



STURM'S CONOID

HIBA AYISHA L J

112

❑ Spherical errors

- in every axis, same amount of errors
- even refractive surfaces
- focused on a point

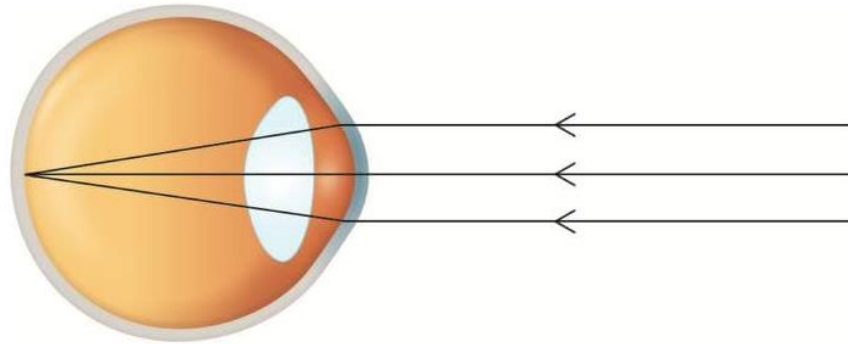


Fig. 4.1 *Refraction in an emmetropic eye*

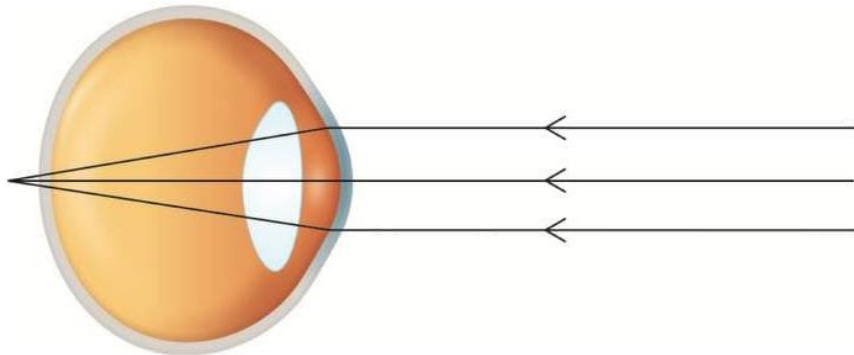


Fig. 4.2 *Refraction in a hypermetropic eye*

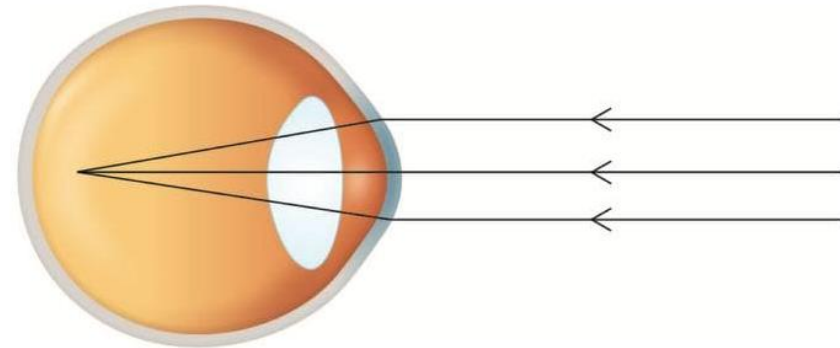
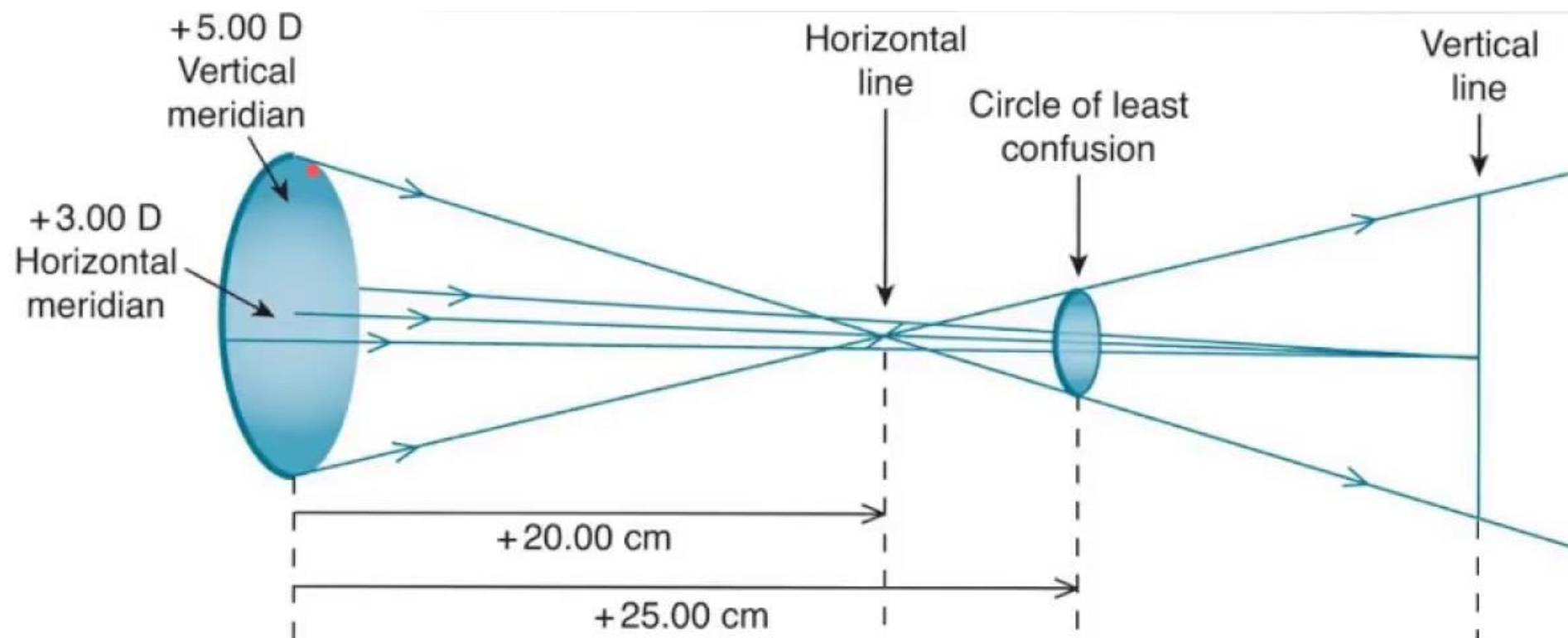


Fig. 4.4 *Refraction in a myopic eye*

❑ Cylindrical errors - ASTIGMATISM

- uneven surface (toric surface)
- rays will not come to a point focus
- forms two focal lines

❑ Configuration of rays refracted through a toric surface in regular astigmatism is called **STURMS CONOID**



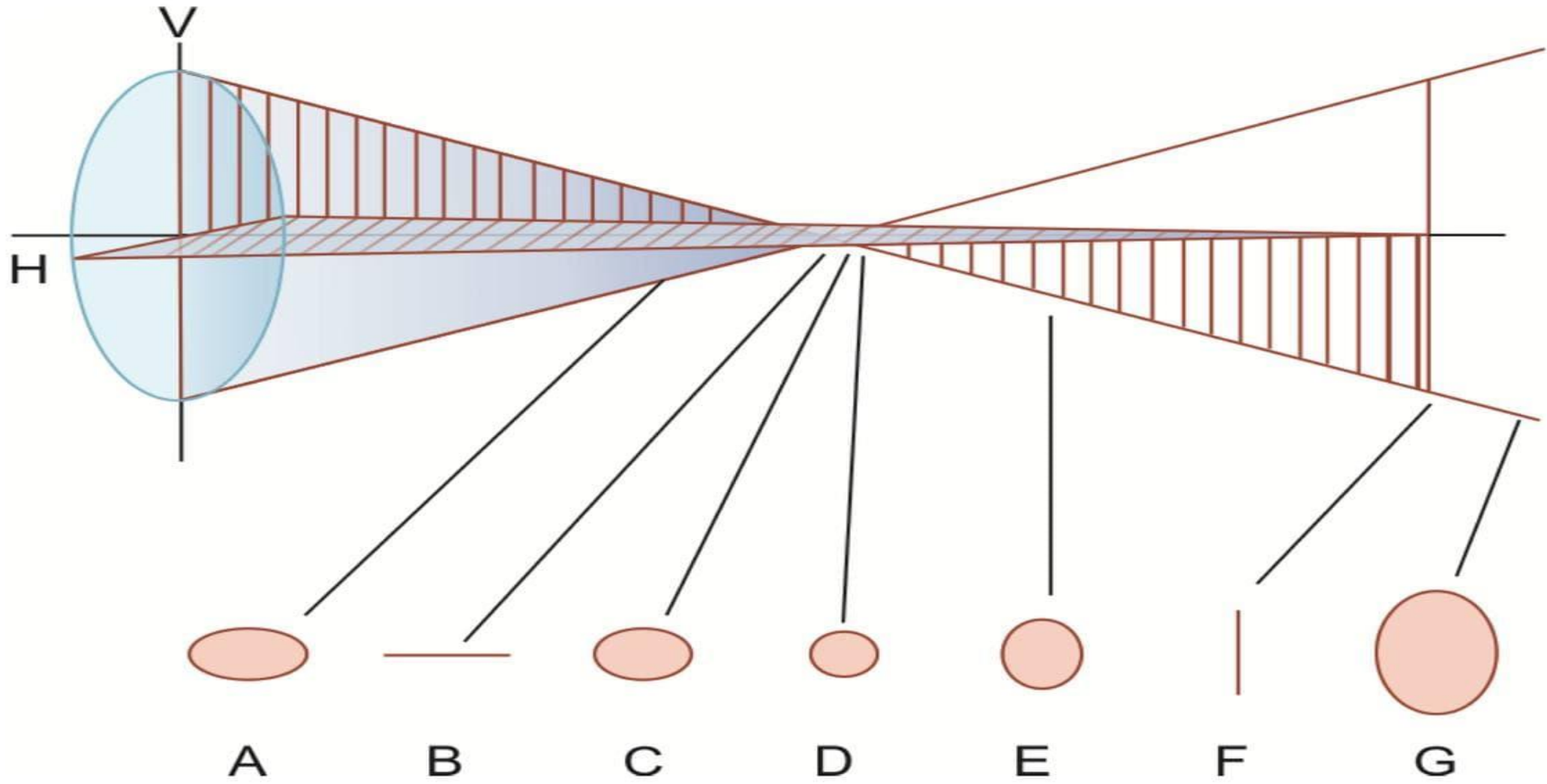
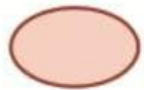


Fig. 4.10 *Sturm's conoid*



A

OBLATE ELLIPSE/HORIZONTAL OVAL

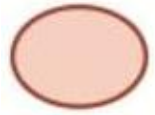
vertical rays are converging more than horizontal rays



B

HORIZONTAL LINE

vertical rays have come to a focus while horizontal rays are still converging



HORIZONTAL OVAL

C

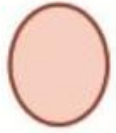
vertical rays are diverging and their divergence is less than convergence of horizontal rays



CIRCLE OF LEAST DIFFUSION

D

vertical rays are diverging and their divergence is exactly equal to the convergence of horizontal rays



E

VERTICAL OVAL

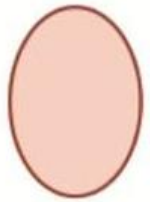
divergence of vertical rays is more than the convergence of horizontal rays



F

VERTICAL LINE

horizontal rays have come to a focus while the vertical rays are divergent



G

VERTICAL OVAL/PROLATE ELLIPSE

Both horizontal and vertical rays are diverging, so the section will always be a vertical oval

**Focal interval of Sturm – distance between two foci (B and F)*

TYPES OF ASTIGMATISM AT DIFFERENT POINTS



A

Vertical – converging (hypermetropic)
Horizontal – converging (hypermetropic)

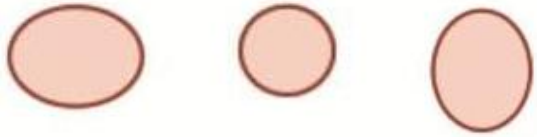
COMPOUND HYPERMETROPIC ASTIGMATISM



B

Vertical – emmetropic
Horizontal – converging (hypermetropic)

SIMPLE HYPERMETROPIC ASTIGMATISM



C

D

E

Vertical – diverging (myopic)
Horizontal – converging (hypermetropic)

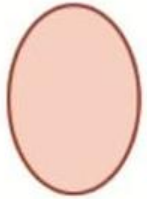
MIXED ASTIGMATISM



F

Vertical – diverging (myopic)
Horizontal – emmetropic

SIMPLE MYOPIC ASTIGMATISM



G

Vertical – diverging (myopic)
Horizontal – diverging (myopic)

COMPOUND MYOPIC ASTIGMATISM



THANK YOU

