Lens measurements

Birth: # mm equatorial, # mm anteroposterior
- **Lens measurements**
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
• Lens measurements
  • Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  • Adult: # mm equatorial, # mm anteroposterior
A

- **Lens measurements**
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior
Q

- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

Cataract surgeons will sometimes employ an age-based rule of thumb for guestimating the A-P depth of a lens—what is it?
Cataract surgeons will sometimes employ an age-based rule of thumb for guestimating the A-P depth of a lens--what is it?
A-P depth = ‘Four-point-age’ (eg, the A-P depth of the lens in a 65 y.o. is ~4.65 mm)
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age...
- Lens curvature increases vs decreases \(\rightarrow\) refractive power
A

- Lens measurements
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior
- With age…
  - Lens curvature increases → ↑ refractive power
- **Lens measurements**
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

- **With age…**
  - Lens curvature **increases** $\rightarrow$ ↑ refractive power
  - Refractive index **increases vs decreases** $\rightarrow$ ↑ or ↓ refractive power
- **Lens measurements**
  - Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
  - Adult: 9.0 mm equatorial, 5.0 mm anteroposterior
- **With age...**
  - Lens curvature increases → ↑ refractive power
  - Refractive index decreases → ↓ refractive power
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age…
- Lens curvature increases → ↑ refractive power
- Refractive index decreases → ↓ refractive power

So which do people become with age—more myopic or more hyperopic?
Lens measurements
- Birth: 6.4 mm equatorial, 3.5 mm anteroposterior
- Adult: 9.0 mm equatorial, 5.0 mm anteroposterior

With age…
- Lens curvature increases → ↑ refractive power
- Refractive index decreases → ↓ refractive power

So which do people become with age—more myopic or more hyperopic? That depends. The change in an individual’s refraction is a function of the interplay of these two factors.
Lens capsule thickness: Fill in the blanks

Anterior

? \( \mu m \)

\_ \( \mu m \)

\_ \( \mu m \)

\_ \( \mu m \)

Posterior
Lens capsule thickness: Fill in the blanks

Anterior

14 μm

? μm

Posterior

? μm

14 μm
Lens capsule thickness: Fill in the blanks

Anterior

14 μm

? μm

21 μm

? μm

Posterior

Q/A
Lens capsule thickness: Fill in the blanks

Anterior:
- 14 μm
- ? μm

Posterior:
- 21 μm
- 7 μm
- ? μm

Q/A
Q/A

Lens capsule thickness: Fill in the blanks

Anterior

14 μm

Posterior

21 μm

23 μm

7 μm
Lens capsule thickness: Fill in the blanks

Anterior

14 \mu m

Posterior

21 \mu m

23 \mu m

4 \mu m
The posterior capsule is so thin it is always distended. Thus, all changes in lens shape during accommodation occur at the anterior capsule.
Zonules

Embryologically, the vitreous
Zonules

Embryologically, the *tertiary vitreous*
Zonules

- Embryologically, the tertiary vitreous originates from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body.
A

- Zonules
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented epithelium* of the *pars plana* and *pars plicata* of the ciliary body
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- **# - #** μm in diameter
A

- Zonules
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
  - 5-30 μm in diameter
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the **basal lamina** of the **nonpigmented** epithelium of the **pars plana** and **pars plicata** of the ciliary body
- 5-30 μm in diameter
- Stain with one stain and another stain
A

- Zonules
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
  - 5-30 µm in diameter
  - Stain with *eosin* and *PAS*
• Zonules
  • Embryologically, the tertiary vitreous
  • Originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body
  • 5-30 μm in diameter
  • Stain with eosin and PAS
  • Three sets of fibers:
    1) Insert at the same location
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 μm in diameter
- Stain with *eosin* and *PAS*
- Three sets of fibers:
  1. *Equatorial*: Insert at the equator (duh)
Zonules

- Embryologically, the **tertiary vitreous**
- Originate from the **basal lamina** of the **nonpigmented** epithelium of the **pars plana** and **pars plicata** of the ciliary body
- 5-30 μm in diameter
- Stain with **eosin** and **PAS**

Three sets of fibers:

1. **Equatorial**: Insert at the **equator (duh)**
   - These zonules **regress vs strengthen** with age
Zonules

Embryologically, the tertiary vitreous

Originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body

5-30 μm in diameter

Stain with eosin and PAS

Three sets of fibers:

1) Equatorial: Insert at the equator (duh)
   - These zonules regress with age
Zonules

- Embryologically, the *tertiary vitreous*
- Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
- 5-30 μm in diameter
- Stain with *eosin* and *PAS*

Three sets of fibers:

1. *Equatorial*: Insert at the *equator* (duh)
   - These zonules *regress* with age
2. *Anterior*: Insert ___ mm anterior to equator
Zonules

- Embryologically, the tertiary vitreous
- Originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body
- 5-30 μm in diameter
- Stain with eosin and PAS
- Three sets of fibers:
  1) **Equatorial**: Insert at the equator (duh)
     - These zonules regress with age
  2) **Anterior**: Insert 1.5 mm anterior to equator
Zonules

- Embryologically, the tertiary vitreous
- Originate from the basal lamina of the nonpigmented epithelium of the pars plana and pars plicata of the ciliary body
- 5-30 μm in diameter
- Stain with eosin and PAS
- Three sets of fibers:
  1) Equatorial: Insert at the equator (duh)
     - These zonules regress with age
  2) Anterior: Insert 1.5 mm anterior to equator
  3) Posterior: Insert mm posterior to equator
A

- **Zonules**
  - Embryologically, the *tertiary vitreous*
  - Originate from the *basal lamina* of the *nonpigmented* epithelium of the *pars plana* and *pars plicata* of the ciliary body
  - 5-30 μm in diameter
  - Stain with *eosin* and *PAS*
  - Three sets of fibers:
    1. *Equatorial*: Insert at the *equator* (duh)
       - These zonules *regress* with age
    2. *Anterior*: Insert 1.5 mm anterior to equator
    3. *Posterior*: Insert 1.25 mm posterior to equator
List the unique properties that distinguish the lens layers from one another histologically:

- Nucleus:
- Epinucleus:
- Cortex:
List the unique properties that distinguish the lens layers from one another histologically:

- Nucleus:
- Epinucleus:
- Cortex:

*Trick question*—*there are none!* These terms refer to differences in *appearance* and *behavior* as encountered during cataract surgery. They are *descriptive* terms, not histological.