
UNIT 4 ANATOMY OF LENS

Structure

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4.0 OBJECTIVES

After reading this unit, you should be able to understand:

- different parts of the lens; and
- functions of lens.

4.1 INTRODUCTION

In the previous unit you have studied the anatomy of outer coats of eyeball and anatomy of anterior and posterior chamber. Lens is a structure that occupies space in posterior chamber. In this unit you will study the structure and composition of crystalline lens.

Lens is a transparent structure of the eye. It is a biconvex structure and its main function is to focus light rays on the retina. Lens also helps in the process of accommodation. As age increases transparency of lens is lost. This process is called cataract. Cataract is a common disorder of eye.

4.2 ANATOMY OF LENS

Lens is a biconvex transparent structure of the eye. Along with cornea, lens forms the optical surfaces of the eye and helps in the formation of image on the retina. Lens acts as a convex lens and when light falls on it, light is converged. Lens has to be transparent so as to function as an effective optical system. When transparency of lens is lost this condition is known as cataract.

Description of Lens

Shape: Biconvex

Situation: Between iris anteriorly and vitreous posteriorly. It lies within the anterior concavity of vitreous which is known as patellar fossa.

Pole of Lens: The centre of anterior and posterior surface is known as pole of the lens. The anterior pole is about 3 mm from the back of cornea.

Diameter: 9-10 mm

Thickness: 4-4.5 mm

Surfaces: Anterior surface (radius of curvature = 10 mm)

Posterior surface (radius of curvature = 6 mm)

Anterior surface is less convex than posterior.

Equator of Lens: Junction of the anterior and posterior surface is called equator of the lens.

Relationship of Lens

Anterior Relationship

Posterior surface of the iris.

Posterior Relationship

Anterior surface of the vitreous.

Structure of the Lens

Lens consists of:

- 1) Capsule
- 2) Cortex
- 3) Nucleus

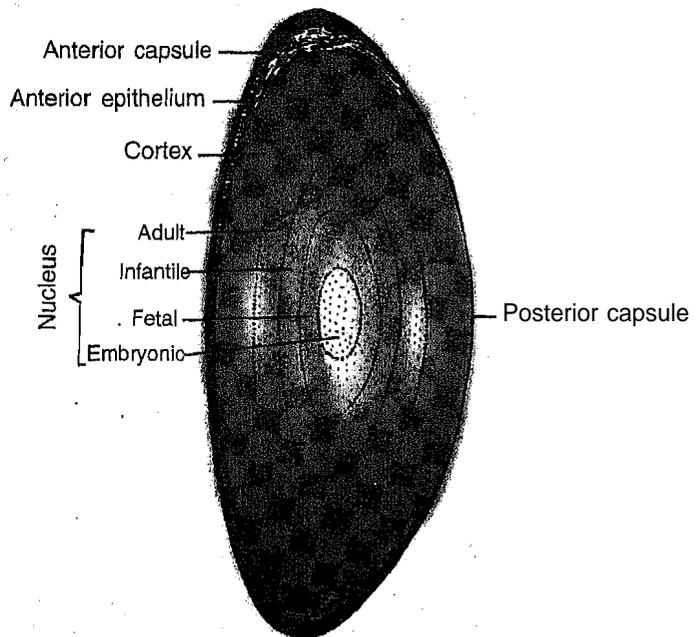


Fig. 4.1: Major components of adult lens

Lens Capsule

Capsule is a membrane like structure completely surrounding the lens. Capsule surrounding the anterior surface of the lens is called anterior capsule and the capsule surrounding the posterior surface is called posterior capsule. The thickness of anterior capsule is more than that of posterior capsule.

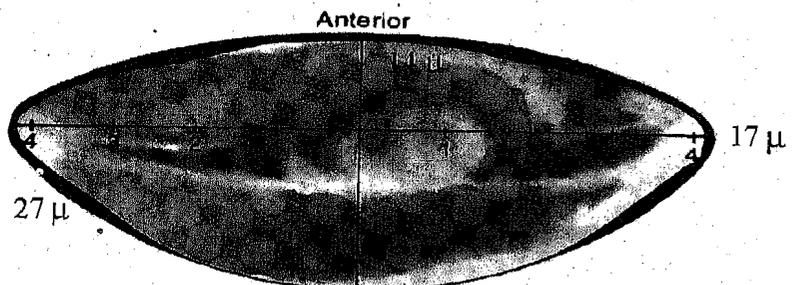


Fig. 4.2: Variable thickness of lens capsule'

Histologically, capsule is a basement membrane cuboidal cell situated underneath the anterior capsule. There are about 500000 cells in a mature lens. There is no epithelium underneath the posterior capsule. The cells are the metabolically most active cells. These cells have fibroblast like activity and helps in the formation of lens fibres. The cells near the equator are the most active cells. The cells continuously form lens fibres. Cells underneath the central part of capsule are polygonal with rounded nucleus.

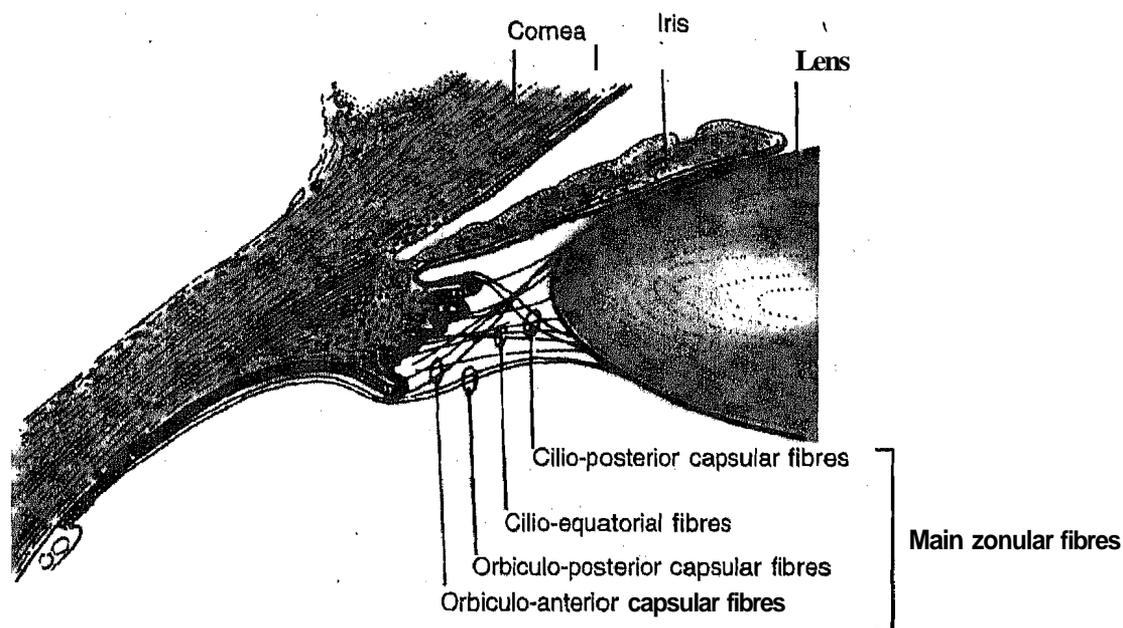


Fig 4.3: Arrangement of main zonular fibres (Old Concept)

Cortex

Part of the lens between the nucleus and capsule is called cortex.

Essentially lens consists of transparent lens fibers. These fibers are formed from the epithelium situated beneath the anterior capsule.

Lens fibres: Formation of lens fibres occur throughout life. As fresh fibres arise the old fibres are pushed to the centre of the lens. The central fibres gets compressed at the centre and because of their compactness looks dense and is called nucleus.

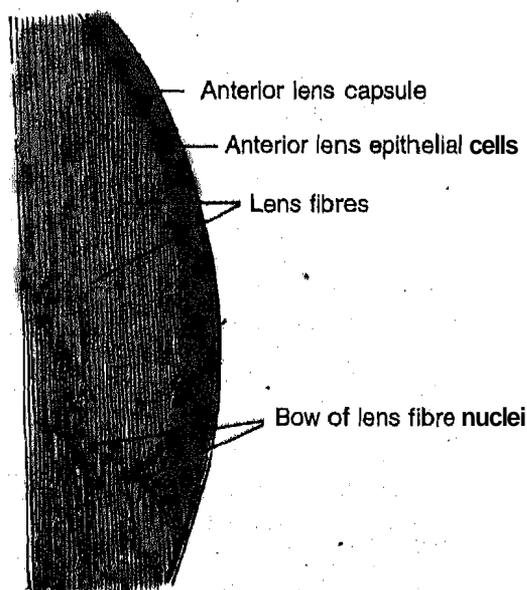


Fig. 4.4: Nuclear bow

Lens Nucleus

The central dense portion of the lens is called nucleus.

The four nuclei which are formed at different stages of life up to late adolescence are namely; Embryonic nucleus (1-3 months of gestation), Fetal nucleus (from 3 months of gestation to till at birth), Infantile nucleus (From birth to puberty), and Adult nucleus (early adult life).

Ciliary Zonules

Ciliary zonules consists essentially of a series of fibres passing from the ciliary body to the lens. These zonules are attached to the equator of the lens and helps in its suspension within the. When ciliary body contracts, the zonules release. This happens when we see some near objects. This process is known as accommodation.

Check Your Progress

1) What is the shape of the lens?

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2) Mention different parts of lens.

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3) Mention the thickness of lens.

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4.3 LET US SUM UP

In this unit you have learnt that lens is transparent structure of the eyeball. It is completely avascular. Shape of lens is convex. Along with cornea, lens acts as optical surfaces of the eye. Loss of transparency of lens lead to condition called cataract. In next unit you will learn about anatomy of inner coat of eyeball and vitreous.

4.4 ANSWERS TO CHECK YOUR PROGRESS

- 1) Biconvex
- 2) Cortex, Nucleus, Capsule
- 3) 4 to 4.5 mm.