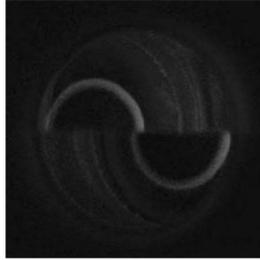


# Tonometry



J. Kevin McKinney, MD, MPH

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# Tonometry

- “Tono” = tension, tone
- “-metry” = to measure
- In medicine, primarily used for measurement of eye pressure

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# Tonometry

- What is the single most important factor affecting the reliability of measurement of IOP regardless of technique?
- The skill of the person taking the measurement
- ... in other words ... YOU

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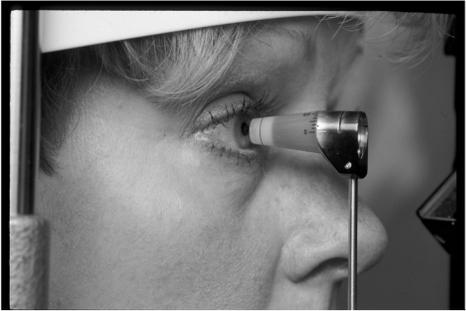
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### Goldmann Tonometry



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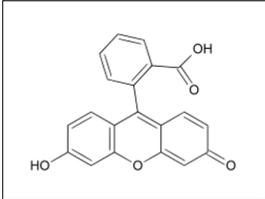
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### Fluorescein





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Excitation at 494 (cobalt blue)  
Emission at 521 (apple green)



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# Goldman Tonometry

## ● Sodium fluorescein

- » Fluorescein 0.25% solution (e.g. Fluress)
  - combined with topical anesthetic (e.g. benoxinate)
  - don't use for Seidel
- » dry strips (e.g. Fluor-i-strips)

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# Fluorescein




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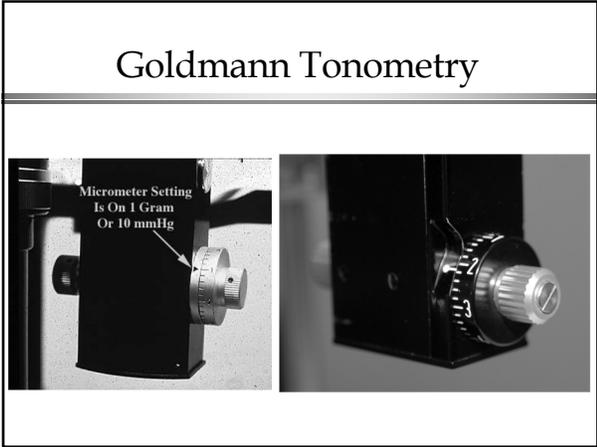
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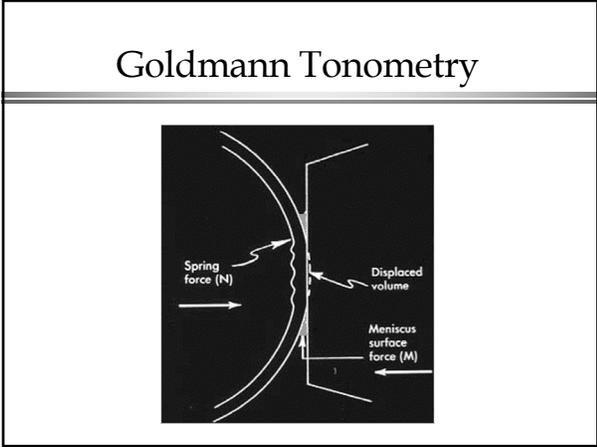
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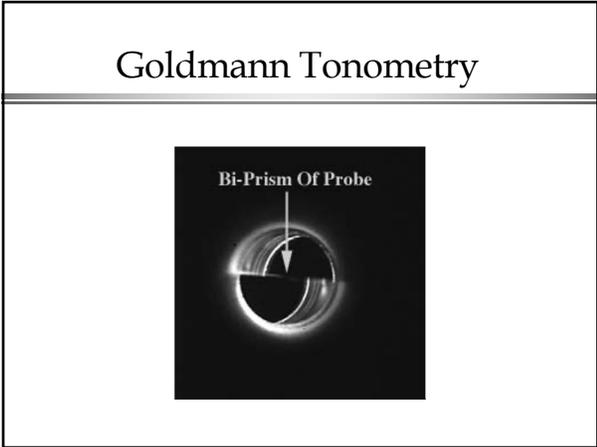
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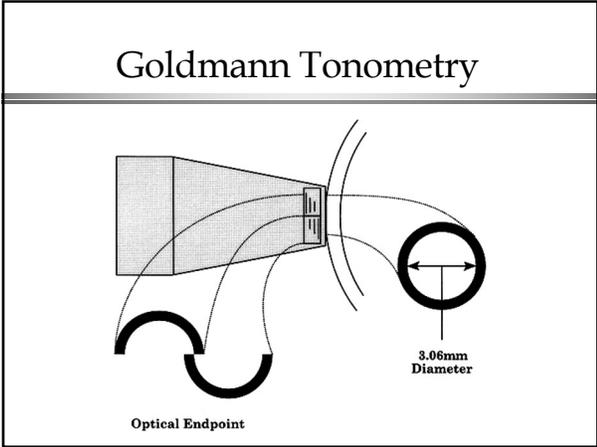
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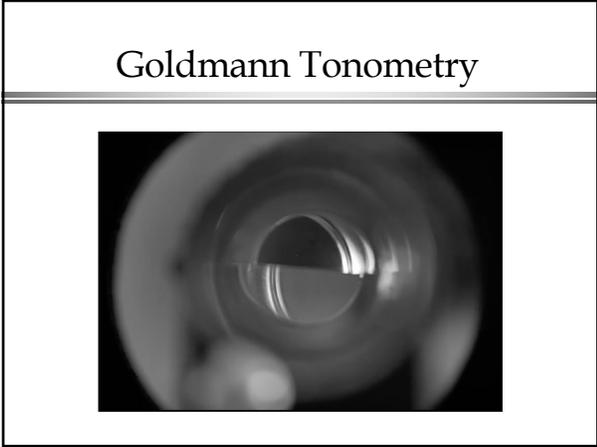
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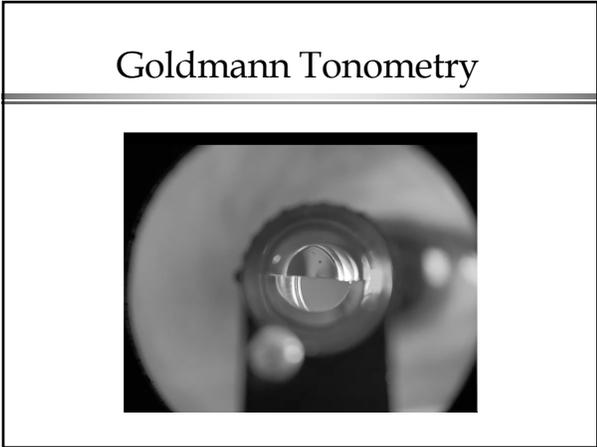
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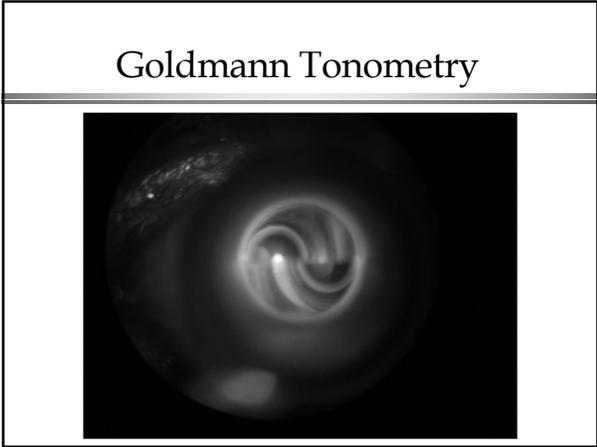
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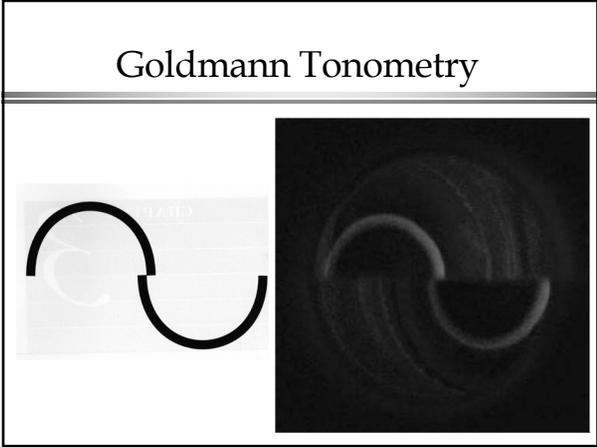
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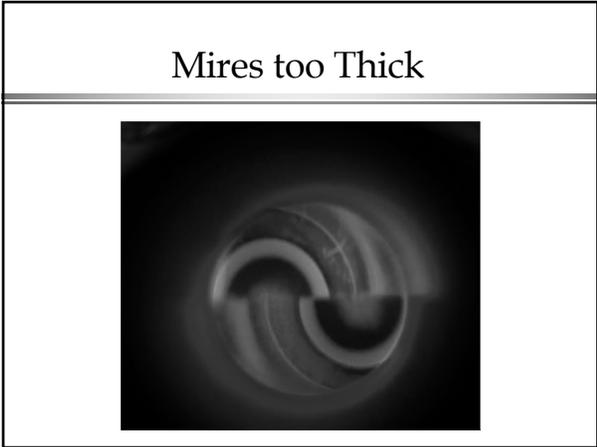
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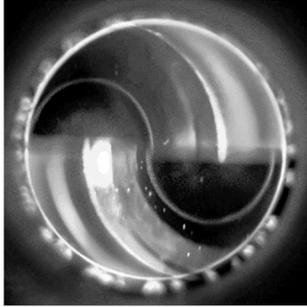
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### Mires too Thin



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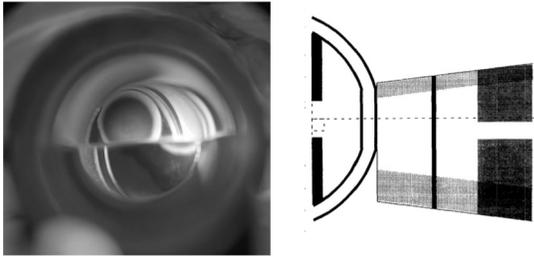
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### Prism off center



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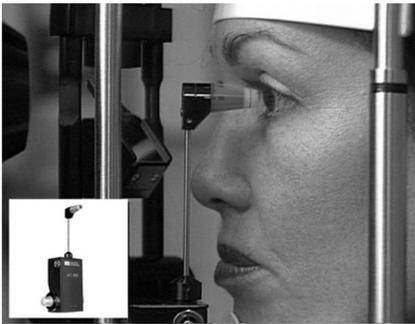
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### What's wrong here?



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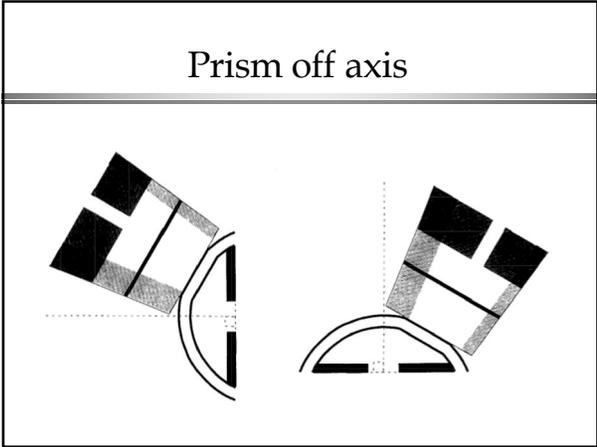
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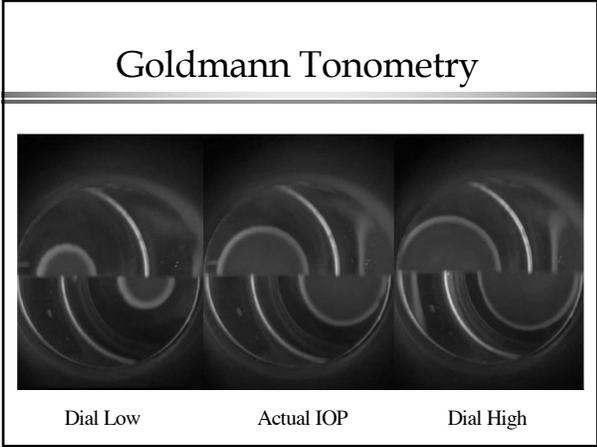
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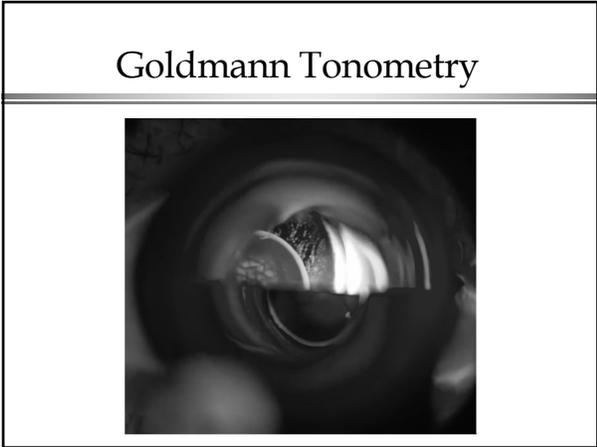
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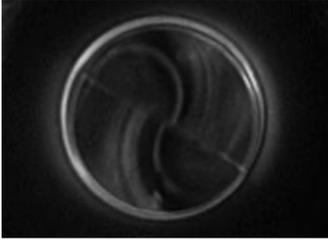
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### Prism Rotation



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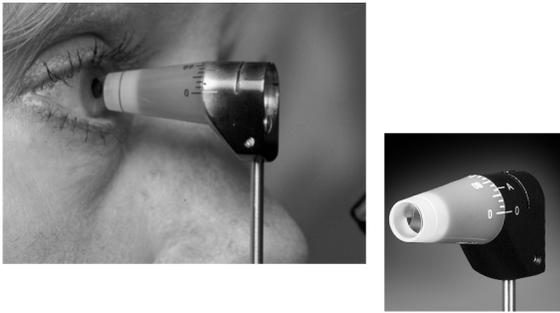
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### Astigmatism



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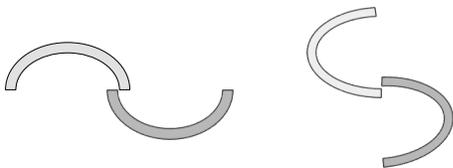
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### Astigmatism Averaging Method



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**Corneal Biomechanics**

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- Thin or soft corneas underestimate IOP
  - » Keratoconus
  - » LASIK/PRK
  - » Corneal edema (thick, but soft)
- Thick or stiff corneas overestimate IOP
  - » Scar
  - » Band keratopathy

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**Corneal Biomechanics**

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- Irregular corneas – unpredictable effect
  - » RK
  - » PKP
  - » Epitheliopathy – EBMD, abrasion, sicca
  - » Focal lesion – scar, ulcer, edema, etc

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**Corneal Biomechanics**

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- GAT
  - » if surface is smooth
  - » keep underestimation in mind
- Tonopen
  - » over areas of normal cornea
  - » peripheral cornea thicker
    - may overestimate IOP

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## Post Surgery

- s/p Trabeculectomy or Tube
  - » Avoid pressure on globe
    - VERY easy to artificially lower IOP
  - » If last IOP was very low, start at that IOP
    - Example: IOP is 04 → starting at 10 may further lower IOP
  - » Know your surgeon's preferences

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## Cardiac & Respiratory effect



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## GAT video



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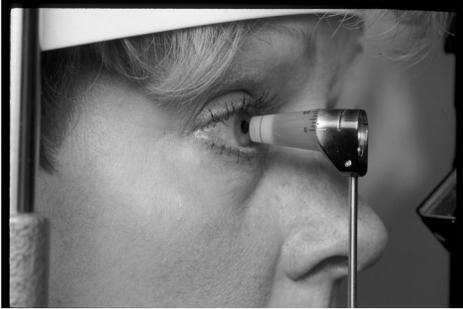
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### Managing the Eyelids



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### Goldmann Tonometry



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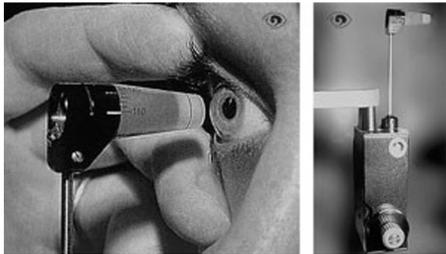
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### Goldmann Tonometry



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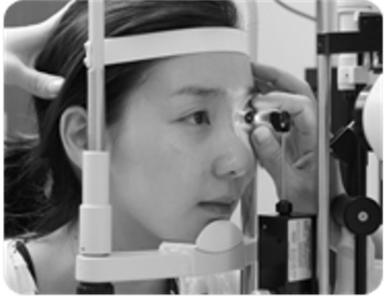
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### Goldmann Tonometry

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### Goldmann Tonometry

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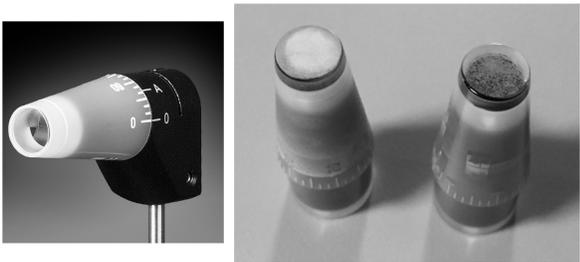
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### GAT Prism Care

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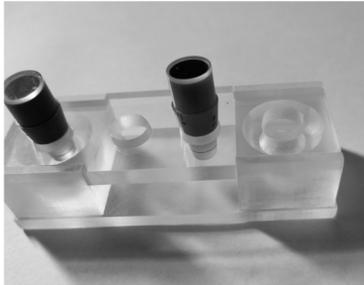
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### GAT Prism Stand



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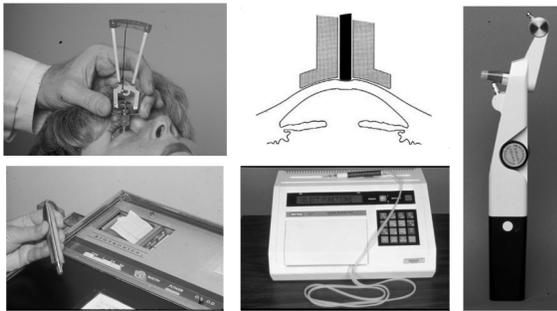
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### Tonometry Other Instruments



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### Non-Contact Tonometry (NCT)

- "Air Puff"
- Some patients hate it 😬 ⇒ 😞  
→ may avoid future exams
- Less accurate than contact methods
- Aerosolizes tears  
» Risk of spreading infection

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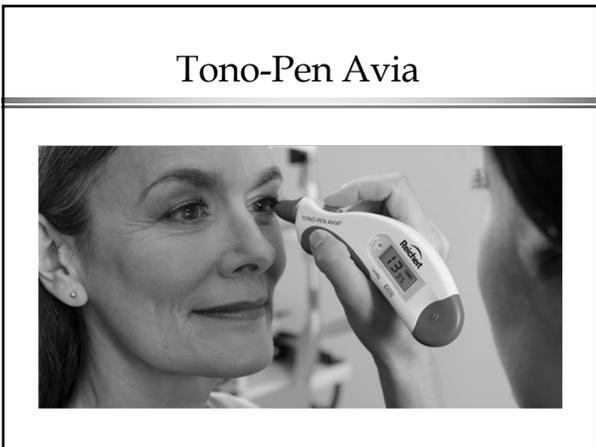
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## Tono-Pen Technique

- Routine calibration not needed
- Stabilize hands
- Hold eyelid(s) without pressure on eye
- Remind patient to breathe
  - » look straight ahead into the distance
- Light rapid taps on central cornea
  - » aligned with visual axis

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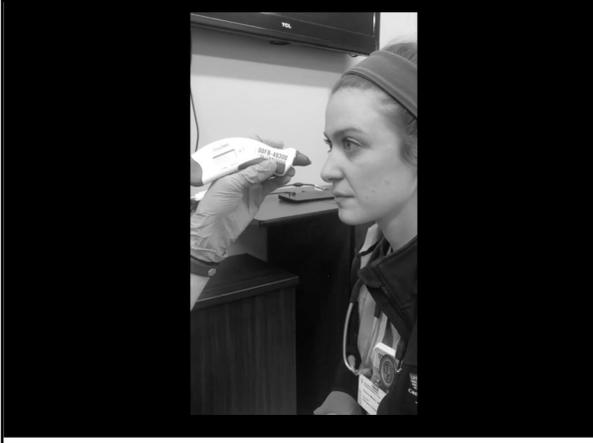
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**iCare Tonometry**

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- Rebound tonometer
- Single use probes
- Does not require anesthetic or fluorescein
- May be easier for kids
- Newest version can be used on supine patients
- May over-estimate IOP at higher IOPs

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**iCare Tonometer**

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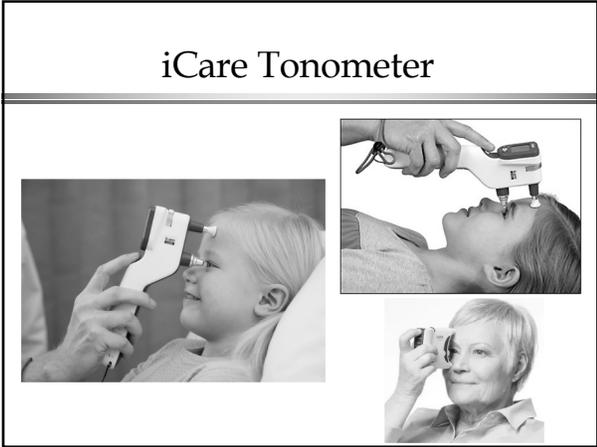
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Thank You!



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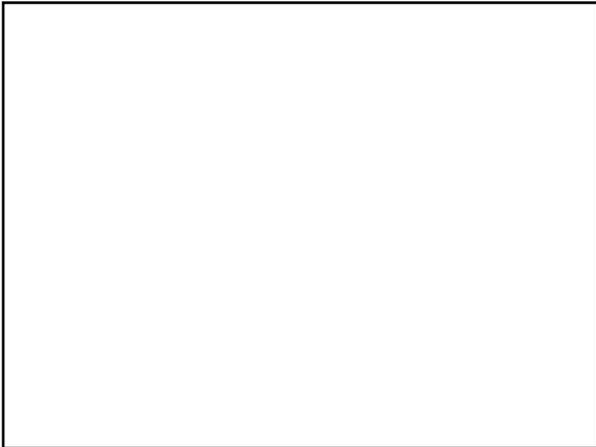
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