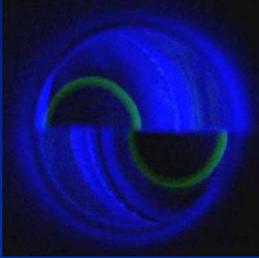


# Tonometry



J. Kevin McKinney, MD, MPH

1

---

---

---

---

---

---

---

---

# Tonometry

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

2

---

---

---

---

---

---

---

---

# 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

3

---

---

---

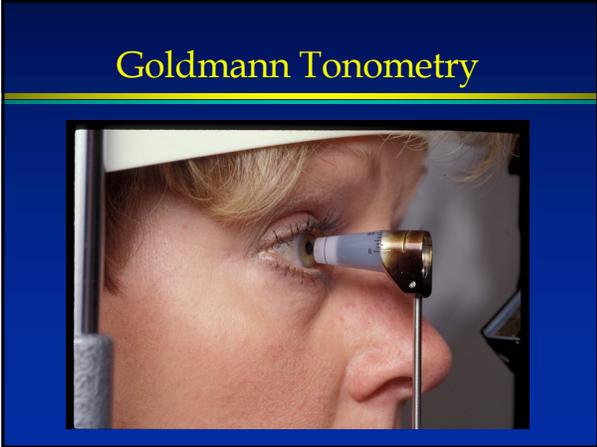
---

---

---

---

---



4

---

---

---

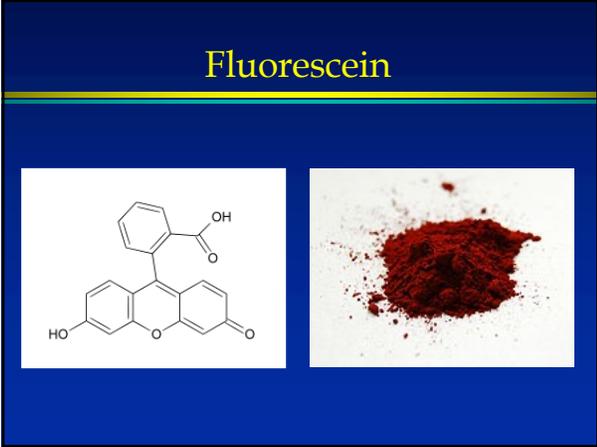
---

---

---

---

---



5

---

---

---

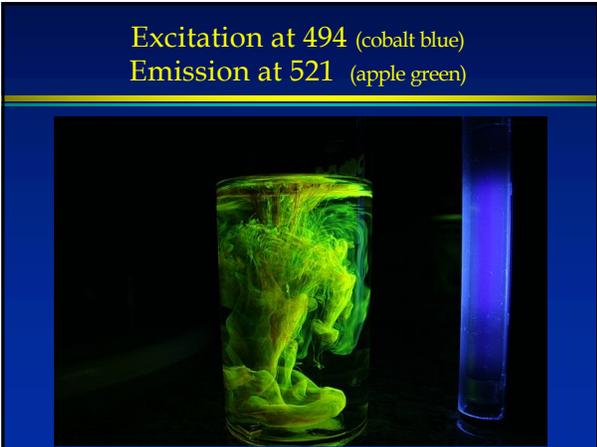
---

---

---

---

---



6

---

---

---

---

---

---

---

---

## 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)

7

---

---

---

---

---

---

---

---

## Fluorescein



8

---

---

---

---

---

---

---

---



9

---

---

---

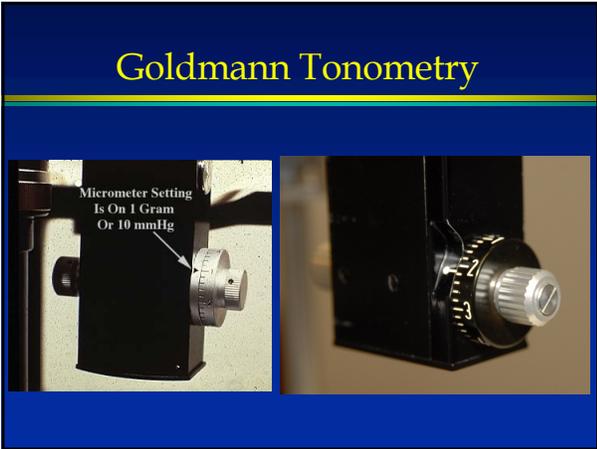
---

---

---

---

---



10

---

---

---

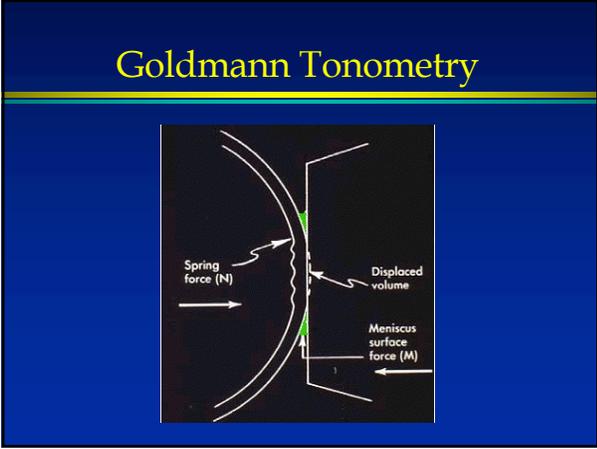
---

---

---

---

---



11

---

---

---

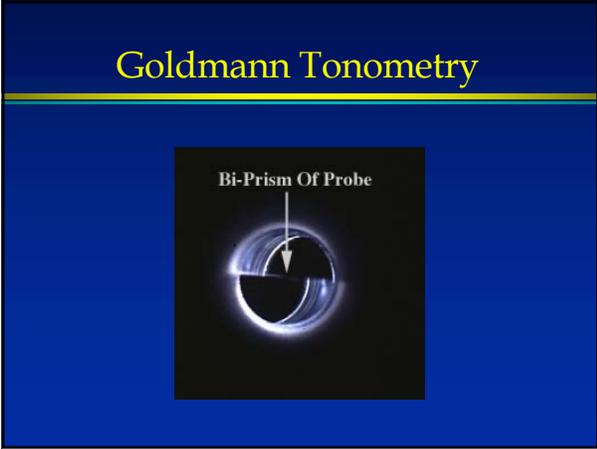
---

---

---

---

---



12

---

---

---

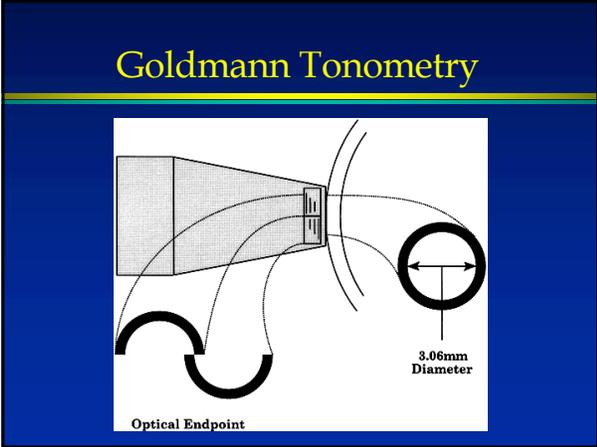
---

---

---

---

---



13

---

---

---

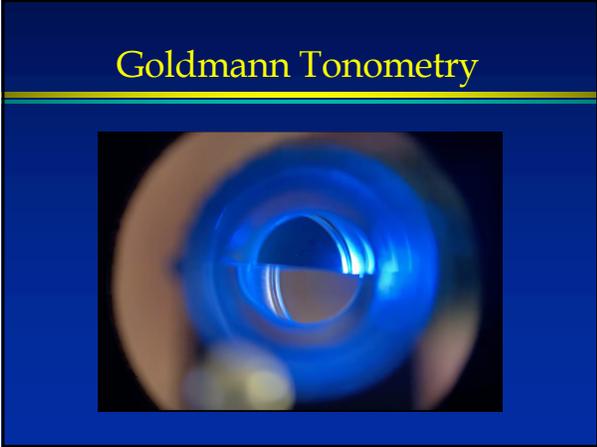
---

---

---

---

---



14

---

---

---

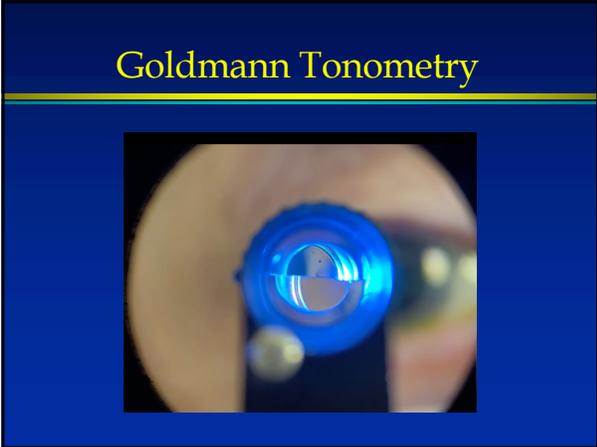
---

---

---

---

---



15

---

---

---

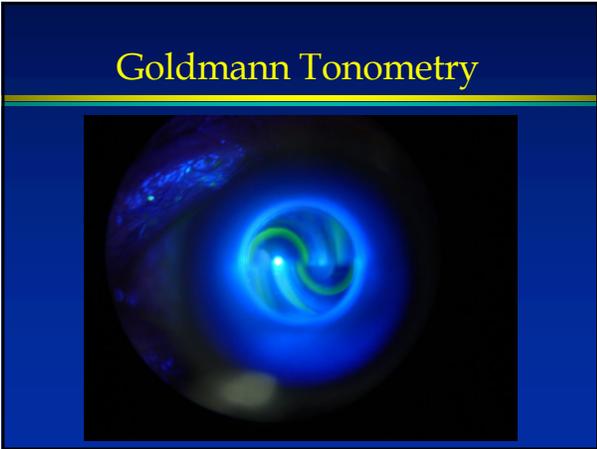
---

---

---

---

---



16

---

---

---

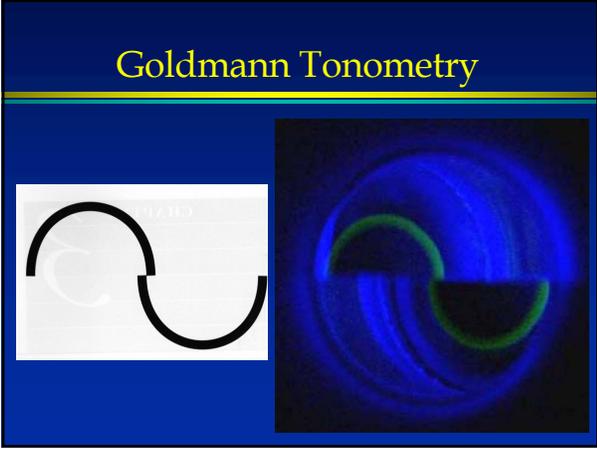
---

---

---

---

---



17

---

---

---

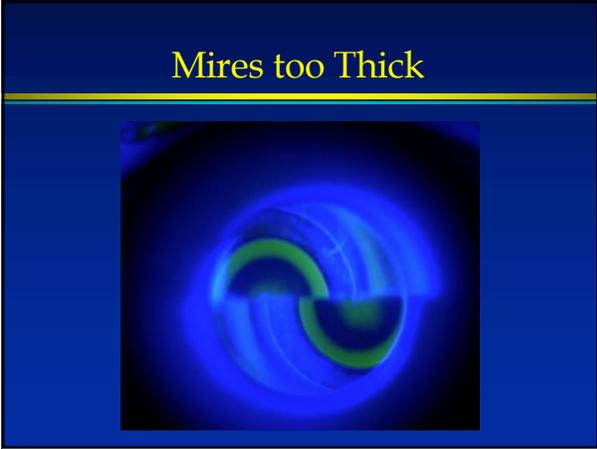
---

---

---

---

---



18

---

---

---

---

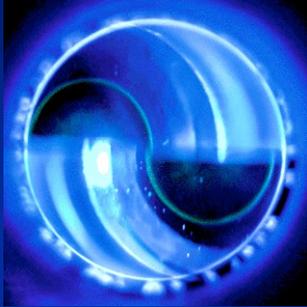
---

---

---

---

### Mires too Thin



19

---

---

---

---

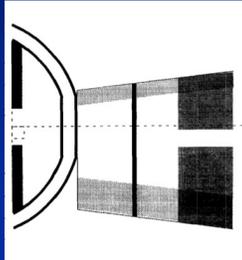
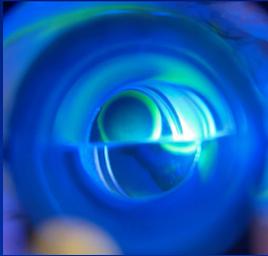
---

---

---

---

### Prism off center



20

---

---

---

---

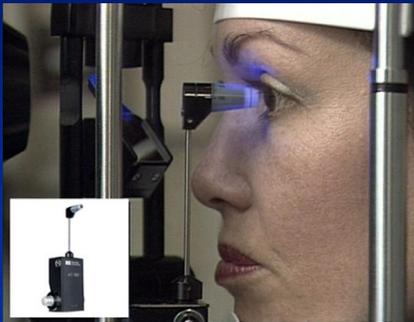
---

---

---

---

### What's wrong here?



21

---

---

---

---

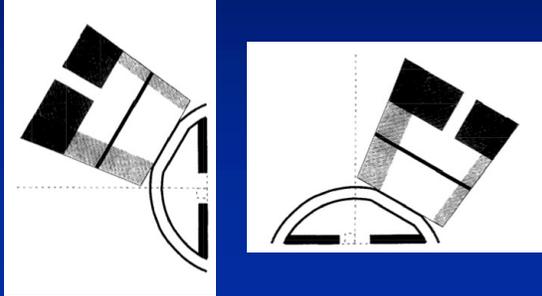
---

---

---

---

### Prism off axis



22

---

---

---

---

---

---

---

---

### Goldmann Tonometry



Dial Low

Actual IOP

Dial High

23

---

---

---

---

---

---

---

---

### Goldmann Tonometry



24

---

---

---

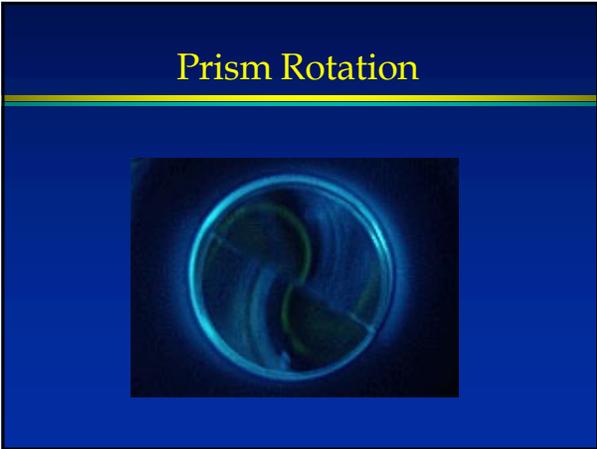
---

---

---

---

---



25

---

---

---

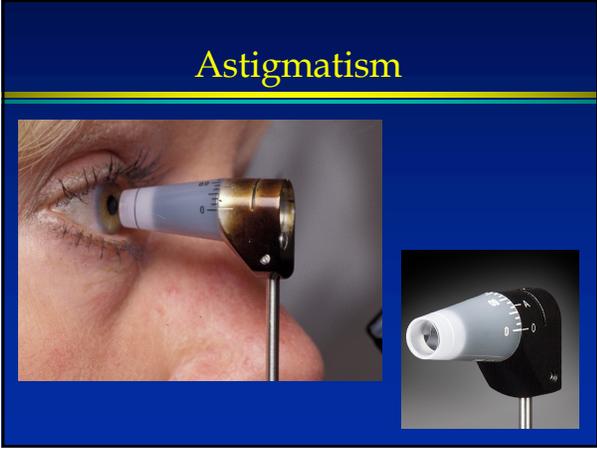
---

---

---

---

---



26

---

---

---

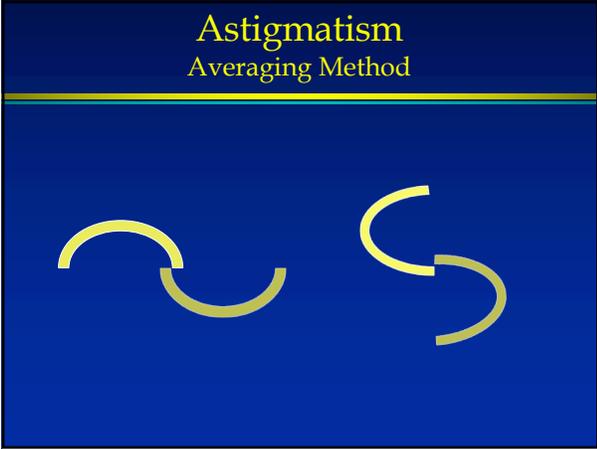
---

---

---

---

---



27

---

---

---

---

---

---

---

---

### Corneal Biomechanics

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

---

---

---

---

---

---

---

---

28

### Corneal Biomechanics

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

---

---

---

---

---

---

---

---

29

### Corneal Biomechanics

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

---

---

---

---

---

---

---

---

30

### 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

---

---

---

---

---

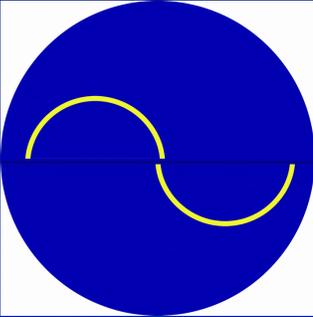
---

---

---

31

### Cardiac & Respiratory effect



---

---

---

---

---

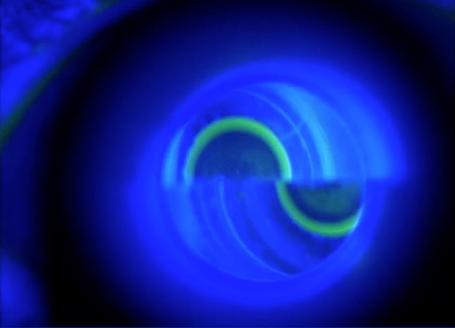
---

---

---

32

### GAT video



---

---

---

---

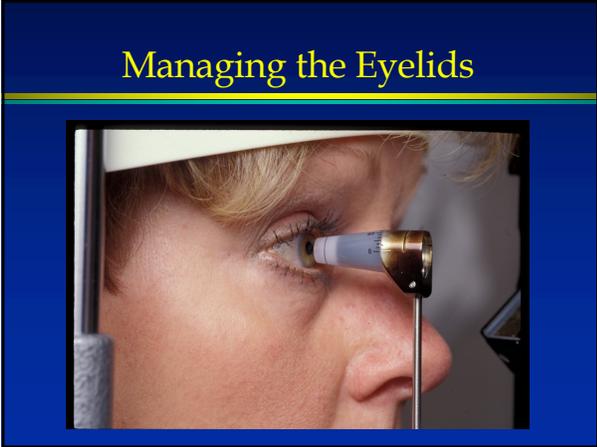
---

---

---

---

33



34

---

---

---

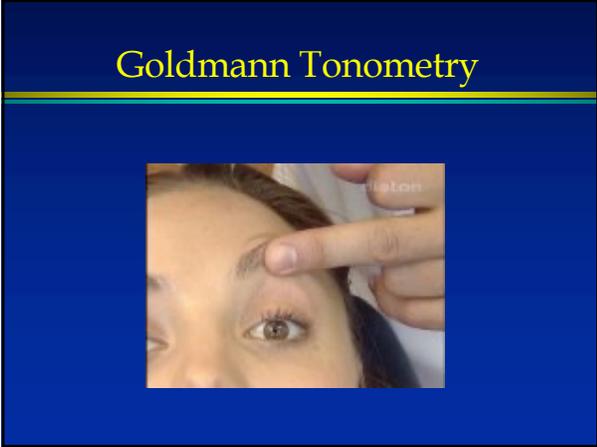
---

---

---

---

---



35

---

---

---

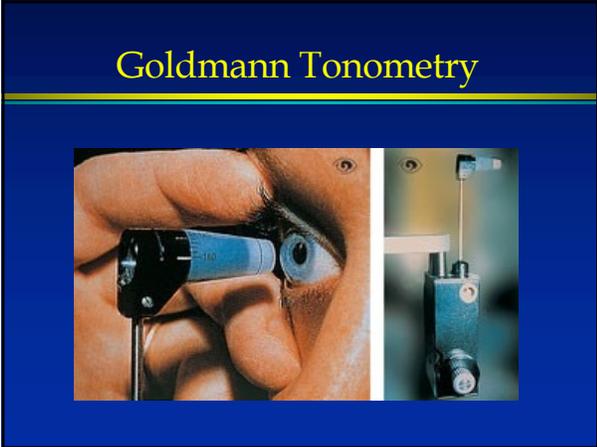
---

---

---

---

---



36

---

---

---

---

---

---

---

---



37

---

---

---

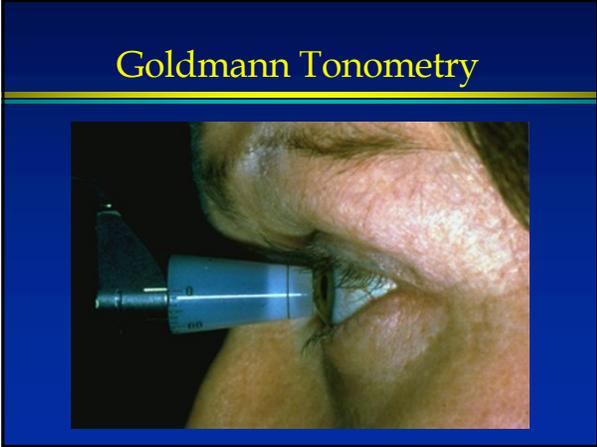
---

---

---

---

---



38

---

---

---

---

---

---

---

---



39

---

---

---

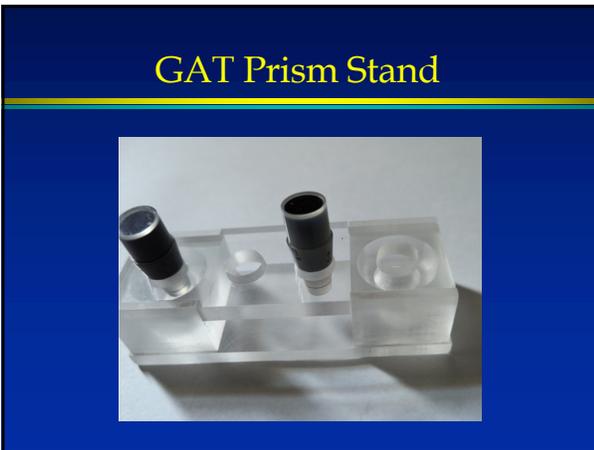
---

---

---

---

---



40

---

---

---

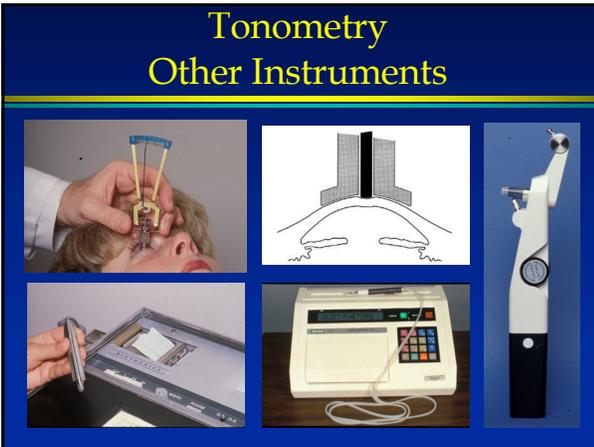
---

---

---

---

---



41

---

---

---

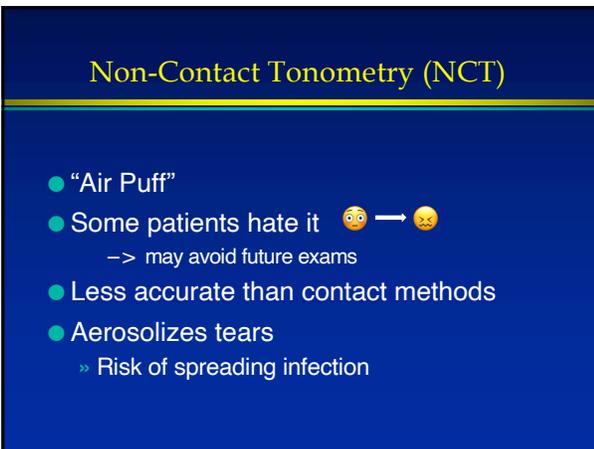
---

---

---

---

---



42

---

---

---

---

---

---

---

---



43

---

---

---

---

---

---

---

---



44

---

---

---

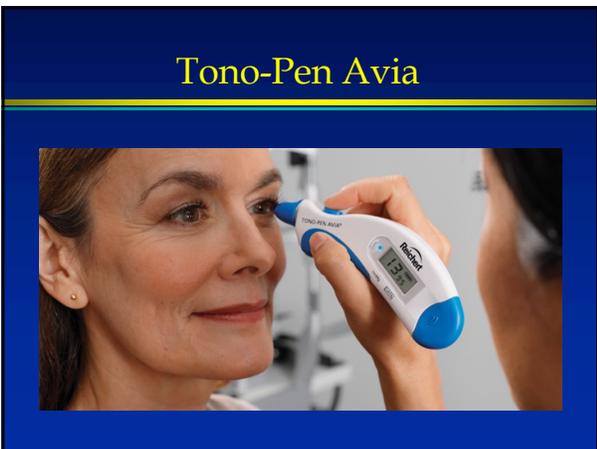
---

---

---

---

---



45

---

---

---

---

---

---

---

---

## 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

---

---

---

---

---

---

---

---

46



---

---

---

---

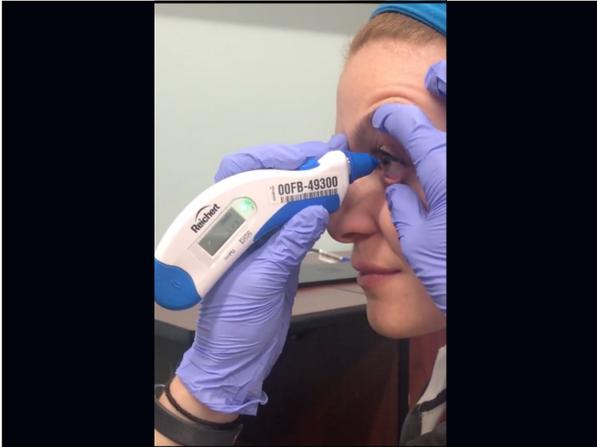
---

---

---

---

47



---

---

---

---

---

---

---

---

48



49

---

---

---

---

---

---

---

---

### iCare Tonometry

- 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

50

---

---

---

---

---

---

---

---

### iCare Tonometer




51

---

---

---

---

---

---

---

---



52

---

---

---

---

---

---

---

---



53

---

---

---

---

---

---

---

---



54

---

---

---

---

---

---

---

---

Thank You!



55

---

---

---

---

---

---

---

---



56

---

---

---

---

---

---

---

---