and red-eye reactions. Proper disinfection procedures are crucial in minimizing the likelihood of contamination and potential complications. (3,16,17)

Soft contact lenses classification by replacement and wearing schedule:

Soft lenses are composed of plastic polymers that not only absorb water but also other substances such as chemicals from contact lens solutions, tear secretions, makeup, and airborne chemicals or vapors. Oily substances from eyelids or facial creams that touch the lens can also coat its surface, hindering clear vision. As a result, every soft lens requires a replacement schedule tailored to the individual patient and type of lens prescribed. The distribution of soft lenses categorized by their recommended disposal schedule, also known as modality, is displayed in Figure 2.

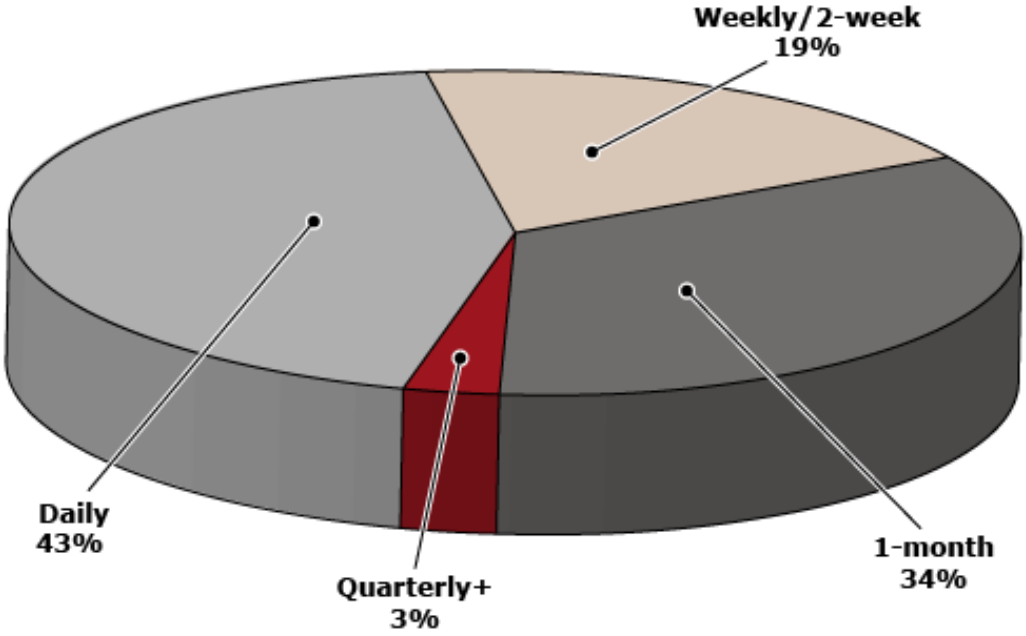

Figure 2: “Soft lens fittings and refittings by disposal schedule” (3)

Types of soft contact lenses categorized by replacement schedule:

- Three-month replacement lenses, also known as quarterly lenses, are often highly customized and can be costly to replace more frequently. Patients are advised to follow recommended cleaning and disinfection routines to ensure that their lenses remain clean and promote optimal corneal health. These lenses are typically distributed in a four-pack to provide a one-year supply.
- Soft lenses are available from several brands in the monthly modality. Daily cleaning and disinfection are necessary, and many patients find the monthly replacement routine easy to recall, with reasonable lens costs.
- One to two-week disposable lenses, like one-month disposable lenses, necessitate daily cleaning and disinfection. Nevertheless, research indicates that most patients who use these lenses do not comply with their designated replacement schedule. (18)
- Daily disposable lenses are increasingly prescribed and have become the most commonly prescribed modality of soft lens wear since 2019. As they are disposed of after each day's use, disinfection is unnecessary. Advantages of daily disposal include the absence of any contact of disinfection solution with the eye, a new lens worn each day, no need for cases or solutions, and no nightly disinfection regimen. Compared to

monthly or one- to two-week soft lens disposal, daily disposable lenses are linked to a decreased risk of corneal infiltrative events. (19,20)

Special use soft lenses

Soft contact lenses are the preferred choice for most people due to their comfort and a wide range of options. The following are some types of soft lenses: (2,3, 21,22)

- Tinted soft lenses – tinting of soft lenses can serve cosmetic, therapeutic, or prosthetic functions.
- Cosmetic tints – soft lenses can be produced in multiple colors, including transparent tints that enhance the natural eye color, or opaque tints that significantly alter the iris color.
- Therapeutic tints – special tints are applied for patients who are highly light-sensitive or to enhance color perception in patients with color deficiencies. While these lenses do not provide complete color blindness compensation, they are red-tinted and worn to aid color-deficient patients in more easily distinguishing between reds and greens.
- Prosthetic tints – soft lenses can be tinted or hand-painted to enhance cosmesis in patients with scarred corneas or to produce an artificial pupil in patients with aniridia, albinism, or pupils that are damaged or distorted.
- Bandage lenses – soft lenses are utilized as bandage lenses in instances of corneal laceration, corneal exposure injury, and during the recovery period following certain ocular surgeries, including photorefractive keratectomy (PRK).
- Piggyback fitting – in instances of significant irregular corneal curvature, such as in keratoconus, a soft lens is positioned on the cornea, with a rigid contact lens placed over it. The soft lens produces a more uniform surface for the gas-permeable (GP) lens to rest upon and serves to shield the cornea from discomfort due to excessive movement of the RGP lens.
- Soft lenses designed for keratoconus or irregular astigmatism (toric lenses) have a higher center thickness than standard soft lenses and are customized to address greater optical irregularity, similar to rigid lenses. These lenses can be worn daily or for extended periods, but they are usually more expensive than other types of soft contact lenses. (21)
- Soft multifocal lenses, such as MiSight, have gained FDA approval to help slow myopia progression in myopic children. In 2021, the FDA granted approval for ACUVUE Abiliti, an orthokeratology (ortho-K) design, to manage myopia. (22)

- Contact lenses intended for presbyopia are specifically created to correct the typical vision difficulties that occur in people over 40 years old, when it becomes challenging to see close objects clearly. Various options are available for these corrective lenses, including bifocal or multifocal contact lenses and monovision correction, in which one eye wears a near vision lens and the other eye wears a distance vision lens.

HARD CONTACT LENSES

Hard contact lenses overview

Hard contact lenses maintain a specific shape, although they do possess a small degree of flexure. While hard contact lenses usually offer clearer and sharper visual acuity, as well as being more resistant to deposit buildup and more durable than soft contact lenses, they do require a longer adaptation period. They are usually more cost-effective over the lens's lifetime due to their longer lifespan than soft contact lenses. They are simpler to manage and less prone to tearing. (3,17,23)

Most patients usually adapt to hard contact lenses after wearing them for four to seven days, although research indicates that the period for complete adaptation varies significantly among individuals, ranging from seven to thirty days. (24,25,26) Hard contact lenses are typically replaced every two to three years. Most rigid gas-permeable lenses (RGP lenses) wearers use their lenses during the day, but there are some FDA-approved lenses that can be worn continuously for up to one week, and at least one brand that is approved for 30 days of continuous wear. (3,16,22)

RGP lenses are commonly used to achieve the best possible visual acuity in patients who have not achieved satisfactory acuity with soft lenses, owing to their rigidity. RGP lenses are also preferred for patients who experience dry eyes, and they are commonly used for orthokeratology (ortho-K) to provide clear daytime vision without the need for corrective lenses during waking hours. (27,28,29,30)

Hard contact lenses materials

(Poly)methyl methacrylate (PMMA) was the first plastic used for hard contact lenses fabrication. PMMA, the first plastic used to make contact lenses, has excellent surface biocompatibility. However, due to its lack of gas permeability, it can cause corneal hypoxia, which has limited its effectiveness in contact lenses. Although some patients still wear PMMA lenses comfortably, they are at risk of long-term consequences of corneal hypoxia, and they should consider switching to RGP contact lenses. (31)

PMMA materials are now uncommonly used in contact lenses due to the development of RGP lenses. RGP lenses are typically made from plastic or silicone-containing compounds

combined with other polymers. Compared to soft lenses, many RGP lenses are more gas permeable and allow oxygen to pass through the lens material to the eye. (3,32)

Distribution of RGP fittings by type of RGP lens

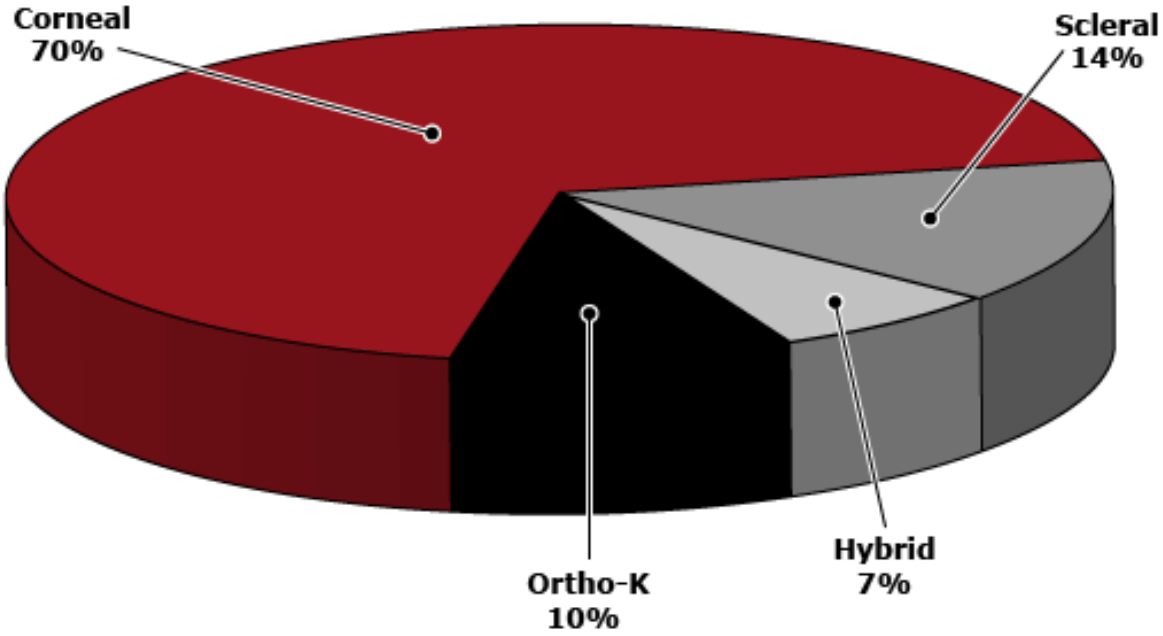

Figure 2: "Distribution of RGP fittings by type of RGP lens" (3)

RGP: rigid gas-permeable; Ortho-K: orthokeratology.

- Corneal lenses — corneal RGP lenses designed to rest directly on the cornea without a thick post-lens tear layer and with movement to deliver additional oxygen through tear exchange provide a potentially better physiological environment for surgically altered corneas and high degrees of refractive error. In glaucoma patients or those requiring chronic usage of topical medications, corneal GP lenses are preferred over other types of lenses as there is less concern for impeding aqueous outflow. Additionally, corneal GP lenses are easier to handle compared to scleral lenses, making them a better choice for patients with limited manual dexterity or those who need adequate training for lens application and removal. Fitting corneal GP lenses is a quicker process and typically requires fewer follow-up visits compared to other lenses. The lower material and fitting costs make them a more cost-effective option for both clinicians and patients. Additionally, their smaller size makes them the preferred choice for patients with naturally small apertures or anatomical changes due to surgical tarsorrhaphy or pathologic cicatricial changes. In addition, irregularities on the conjunctiva and/or

sclera such as pinguecula, pterygia, chalasis, and filtering blebs do not pose fitting complications or interfere with lens wear when using corneal GP lenses. Although advanced scleral lens manufacturing technologies, such as topographically assisted digital designs and fabrication from direct ocular surface impression, are available clinical options, they may have limited accessibility for both general practitioners and patients. (33)

- Scleral lenses — scleral RGP lenses are prescribed to completely vault over the cornea with a larger diameter of up to 24 mm. They are designed to rest on the conjunctiva overlying the sclera and are generally comfortable to wear. These lenses have the advantage of retaining a reservoir of tears between the lens and the cornea since they completely vault the corneal surface. Scleral lenses are often prescribed to correct vision in patients with irregular or distorted corneas due to conditions such as keratoconus, corneal scarring, post-penetrating keratoplasty (corneal transplant), post-refractive surgery, and ocular surface disease such as severe dry eyes, Stevens-Johnson syndrome, ocular pemphigoid, and graft-versus-host disease Specialized training is required for fitting and managing scleral lenses as they have unique characteristics and potential complications. Moreover, patients who wear scleral lenses require specialized techniques and solutions for lens application and removal, wearing, and maintenance. (3,34,35)
- Hybrid contact lenses — hybrid contact lenses consist of a central portion made of rigid gas permeable (RGP) material and a soft skirt at the periphery. The initial hybrid lens, SoftPerm, had limited parameters due to its use of low permeability materials. However, the latest version, such as SynergEyes/Duette, uses more permeable materials for both the central RGP and peripheral soft portions, and is available in various parameters to fit a wide range of unique corneal shapes. Hybrid lenses are typically worn throughout the day and discarded after six months of use. They come in different designs to address myopia, hyperopia, astigmatism, presbyopia (in multifocal design), keratoconus, post-surgical eyes, and other irregular astigmatism cases. Hybrid lenses offer several benefits, such as providing excellent acuity, greater comfort when compared to RGP lenses, and the availability of a diverse range of parameters and designs. However, they also come with some drawbacks, including a more challenging process of application and removal, and higher costs compared to other types of lenses. (3,36,37)

RGP lenses manufacturing (3)

Eye care practitioners typically order RGP lenses, which are custom-made by RGP laboratories based on the practitioner's specifications. Various parameters can be specified to ensure a comfortable and optimal fit, including diameter, base curve, power, peripheral curves, thickness, edge design, optical zone, material, and color.

In the past 15 years, computer-guided lathes have been developed to produce highly personalized RGP lenses. These lenses are available in different diameters to fit various areas such as the interpalpebral opening (7 to 9 mm), corneal diameter (10.0 to 11.5 mm), corneoscleral area (12 to 14 mm), or sclera (15 to 24 mm).

Patients with irregular corneal topography who cannot achieve adequate correction with soft lenses or spectacles may require custom RGP designs as their only viable vision correction option.

Some of the specialty GP designs available include:

- Reverse geometry – refers to a peripheral curvature that is steeper than the central curvature.
- Quadrant-specific curves – refers to various curvatures incorporated in each quadrant of the lens.
- Toric/bitoric – different horizontal and vertical curvatures present on either the front or back surface of the lens.
- Aspheric curves – placed on front or back surface.
- Multifocal lenses – eg, aspheric, segmented, concentric.
- Ortho-K/corneal reshaping – reverse geometry lenses of custom or proprietary design to temporarily modify the corneal curvature, aiming to enhance unaided visual acuity.

ORTHO-K CONTACT LENSES

Overview of orthokeratology

Orthokeratology, also known as Ortho-K, involves a lens fitting procedure utilizing specially designed RGP contact lenses to modify the corneal curvature, leading to a temporary improvement in the eye's ability to focus on objects. The process of using RGP contact lenses during sleep to create a temporary modification in the corneal curvature, resulting in clear vision during the day without the need for correction, is known as orthokeratology. This procedure is mainly employed to correct myopia. (2,3)

Aside from different brand names, the techniques used in Ortho-K are also known as: (3)

- Corneal refractive therapy (CRT)
- Overnight corneal reshaping (OCR)
- Vision-shaping treatment (VST)
- Ortho-K

Technique of orthokeratology

Orthokeratology technique involves the use of rigid contact lenses to apply mechanical pressure on the cornea, which creates fluid forces under the lens and leads to corneal reshaping. (Figure 3) Studies has shown that Ortho-K lenses induce changes in the epithelial layer, rather than stromal layer. The procedure is not a structural "bending" of the cornea, but instead a redistribution and relative thinning/thickening of the epithelial layer. (2,3,28,38,39)

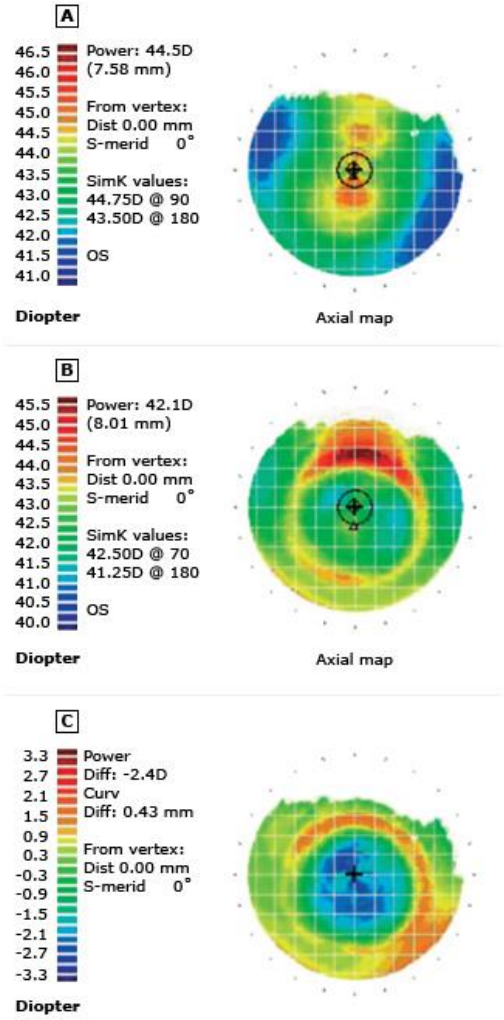

Figure 3: "Corneal topography: Difference map for overnight corneal reshaping (OCR)". (3) A: Prefitting topography map, B: Post-fitting topography map (after 2 months of OCR), C: Difference map: Computer analysis of location and quantity of corneal curvature changes

The most commonly prescribed Ortho-K lenses are the ones meant to be worn overnight. However, some Ortho-K lenses are intended for daytime use only. Overnight Ortho-K lenses are primarily prescribed for at least eight hours of sleep at night. Ortho-K lenses intended for overnight use are removed upon waking up and should not be worn during the day. While some individuals can enjoy clear vision throughout the day without the need for glasses or contact lenses, others may experience a gradual loss of vision correction over time. (2)

After the initial night of wearing Ortho-K lenses, there is a notable improvement in unaided vision. A crossover study comparing the vision-related quality of life (VR-QOL) of subjects wearing Ortho-K versus soft contact lenses during the day found that around 70 percent of the participants preferred Ortho-K and opted to continue using them beyond the study period. (3)

Reversibility of Ortho-K contact lenses

Reversibility is a critical feature of Ortho-K. If patients decide to stop using Ortho-K lenses for any reason, their refraction will typically return to the pre-treatment levels within a period of 5 to 10 days. (3,40,41,42) While changes in corneal topography resulting from Ortho-K are also reversible, research suggests that it may take longer to return to the baseline (between 3 to 12 weeks). However, some studies have reported that in certain cases, topographic changes may not fully revert to the original baseline. (41,43) This is why the visual correction effect is only temporary, and the Ortho-K lenses must be worn every night or according to a prescribed maintenance schedule to maintain the treatment's effects. (2)

Ortho-K fitting techniques (3,43)

- Empirical – pretreatment findings (refraction, central keratometry readings, horizontal visible iris diameter, and corneal eccentricity) are given to the lab who manufactures the calculated lens parameters.
- Diagnostic – lenses of known parameters are evaluated on the patient to assess movement, centration, and fluorescein pattern to determine the optimal lens parameters.
- Topography-based – baseline corneal topography is imported into a lens-design software program to simulate actual lens fit and custom-design the optimal lens parameters.

Adaptation to the treatment with orto-K lenses is relatively short and easy. Most patients report awareness of the lenses while their eyes are open but minimal to no awareness of the lenses while the eyes are closed. Application is similar to traditional RGP lenses, but removal is usually assisted with a suction device because of the larger diameter (from 10.0 to 11.8 mm). (3,44)

Safety of Orto-K contact lenses (3)

Although rare, serious complications may occur in patients using Ortho-K lenses, such as microbial keratitis and corneal ulcers. The incidence of microbial keratitis associated with the use of Ortho-K lenses has been reported to be approximately 7.7 cases per 10,000 patient-years of wear. (45). Numerous case reports, suggest that the majority of adverse events related to Ortho-K are attributed to noncompliance by patients and/or prescribers, the use of non-FDA approved products, and a lack of certification or training among the practitioners involved.

During a 4.5-year retrospective study of 300 children and adults, only three minor adverse events occurred, which necessitated medical treatment.(46,47). These events were related to central epithelial defects caused by debris getting trapped under the lens, and after treatment, there was no loss of best-corrected visual acuity during follow-up. The risk of complications associated with Ortho-K is relatively low and can be minimized through compliance with lens care, proper cleaning and disinfecting procedures, regular follow-up visits, use of adequate lubricants, and routine replacement of lenses.

The progression of myopia, characterized by an increase in axial length, is linked to a higher risk of severe complications that could impair vision. These complications include myopic maculopathy, peripheral retinal degeneration, retinal detachment, glaucoma, and cataract. (48,49,50) Research suggests that the risk of severe complications associated with myopia progression is higher compared to the risks associated with ortho-K. (51,52)

CLINICAL DESCRIPTION AND COMPARISON OF CONTACT LENSES

Table 1 “Clinical description and comparison of contact lenses”

Characteristiccs	Soft Contact Lenses	Hard Contact Lenses	Orto Contact Lenses
Compositional material	Silicone-hydrogels, 2-hydroxyethyl methacrylate (HEMA)-based, non-ionic polymer, 24-70% water content	Plastic materials, silicone-containing compounds, , combined with other polymer materials such as cellulose acetate butyrate (CAB), silicone acrylate, styrene, silicone resin, fluoropolymer, and fluorinated silicone-acrylate combinations, polymethylmethacrylate (PMMA) was used previously	Plastic materials, polymethylmethacrylate (PMMA), silicone-containing compounds combined with other polymer materials
Wearing schedule	Daily, one to two weeks, monthly	Daily, one to two weeks, monthly	8-9 hours overnight
Disposal schedule	Daily, one to two weeks, monthly, quarterly	2-3 years	1-2 years
Oxygen permeability (Dk)	14 – 140	10-150 for RGP contact lenses, PMMA contact lenses - 0	60 – 100 depending on the material, but may have slightly lower oxygen permeability than standard RGP lenses.
Water content	24% – 70%	Less than 2%	Less than 2%
Type of correction	Myopia, hyperopia,	Astigmatism, keratoconus	Main use for myopia, less frequently can be

	astigmatism, presbyopia.		used for hyperopia, presbyopia, and astigmatism.

ADVANTAGES AND DISADVANTAGES OF DIFFERENT TYPES OF CONTACT LENSES

Table 2 "Advantages and disadvantages of different types of lenses"

Lens Types	Advantages	Disadvantages
Soft contact lenses	• Comfortable to wear • Easy to apply • Easy to adjust • Flexible quality • Remain in place better than hard contacts do • Some of them can be worn up to seven days without removal, some lenses are FDA-approved for up to 30 days (extended wear contact lenses)	• Vision correction is not as sharp compared to RGP contacts • Do not correct refractive errors, caused by keratoconus or other corneal distortions • Not as durable as hard contact lenses • Needed to be replaced more often • Associated with higher risks of infection compared to hard contact lenses • Difficult to handle • Require regular monitoring and professional care
Hard Contact Lenses (RGPs)	• More durable • Less likely to tear • Provide clearer visual acuity • Correct most vision problems, especially most of astigmatism	• Not as flexible as soft contact lenses (hold a specific shape) • Require consistent wear to maintain adaptation • Can slip off center of eye more easily than other types

	• More resistant to deposit buildup • Lower risk of infection if they are cleaned properly • Less expensive over life (last longer than soft contact lenses)	• Debris can sometimes get under the lenses • Vulnerable to scratches • Harder technique of fitting • Require regular office visits for follow-up care
Orto Contact Lenses	• No need to wear any eyeglasses or contact lenses during the day for vision correction • Usually reduce myopia of -4.00D within the first two weeks • Problems, such as dry eye, arising from normal day time contact lens wear can be avoided • Night time wearing modality brings convenience to those who dislike wearing glasses or contact lenses during the day, especially this is important for those who participate actively in sports	• Patients need to spend more time initially for ortho-k lens fitting and follow-ups • Require time to adjust • In the absence of adverse events, regular aftercare visits (3-6 monthly) are still essential to ensure the health of the eyes • Do not cure myopia (the myopia reduction effect will wear off gradually after stopping of lens wear) • Can cause potential allergies • Cost more than regular contact lenses

	• Can slow down the myopic progression in children by about 50% per year when compared to children just wearing single vision lenses. • Lower risk of developing of eye infections • The effect is reversible, ocular parameters generally return to their original status within few weeks	
Abbreviations: RGP - Rigid gas permeable contact lenses		

CONCLUSION

Considering wide spread of contact lenses in today's world, increased demand on contact lenses appears day by day. There are many alternatives to help patients achieve comfortable lens wear with clear vision. In this final thesis most common types of contact lenses were discussed in detail, namely soft contact lenses, hard contact lenses and orto contact lenses. For clarity, these types of contact lenses were compared by their compositional material, water content, oxygen permeability, wearing schedule, disposal schedule, type of correction, indications for their use, main advantages, and disadvantages.

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