REFRACTIVE ERRORS

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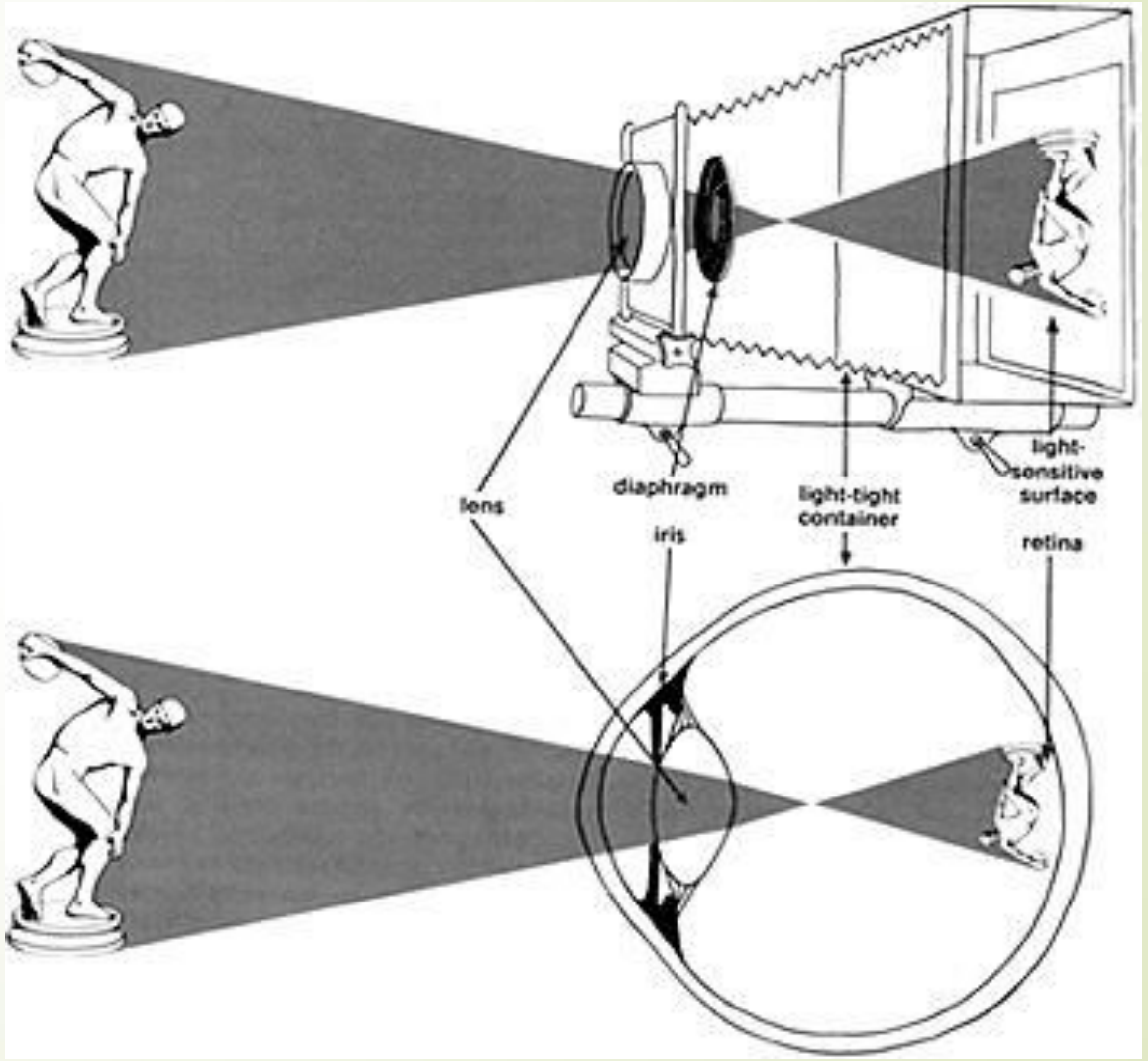
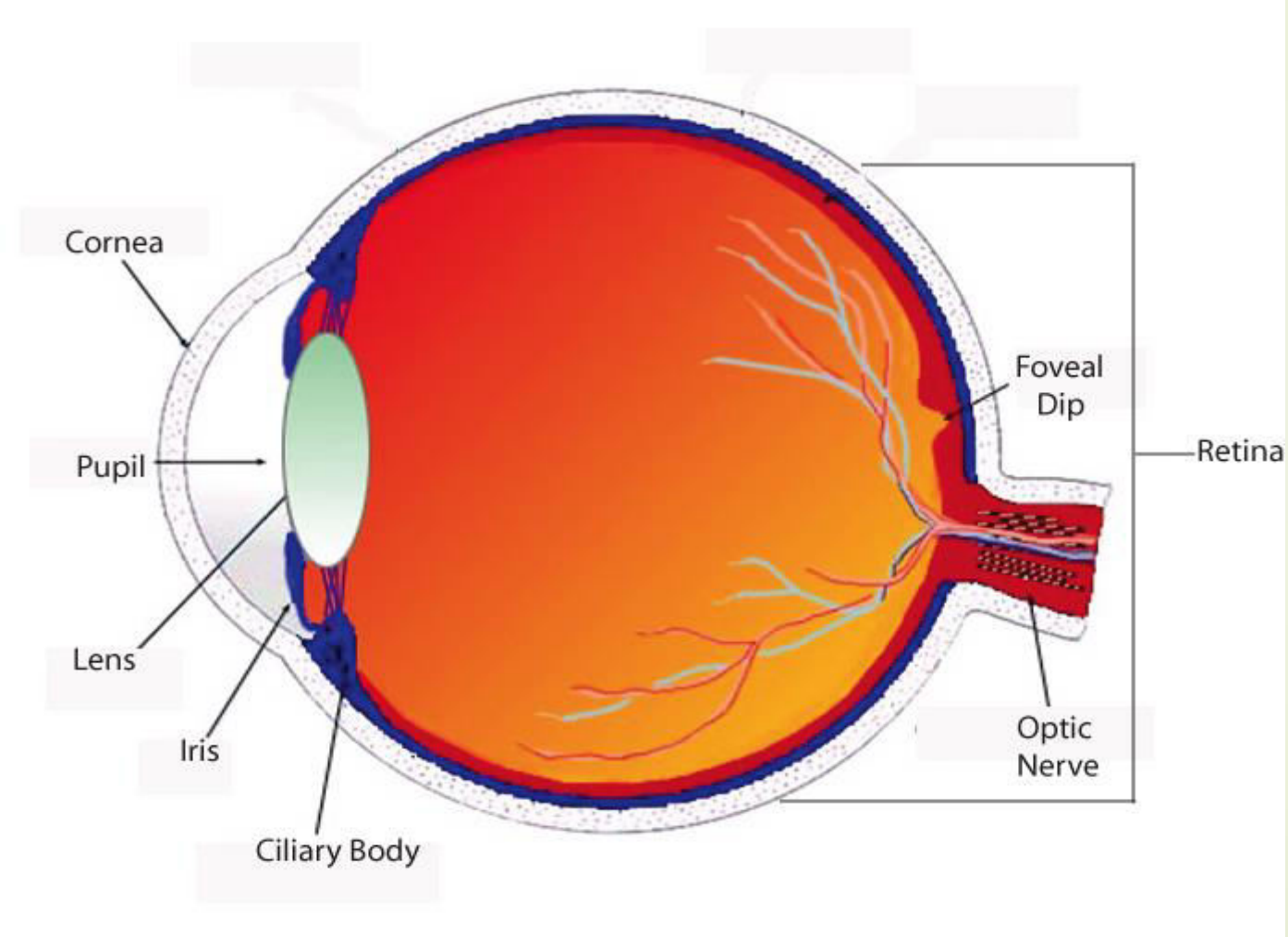
Objectives:

- Define and enumerate treatment options of
  - Emmetropia
  - Myopia
  - Hypermetropia
  - Astigmatism
  - Presbyopia

- **Eyelids**- shutter
- **Cornea**- focusing system
- **Lens**- focusing system
- **Iris**- diaphragm
- **Choroid**- dark chamber
- **Retina**-light sensitive film

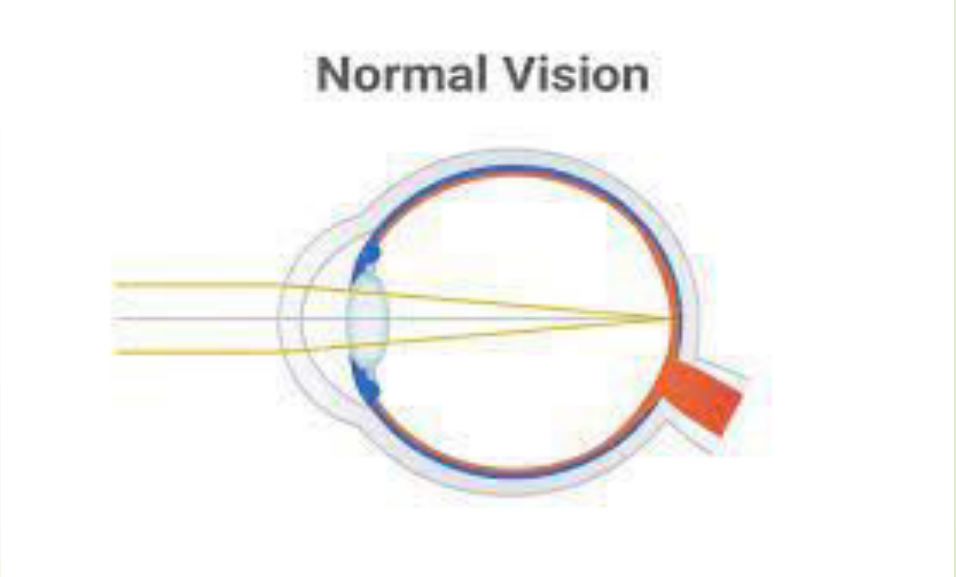



Cornea
Pupil
Lens
Iris
Ciliary Body
Foveal Dip
Retina
Optic Nerve

- Emmetropia
- Ametropia
  - Myopia
  - Hypermetropia
  - Astigmatism
  - Presbyopia

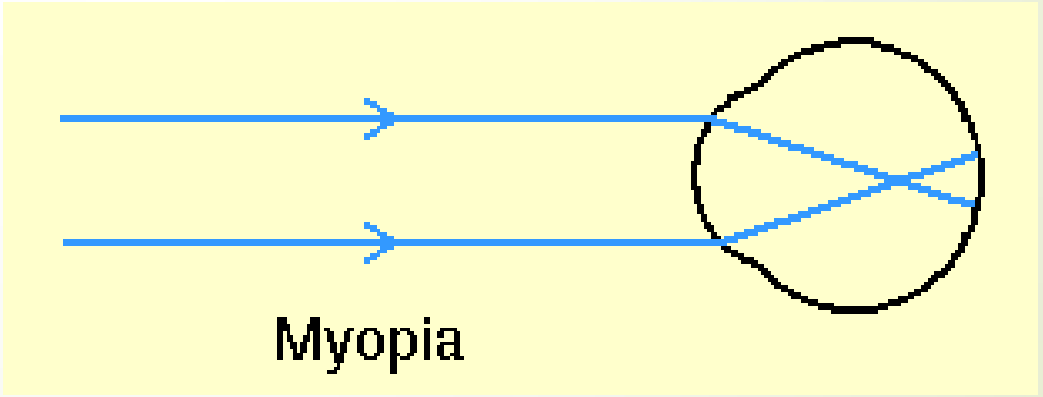
Emmetropia

- Parallel rays of light focus on retina with accommodation at rest



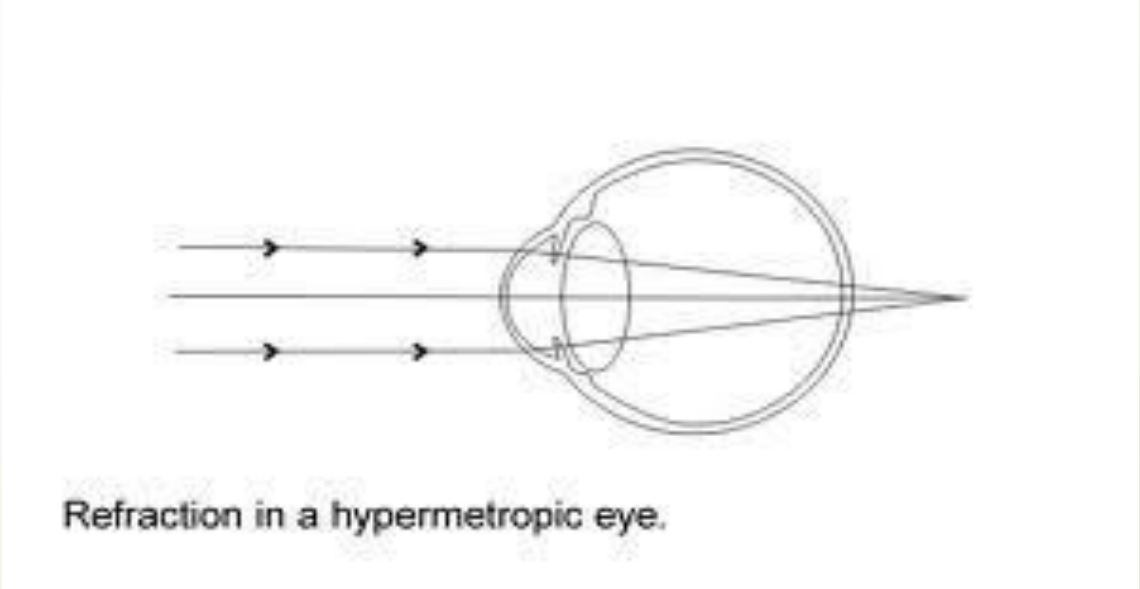
Myopia

- A form of refractive error in which parallel rays of light entering the eye are focused in front of retina with accommodation being at rest.



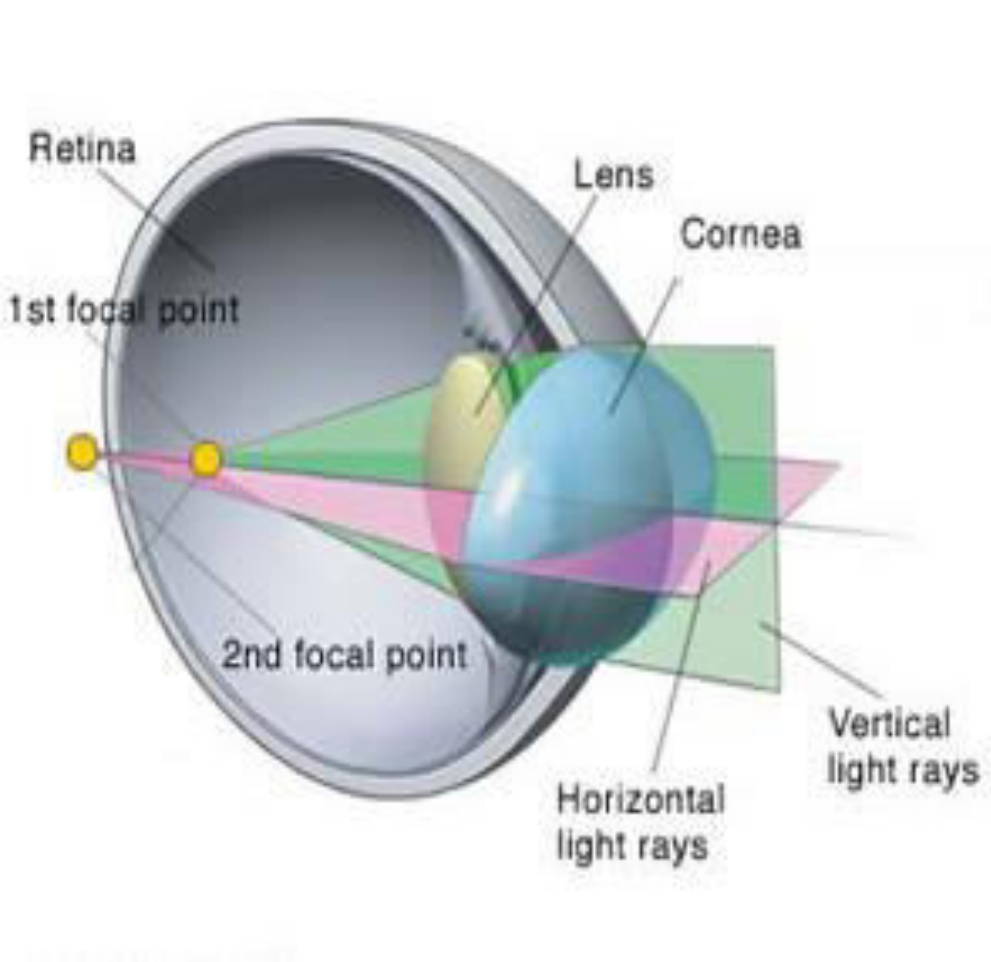
Hypermetropia

- Parallel rays of light coming from infinity are focused behind the retina with accommodation at rest



Refraction in a hypermetropic eye.

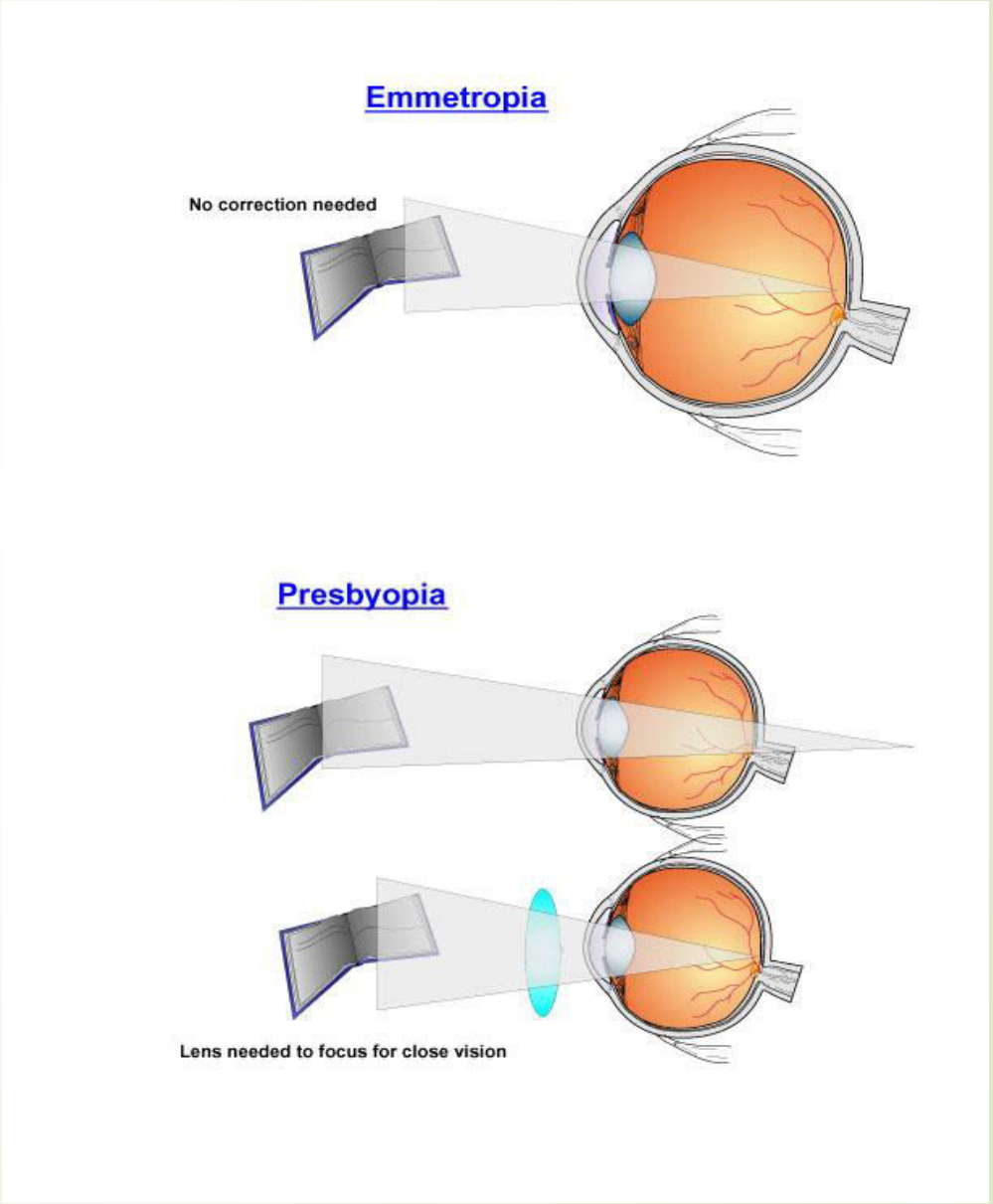
ASTIGMATISM



- A-Stigma = Not a point
- A defect of an optical system causing light rays from a point source to fail to meet in a focal point resulting in a blurred and imperfect image

PRESBYOPIA

- The physiologic loss of accommodation in the eyes with advancing age



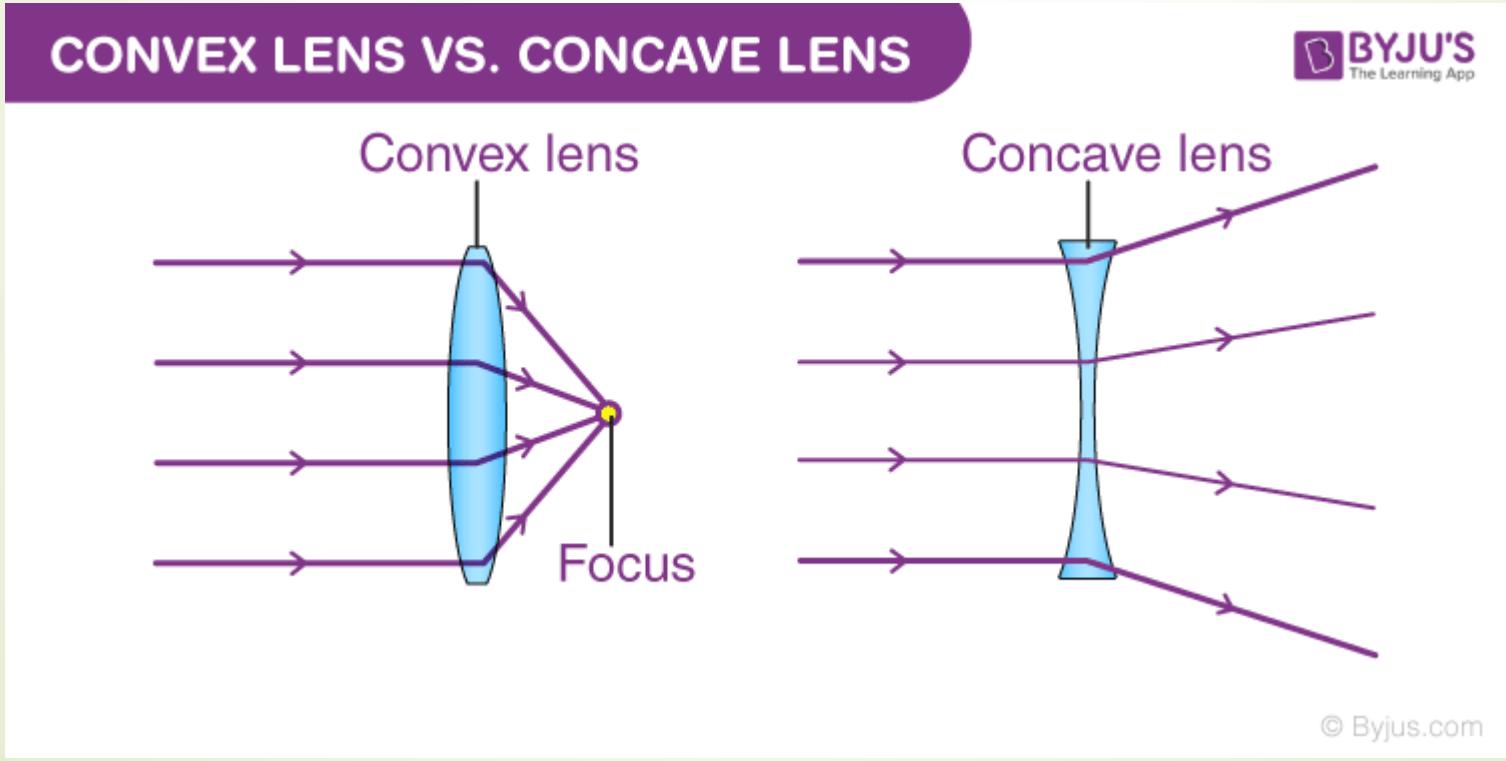
Treatment

GLASSES

- *Myopia*
  - Concave = - (minus) lenses

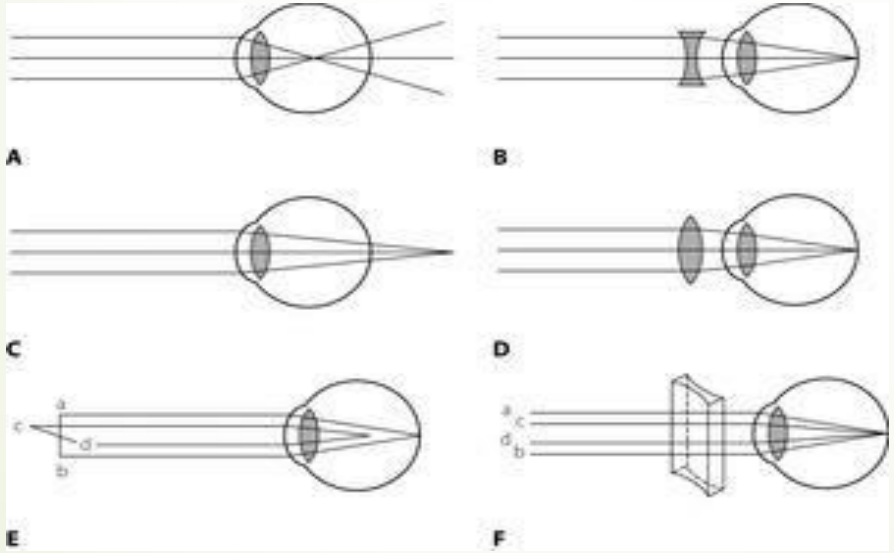
Hypermetropia

- Convex = + (plus)



ASTIGMATISM

- Cylindrical lenses



Contact lenses

why opt for refractive surgery

Previously:

- Profession
- Sport
- Spec/CL intolerance

Now:

- Cosmesis
- Frustration with use of spec
- Improved Unaided VA

- Keratorefractive procedures
- Lens based refractive procedures
- Combined procedures

- **Incisional**
  - Radial keratotomy
  - Astigmatic keratotomy
  - Limbal relaxing incisons
- **Laser ablation**
  - PRK
  - LASIK
  - SMILE
- **Corneal implants**
  - ICL
  - Intrastromal corneal ring segments (INTACS)

Preoperative evaluation

- History Taking
- Screening
- Examination and counselling

Ophthalmic Examination

- VA
- Refraction
- Gross External Examination
- SLE
- Fundus Examination
- Jones' Basal tear secretion rate

Patient selection

- Age: 18 or more
- Stable refraction: at least 6-12 months
- Normal eye exam
- Normal screening tests

Systemic contraindications

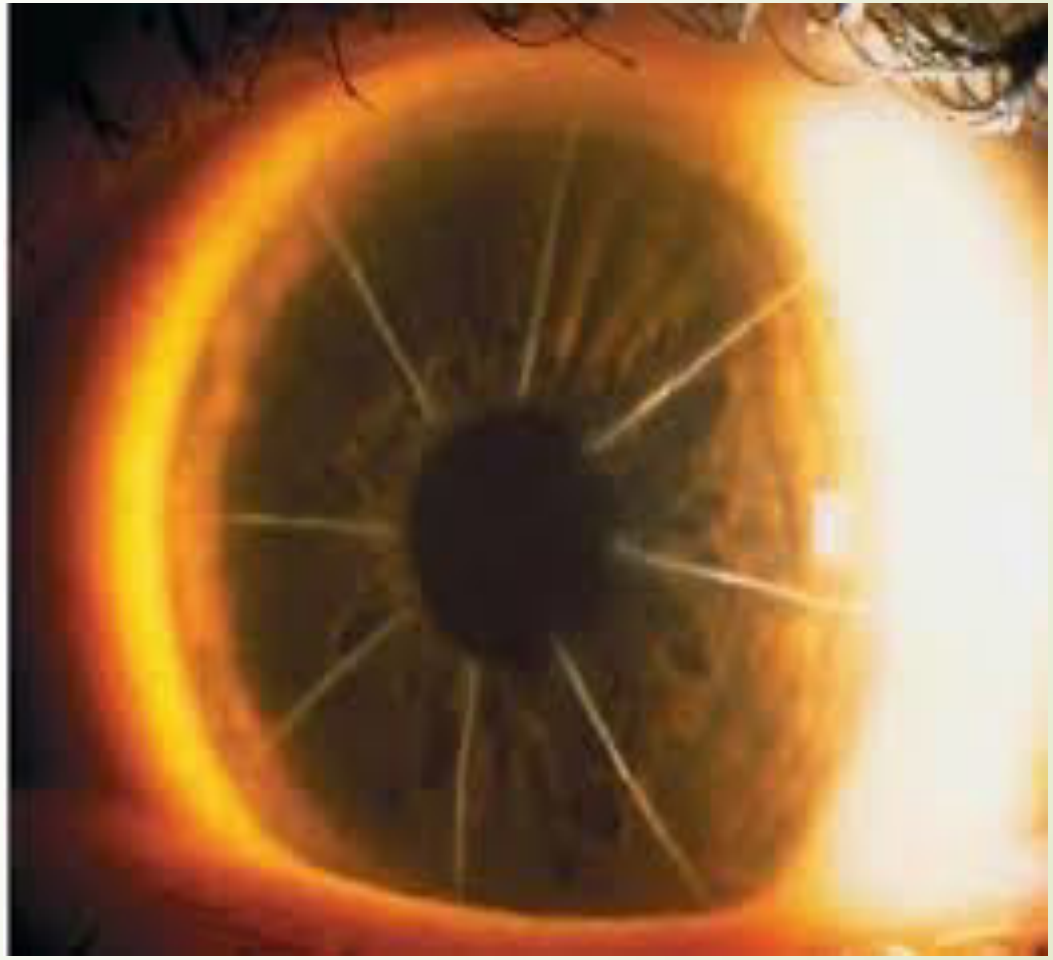
- DM
- Pregnancy/Lactation
- Autoimmune disorders(RA,SLE,PAN)
- Immunodeficiency
- Abnormal wound healing(Keloid)

Ophthalmic Contraindications

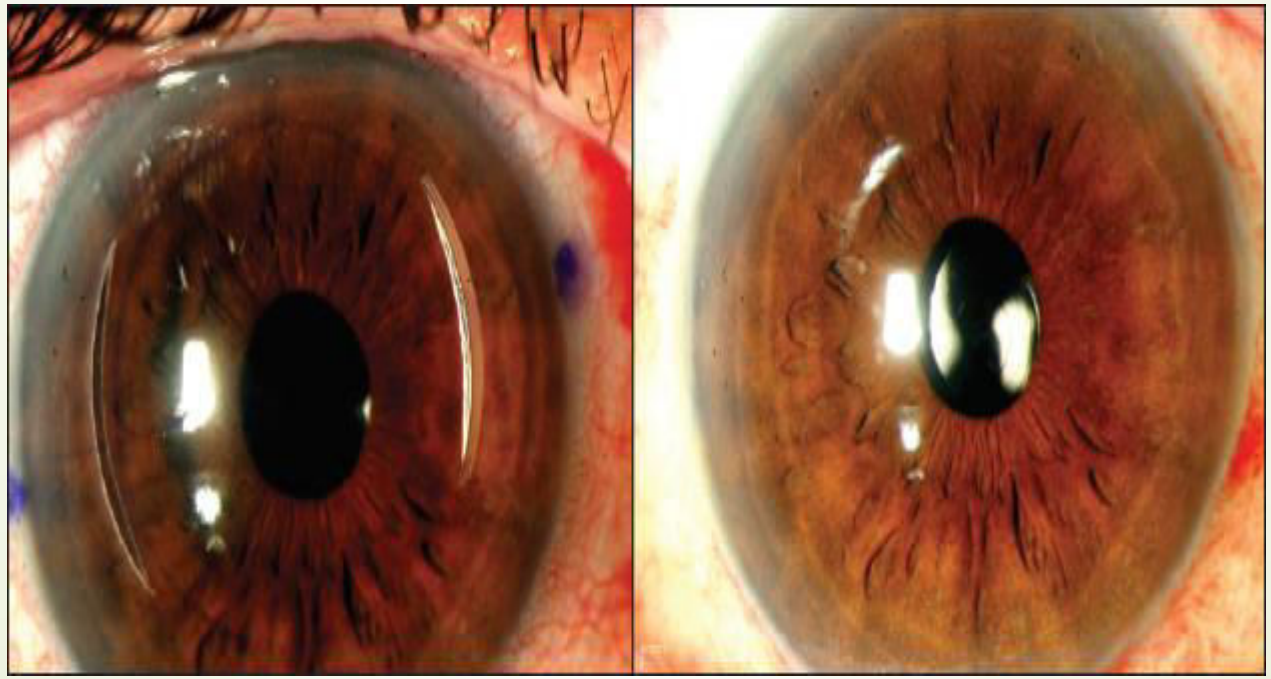
- HZO, HSK
- Glaucoma
- Dry eyes
- High irregular astigmatism
- Corneal ectasia i,e KC, PMD
- Uveitis, Progressive retinal degenerations

Radial Keratotomy

- Russian surgeon svyatoslav Nikolay Fyodrov. 1970



Astigmatic Keratotomy



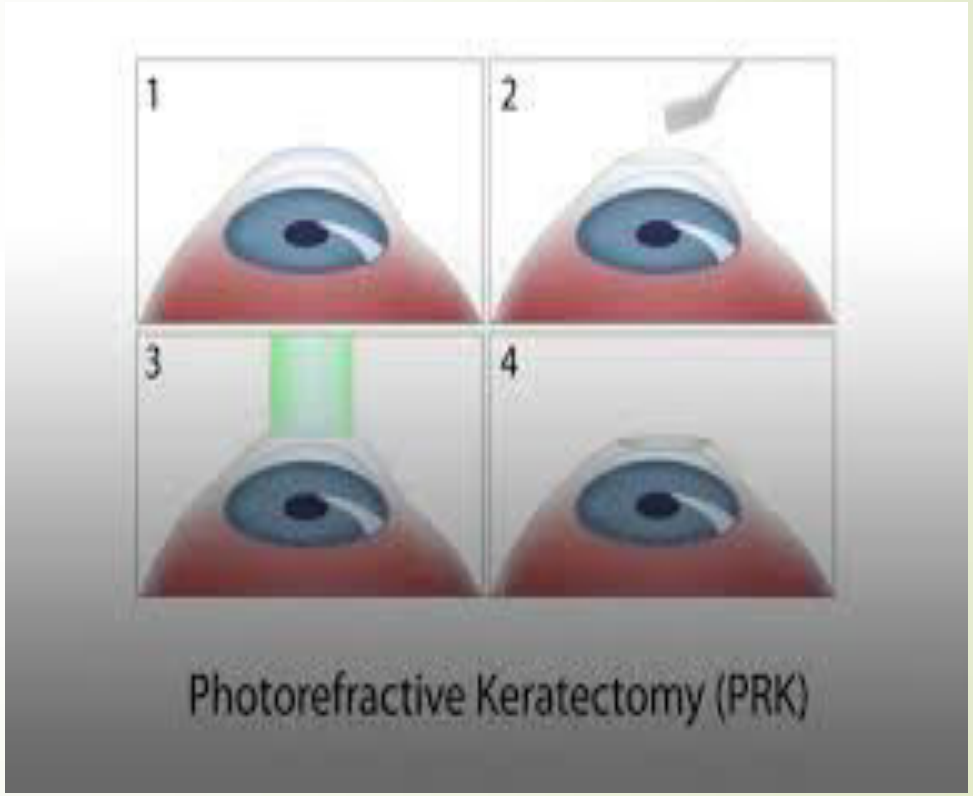
complications

- Under/overcorrection
- Instability of correction
- Astigmatism
- Perforation
- Traumatic globe rupture
- Bacterial keratitis
- Glare

- Blind eye, partially sighted and fully sighted clinical trials
- LASIK was developed by Ioannis Pallikaris

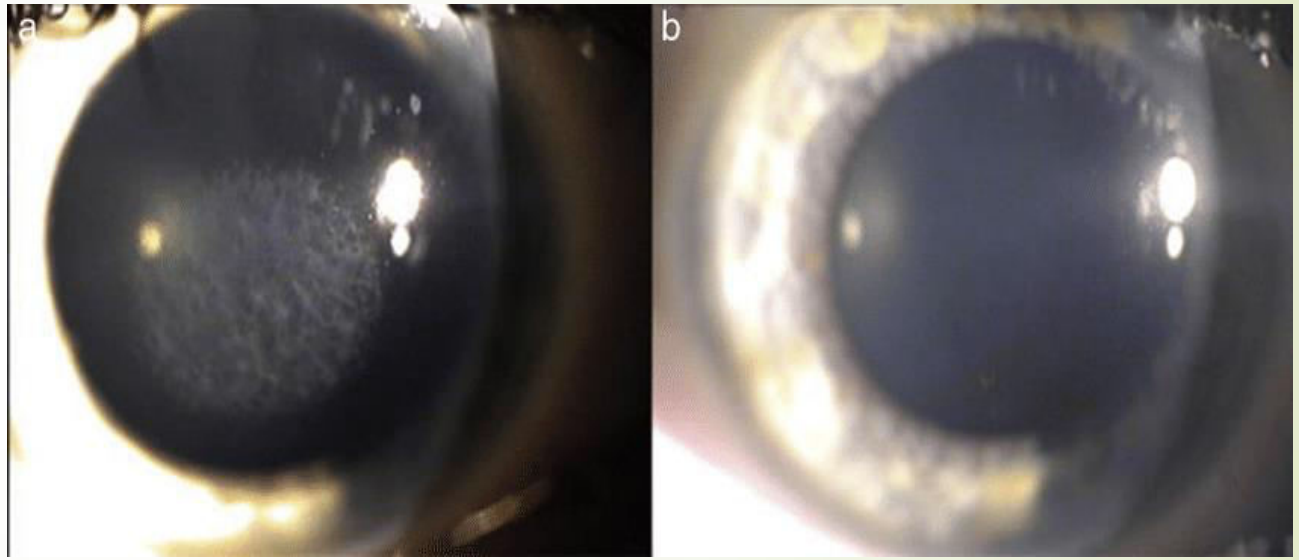
Photorefractive Keratectomy (PRK)

- Epithelial removal
- Patient fixate on aiming beam
- Photoablation of cornea
- MMC
- BCL



Complications

- Pain
- Decentration
- Corneal haze
- Keratitis
- Dryness



LASIK (Laser Assisted In Situ Keratomileusis)


BASIC LASIK PROCEDURE
2
3
Under L/A, cornea is marked
Suction ring applied (65mmHg)
Microkeratome cut hinged flap
4
5
6
Flap folded to expose stromal bed
Stromal ablated
Flap repositioned

Advantages

- No or minimal pain
- Early recovery
- Residual haze is unlikely
- High degree of correction
- Less regression

Disadvantages

- Flap complications
  - Incomplete
  - Thin flap
  - Button hole
  - Free cap
- Army personnel
- Contact sports

SMILE(SMall Incision Lenticule Extraction)

- Patient raised to contact glass
- Suction is applied

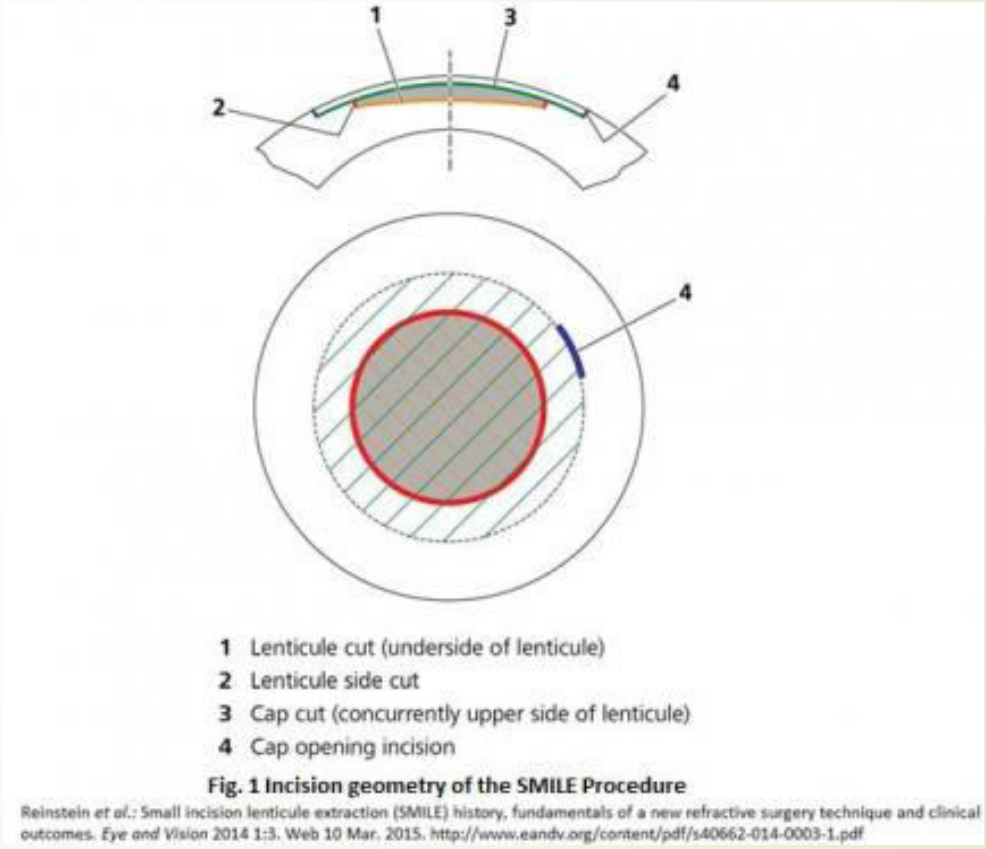
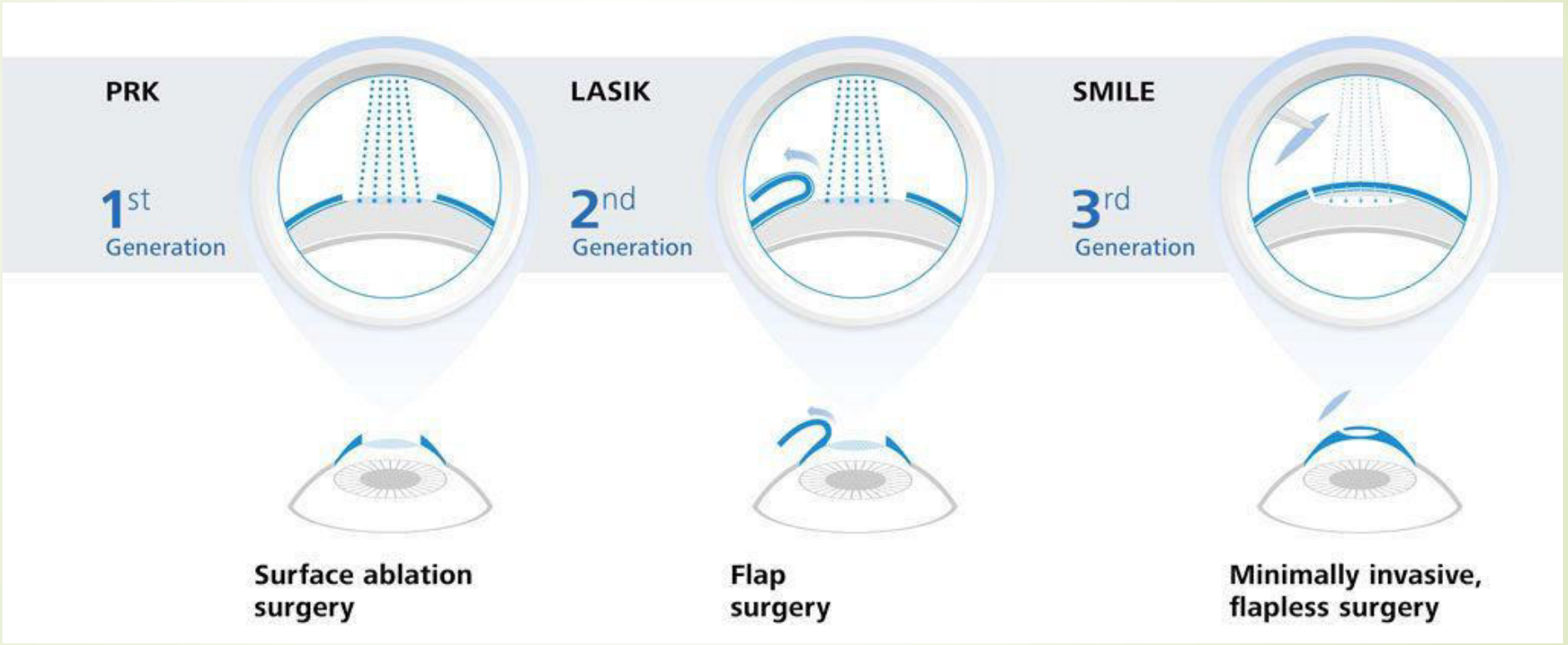


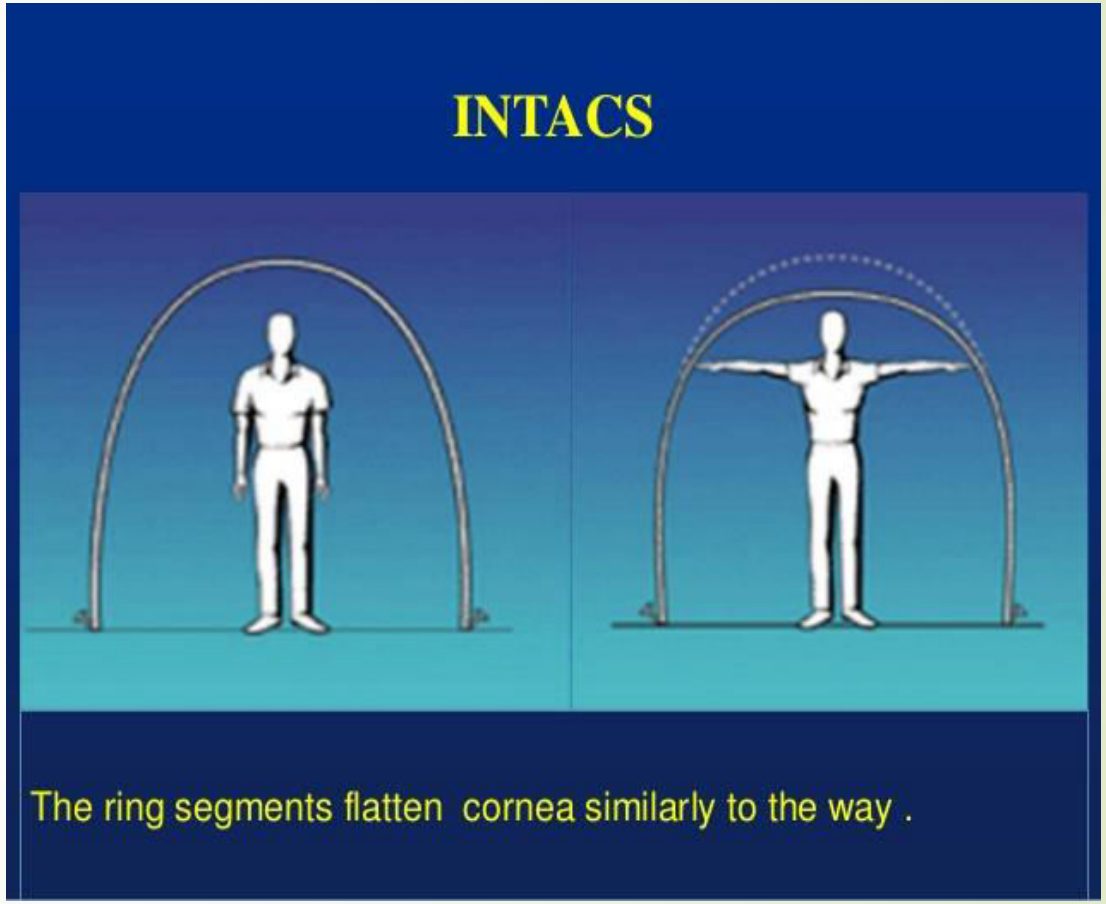
Fig. 1 Incision geometry of the SMILE Procedure

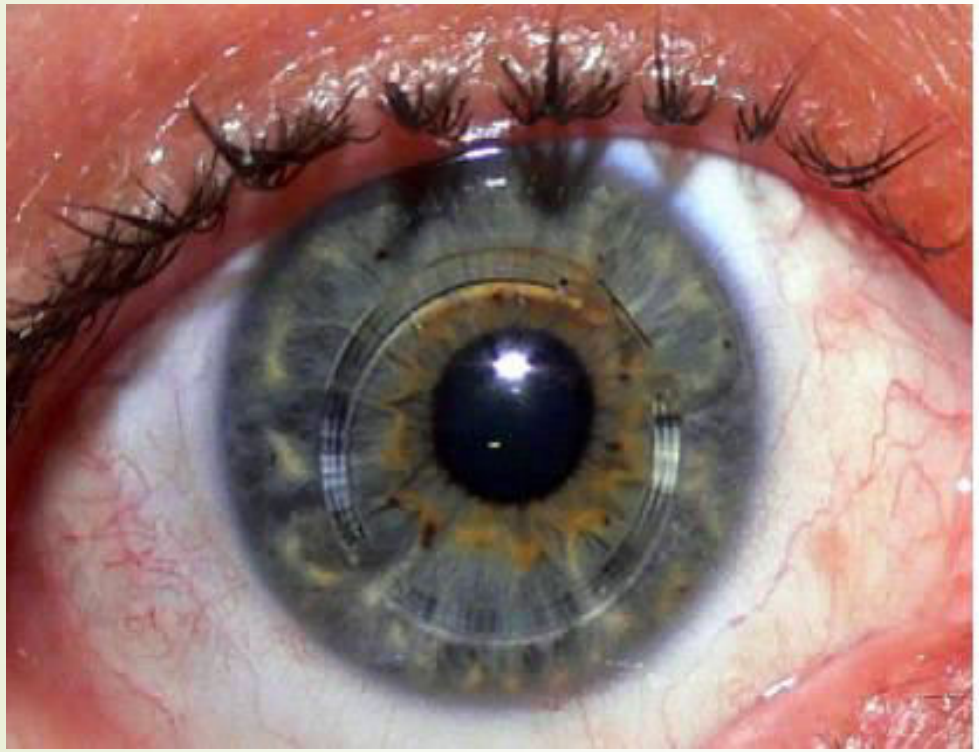
Reinstein *et al.*: Small incision lenticule extraction (SMILE) history, fundamentals of a new refractive surgery technique and clinical outcomes. *Eye and Vision* 2014 1:3. Web 10 Mar. 2015. http://www.eandv.org/content/pdf/s40662-014-0003-1.pdf

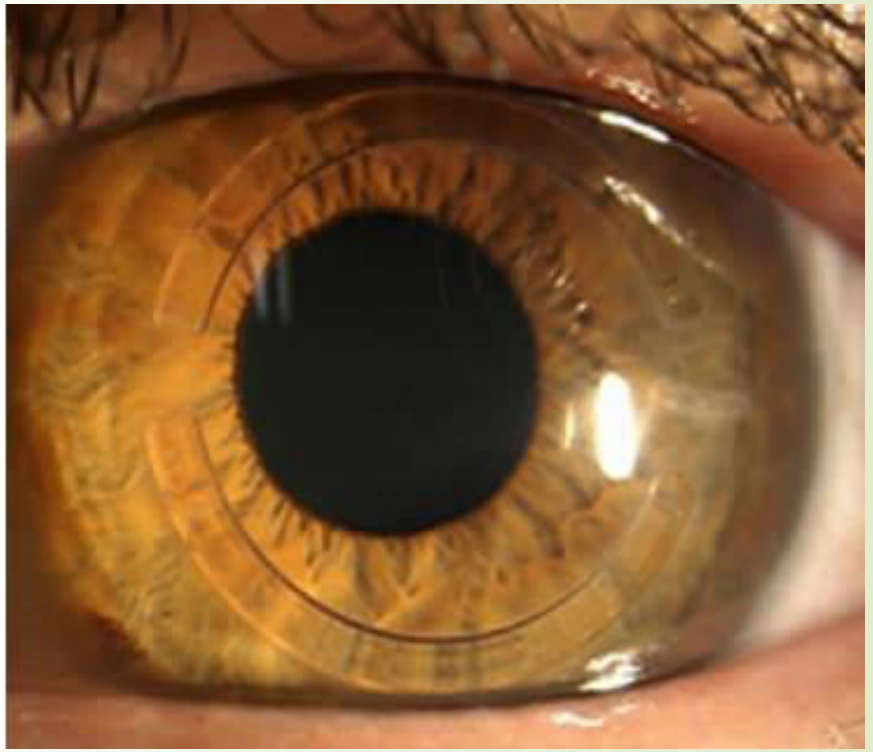

PRK
1st Generation
LASIK
2nd Generation
SMILE
3rd Generation
Surface ablation surgery
Flap surgery
Minimally invasive, flapless surgery

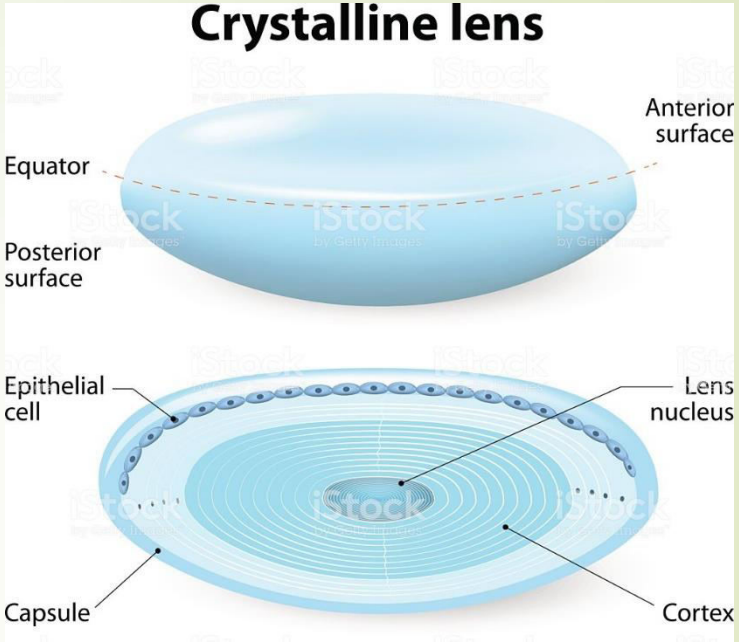
Intracorneal Ring Segments

- Intacs
- Keratoconus
- Flatten central cornea









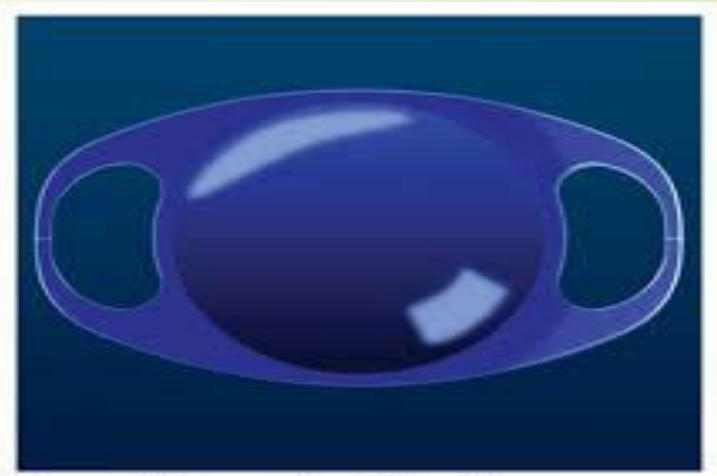
LENS BASED SURGERY

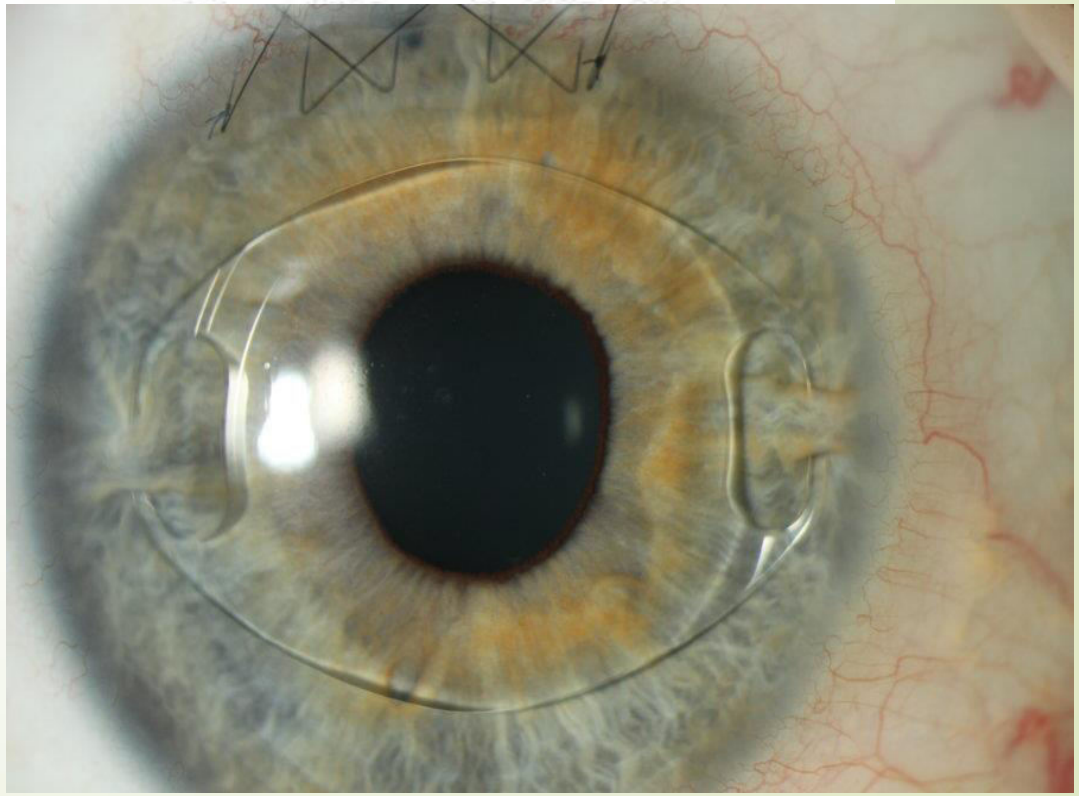
Phakic IOLs

- 1953 by Dr. Strampelli
- High refractive error
- Not suitable for corneal procedures

Artisan

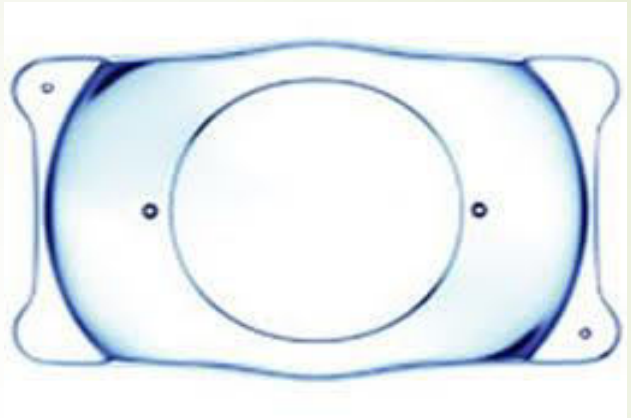
- Iris claw
- AC IOL
- Complications
  - Inflammation
  - Glaucoma
  - Decompensations

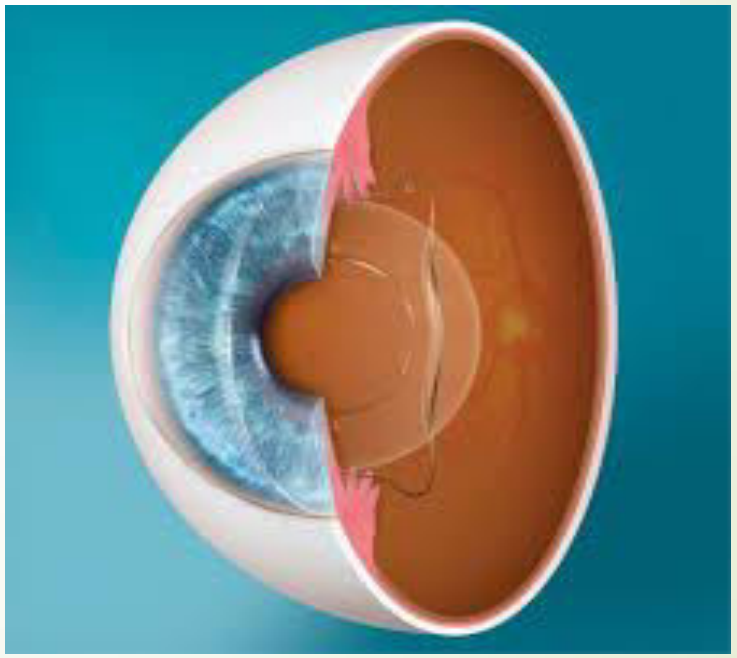




visian

- PC pIOL
- b/w iris and lens
- Complications
  - Cataract
  - Glaucoma
  - Inflammation





Refractive Lens Exchange

- Clear lens exchange
- Presbyopic age
- High Hypermetrope

Thank you for your cooperation