

Contact Lenses and high myopia

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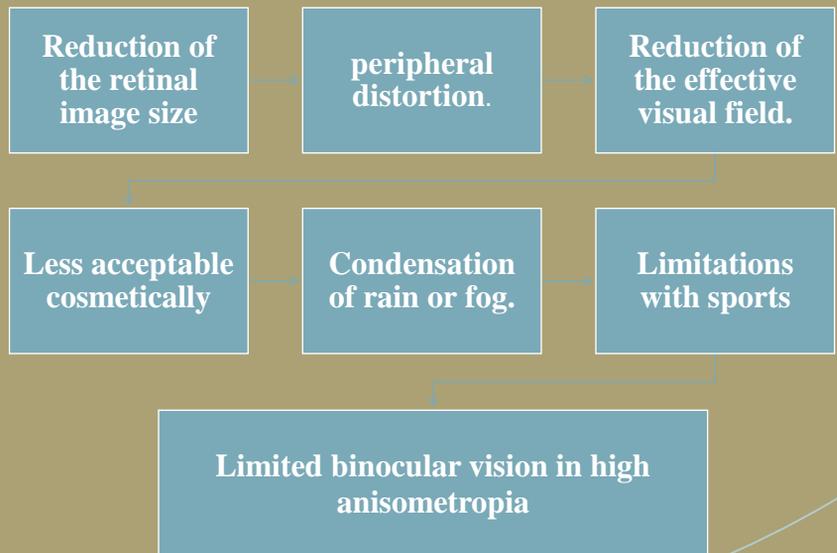
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Agenda

- Soft contact lenses types and fitting.
- Complications of contact lenses.
- Myopia control.

Disadvantages of spectacles in high myopia



Soft Contact Lenses

• Range of Lenses Available

- Base curves: 8.3 to 8.9
- Powers: -20 D to + 20 D
- Diameters: 13 – 15 mm



Soft Contact Lenses

• Classification Systems

- **Water content**
 - 1) Low water content (daily)
 - 37.5% - 45%
 - 2) Medium water content (daily or extended wear)
 - 46% - 58%
 - 3) High water content (extended)
 - 59% - 79%



Soft Contact Lenses

• Classification Systems

Hydrogel lenses

- ❖ High water content.
- ❖ DA:
 - ▶ Low oxygen permeability
 - ▶ Attract more protein deposits:
 - Replaced more frequently
 - Digitally rubbed with cleaner more regularly.

Silicone Hydrogel



Allow more oxygen to reach the cornea



Great for patients who need extended wear replacement schedules.



Firmer: easier to handle for new wearers



DA: Stiffer and the lens surface can be hydrophobic, less comfortable

Ideal Soft CL fit



Interferes minimally with corneal metabolism



Provides clear stable vision



Comfortable all the times.



No complications



Lens parameters

- Base curve
- Power
- Diameter

Lens parameters



Many manufactured “boxed” lenses are only available in one diameter and one or two BC.



The flexibility of lenses : fit many patients.



Empirical fitting – ordering the final lens without first observing a lens on the eye and then making adjustments.



Change the parameters within the same design and brand.

Fitting of Soft Contact Lenses

▶ Steps of choosing the proper lens:

- ▶ Conversion tables are used to convert spectacle spherical errors > 4.0 D to contact lens power.
- ▶ > 0.5 D cylinder \rightarrow use the spherical equivalent (sphere + half the cylinder)

Lens parameters

Ideal lens fit

- ▶ A well-centered contact lens
- ▶ 0.2 to 0.4mm movement on blink
- ▶ Full corneal coverage in all positions of gaze
- ▶ Easy movement on push-up.



Tight Fit

- ▶ Little movement with blinks
- ▶ Variable vision, improves immediately post-blink.
- ▶ Centered in all positions

Solution:

- ▶ Flatten the base curve or decrease the diameter



Loose Fit

- ▶ FB sensation
- ▶ Variable vision, worse immediately after a blink
- ▶ Poor centration
- ▶ Excessive movement

Solution

- ▶ A steeper BC or larger diameter



How to wear?



Is the lens inverted ?



Right way



Wrong way

**How to
remove ?**



Contraindications

Mental incompetence /
poor motivation.

Chronic dacryocystitis.

Chronic blepharitis.

Dry eye syndrome.

Recurrent diseases like
iritidocyclitis or scleritis.

STATISTICS

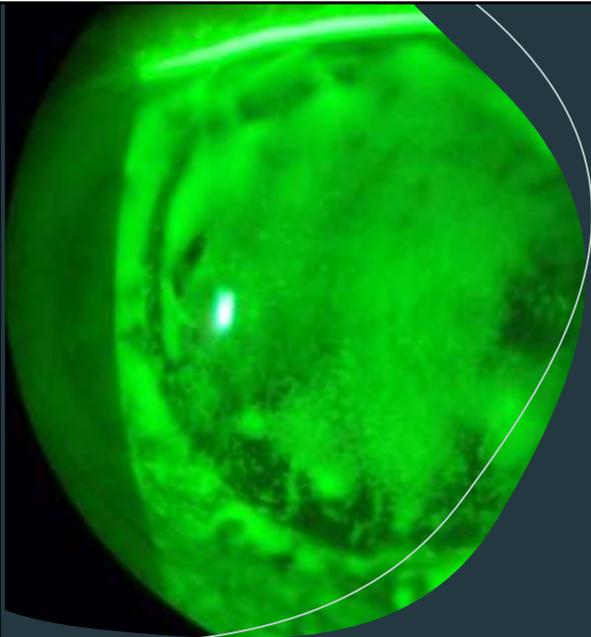
- CBS news, Aug 20, 2015 → CDC:
Contact Lens wearers are putting their eyes at risk.
- Report from US Centers for Disease Control and Prevention

Research: 1000 contact lens wearer, age >18 years old

Percentage	Activity with lens on
87%	Sleep
85%	Showered
61%	Swimming
55%	Top off lens solution in the lens case
99%	Neglect CL hygiene at least once
30%	Rinse with tap water

TEAR FILM

- DRY EYE





EYELIDS

- Meibomian gland dysfunction(MGD)

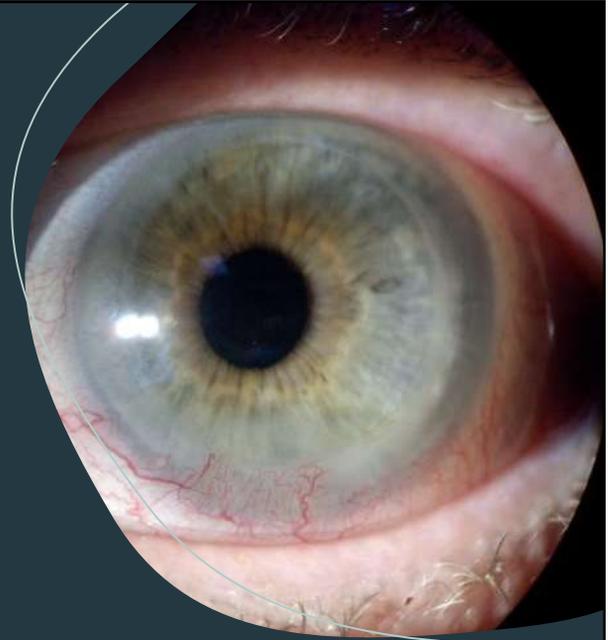


CONJUNCTIVA

- CL PAPILLARY CONJUNCTIVITIS (CLPC)

LIMBUS

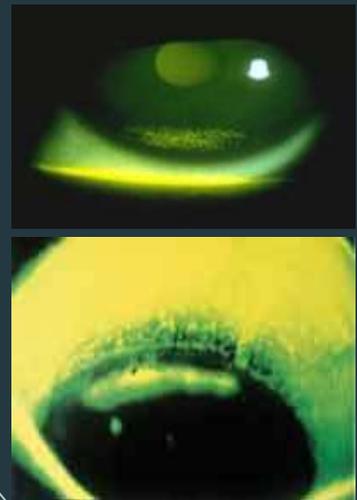
- Neovascularization



Corneal Epithelium

Corneal Staining

- Mechanical trauma.
- Exposure keratitis causing 3 and 9 o'clock staining in a rigid lens wearer.
- Metabolic disturbance.
- Toxicity or Allergy.
- Infection.



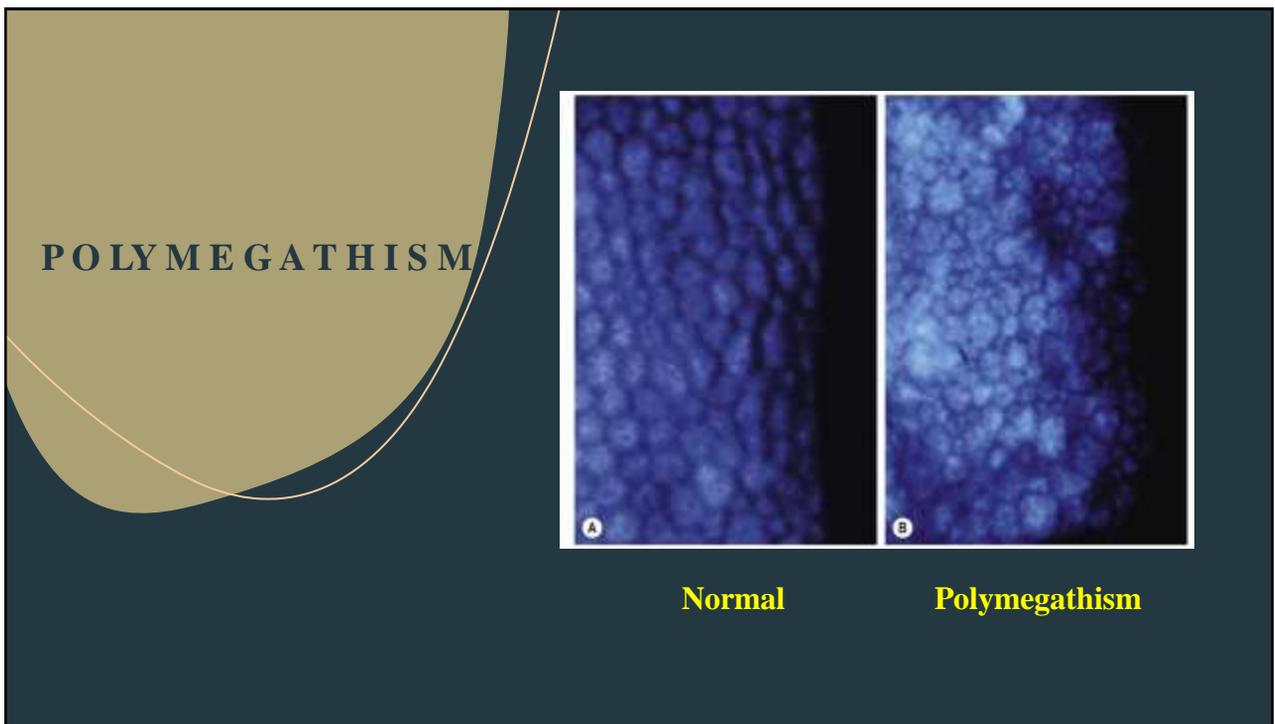
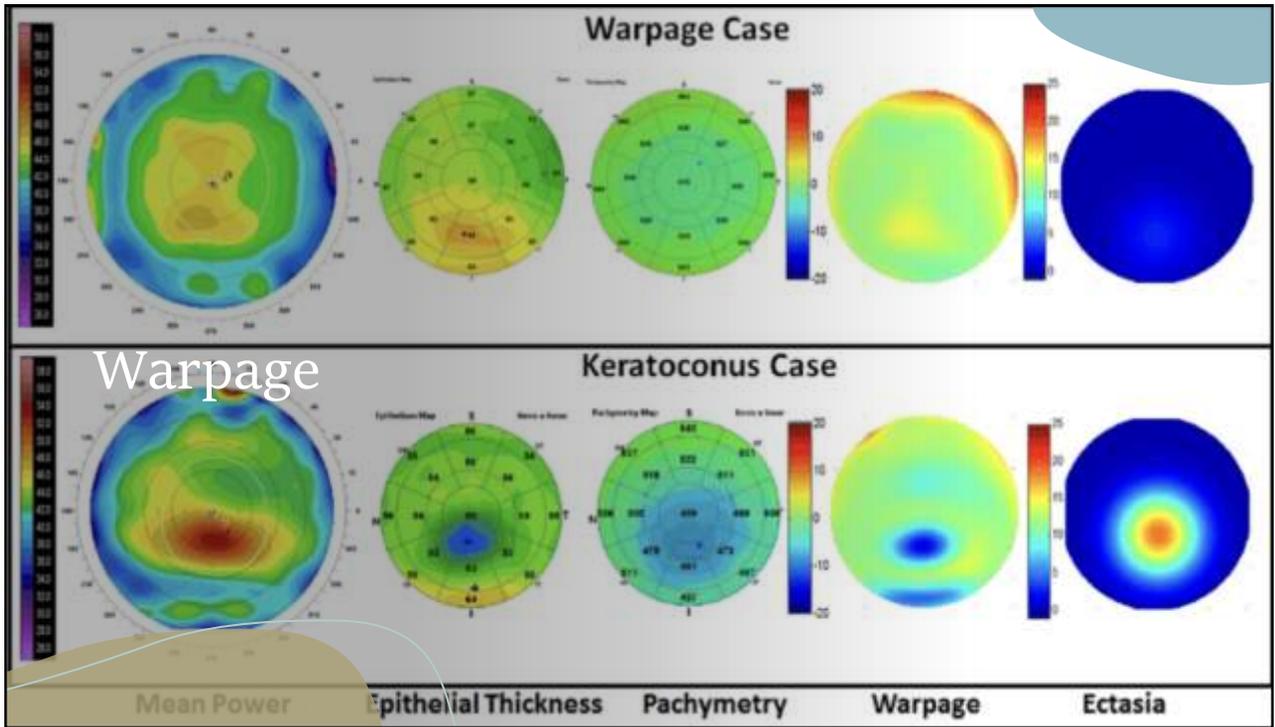


Microcysts

Infectious keratitis

- Pseudomonas
- ACANTHAMOEBA





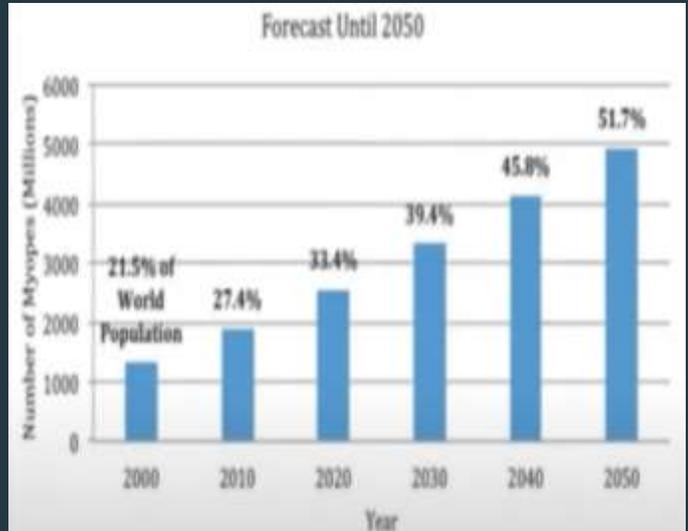
Myopia future

Myopia, Just a Refractive Error?

Asbell, Penny A. M.D.

Author Information

Eye & Contact Lens: Science & Clinical Practice 43(1):p 1-2, January 2016. | DOI: 10.1097/ICL.0000000000000224

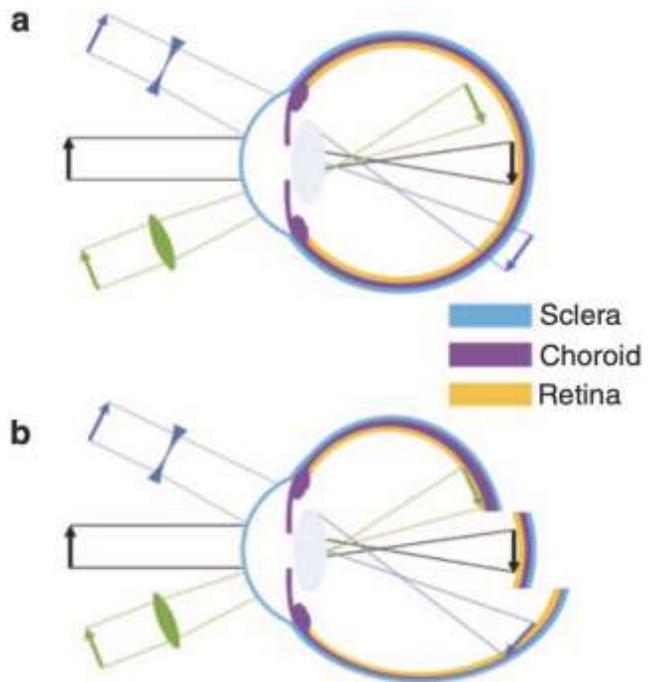


Myopia control

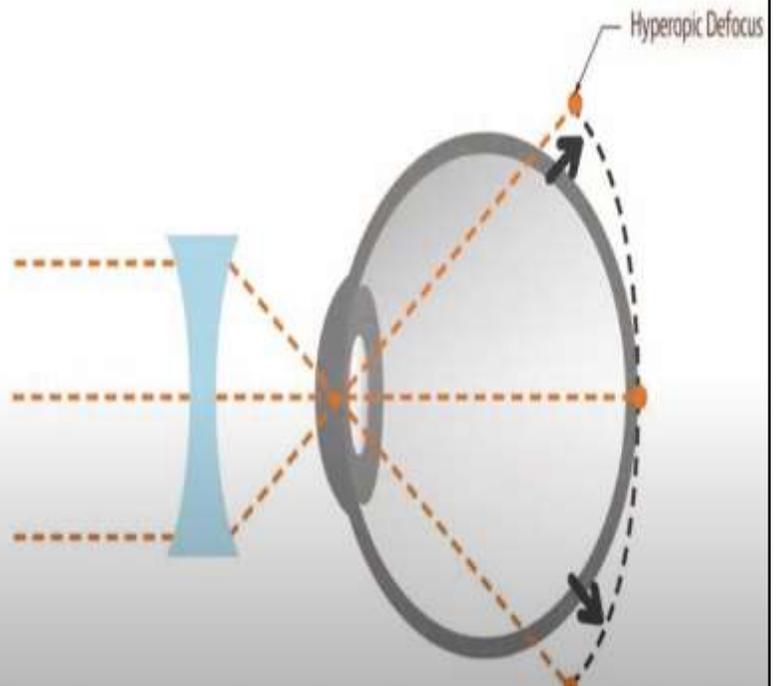
The main clinical interventions for myopia control currently include

- Optical lenses.
- Pharmaceutical agents.
- Outdoor activities.

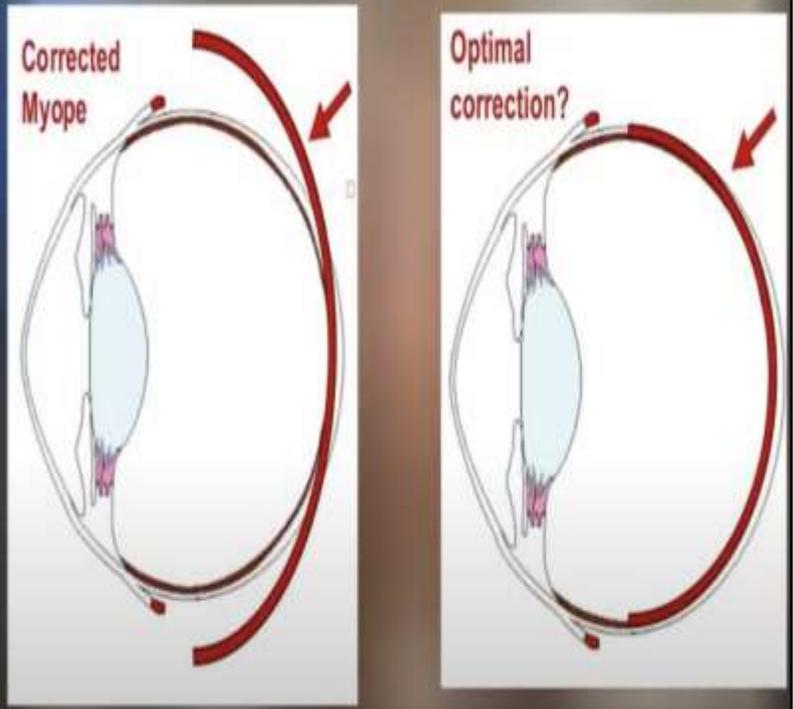
Lens Defocus Ametropias



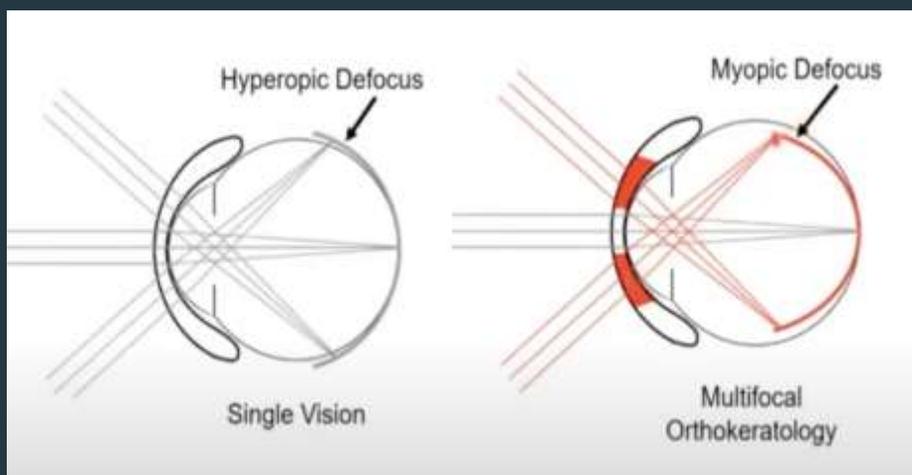
Hyperopic defocus

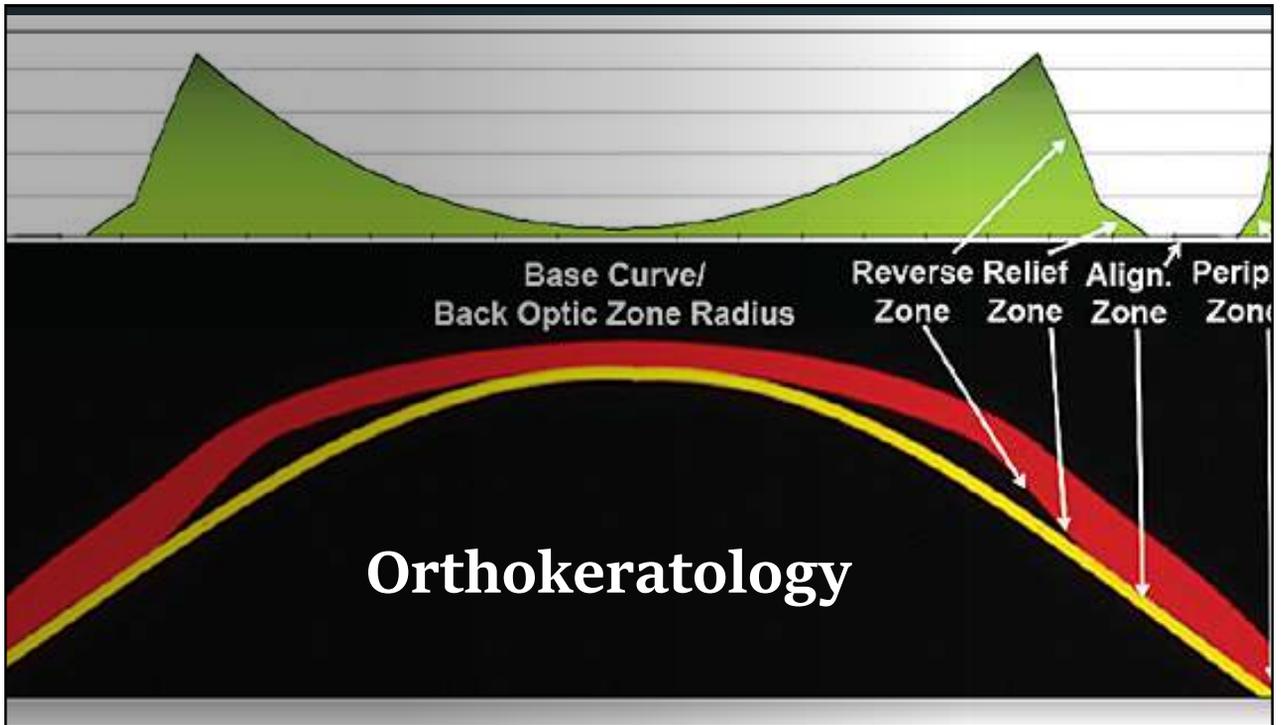


Optimal correction



Single Vision Vs Dual Vision





Orthokeratology

- ❑ In addition to the enhancement of unaided vision at daytime, ortho-k is also able to control myopia progression.
- ❑ The main hypothesis of myopia control using ortho-k is the introduction of myopic defocus on the peripheral retina
- ❑ The maximum power of myopia reduction with overnight ortho-k, and most studies use -4.00 d
- ❑ FDA approved up to -6 d

REVIEW ARTICLE

Myopia Control With Orthokeratology: A Review

Hiraoka, Takahiro M.D.

Author information 

Eye & Contact Lens: Science & Clinical Practice 48(3):p 100-104, March 2022. | DOI:
10.1097/ICL.0000000000000867

- ❑ The inhibitory effect on axial elongation for 2 years has been reported to be from 32% to 63%, as compared with single-vision spectacles and contact lenses.

Randomized Controlled Trial > Optom Vis Sci. 2013 Jun;90(6):530-9.

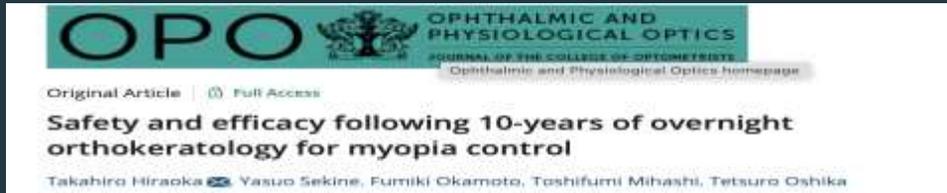
doi: 10.1097/OPX.0b013e318293667d.

High myopia-partial reduction ortho-k: a 2-year randomized studyJessie Charm [†], Pauline ChoAffiliations 

PMID: 23646372 DOI: 10.1097/OPX.0b013e318293667d

- ❑ The myopia control effect was comparable to other studies of Ortho-K in low-moderate myopic subjects over 2 years

Safety of Ortho-K



- ❑ The number of corneal complications, such as keratitis and infiltrates, was found to be significantly higher in the Ortho-K group, but no infectious keratitis was reported.
- ❑ This shows that with appropriate fitting and lens care, Ortho-K is a safe myopic control method.

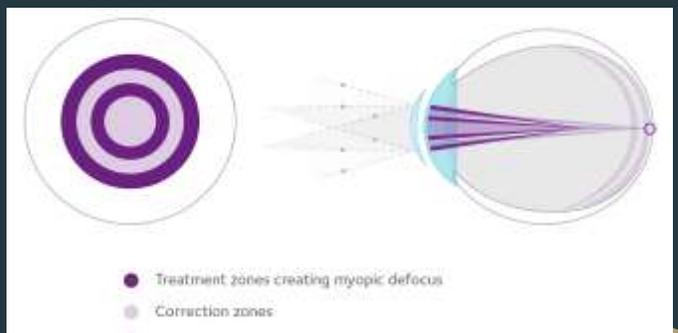
Limitations of Ortho-K

Possible factors affecting the effectiveness of myopic control among Ortho-K wearers.

- The age at which Ortho-K is started
- Baseline myopia
- Cornea profile
- Pupil size

Dual focus contact lenses

DFCL



Dual focus contact lenses

Multicenter Study | Optom Vis Sci. 2022 Mar 1;99(3):204-212.
doi: 10.1097/OPX.0000000000001873.

Long-term Effect of Dual-focus Contact Lenses on Myopia Progression in Children: A 6-year Multicenter Clinical Trial

Paul Chamberlain, Arthur Bradley¹, Sankar Arumugam¹, David Hammond¹, John McIlwily¹, Nicola S Logan², Deborah Jones³, Cheryl Ngo⁴, Sofia C Peixoto-de-Matos⁵, Chris Hunt⁶, Graeme Young⁶

Dual-Focus 1-Day soft contact lens slows myopic progression and axial elongation in children by 59% and 52%, respectively, over 3 years.

Eye growth with DFCL was slowed by **71% over 6 years**

Summary

- Contact lenses are double edged swords.
- Myopia is a disease we should correct and fight its progression.

*Thank
you*



Special Thanks Dr Alaa Ghaith
Dr Shahira Rashad