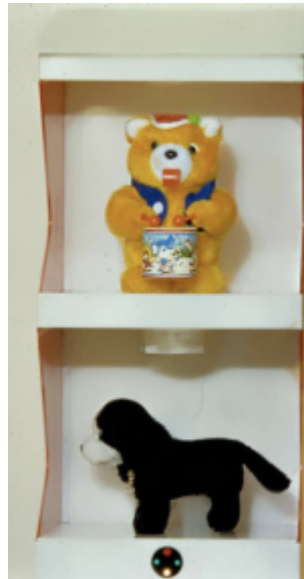


How to Measure Strabismus

1. Ensure proper spectacle/contact lens prescription
2. Use an accommodative target: an object that requires a fixed accommodative effort to resolve
 1. Acuity Chart with optotypes
 2. Scott Fixation Device



1. Video with formed images
2. Finger puppets
3. Wiggle sticks
4. Fusion may need to be suspended with 45-minute occlusion test first
5. only for intermittent or largely variable deviations

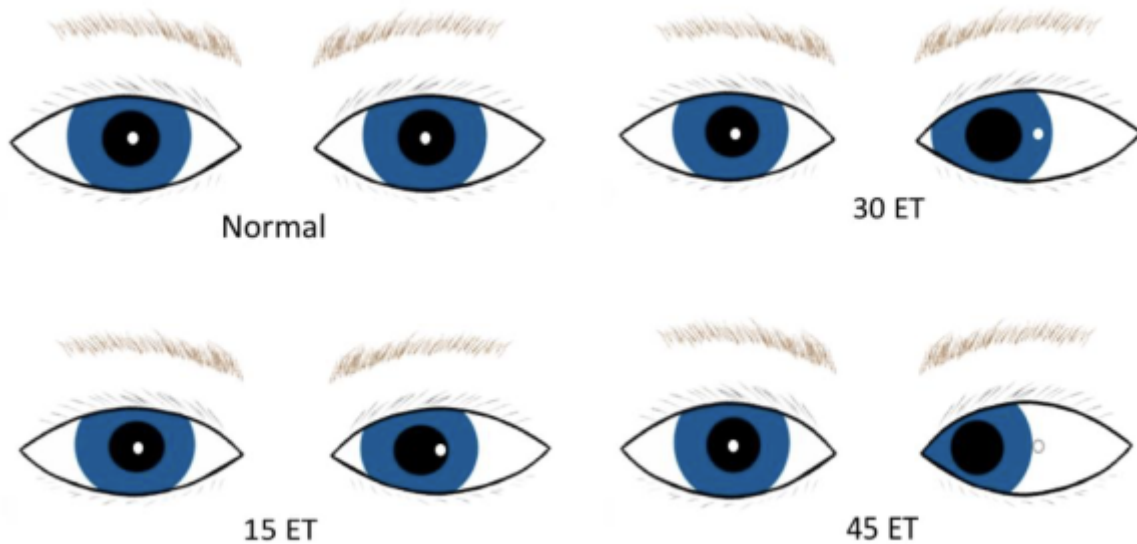
Detection of Strabismus

- Single Cover Test and Cover/Uncover Test
 - Detects presence of a tropia
 - Fusion is not suspended
- Alternate Cover Test
 - Detects basic deviation= Phoria + Tropia

Quantify Strabismus

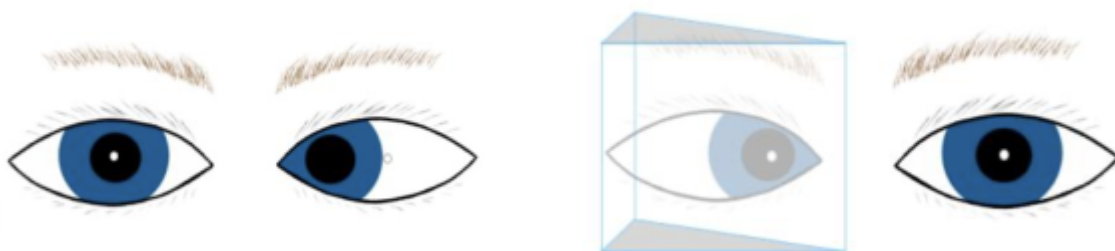
- Observation is helpful before any cover testing to assess level of control of intermittent deviations
 - watch how their eyes look with distance and near targets
 - you should be able to estimate the amount of manifest deviation with practice

- Corneal Refection tests
- Accommodation not controlled and fusion not suspended
- **Hirschberg test**
 - Compare light reflexes and estimate ocular alignment without prisms



- **Modified Krimsky Test**

- Most useful when there is poor fixation in one eye
- The Prism is held in front of the preferred eye (which isn't deviated) with the appropriate power to ensure both corneal light reflexes are symmetrically centered in the pupil.
- The original Krimsky test required holding the prism over the deviating eye. This test requires the prism over the aligned eye.



- Scleral Comparison
 - compare the amount of white visible between the eyes
- **Prism Cover Tests**
 - Single Prism Cover Test
 - Prism is placed over the deviated or parietic eye
 - Fellow eye covered
 - End point is when any movement stops
 - Measures Tropia

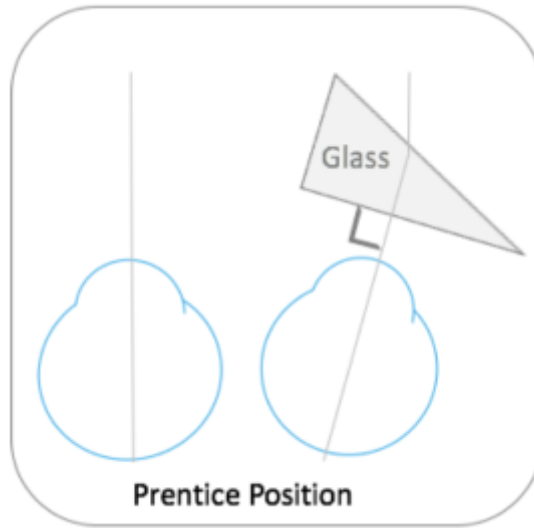
- Simultaneous Prism Cover Test
 - Same as Single Prism Cover test except the prism is placed in front of the deviated eye at the same time the fellow eye is occluded.
- Alternate Prism and Cover Test
 - Prism is placed over the deviating or paretic eye and the cover is rapidly shifted from one eye to the other
 - End point is the prism that causes no additional movement.
 - This measures the manifest (tropia) and latent (phobia) components to the deviation
 - This measurement is most useful for pre-operative planning
 - This measurement may overestimate the control of deviation in the setting intermittent deviation
 - Prolonged cover testing can break down any tenuous sensory fusion and worsen the control of the strabismus
- Measurements should be recorded for the following eye positions
 - Distance Fixation (6 meters)
 - Primary position
 - Right, left, up and downgaze
 - Head tilts if there is a vertical deviation
 - Near fixation (1/3 meter)
 - Primary position
 - Reading position if there are reading concerns

Positioning Prisms

- The deviation that a prism produces or neutralizes is dependent on the position of the prism as it is held before the patient.
- When prisms are used to measure a strabismus deviation, the prism displaces the image so that no movement of either eye is needed to fixate on the target.

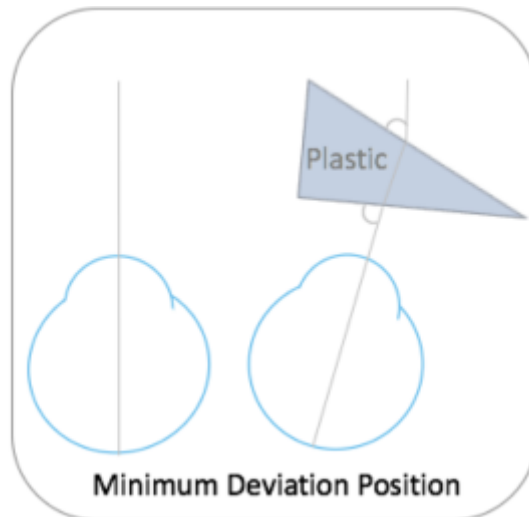
Prentice position

- The line of sight of the deviated eye is perpendicular to the posterior face of the prism.
- This is the proper way to hold a **glass prism**.
- Fresnel press-on prisms are calibrated in the Prentice position.



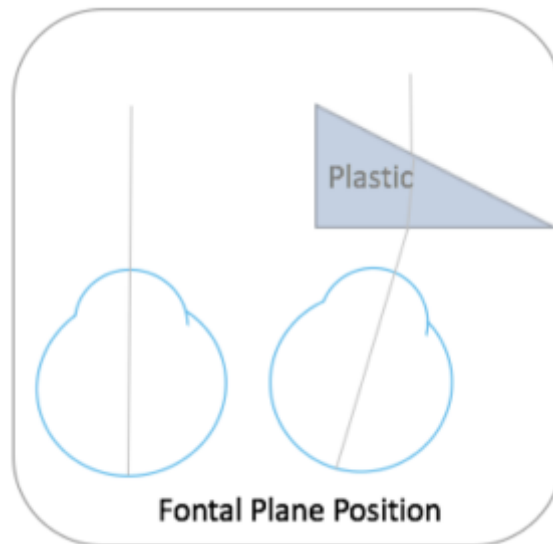
Minimum Deviation Position

- The visual axis makes an equal angle with each prism surface. This is the position in which **plastic loose prisms** are calibrated.



Frontal Plane Position

- **Horizontal and vertical prism bars** are calibrated for use in the frontal plane position.



Prism Stacking

- Stacking two prisms in the same direction will induce measurement error
 - [See values of stacked prisms](#)
- Prisms held in the same direction over either eye will induce some error, albeit smaller.
 - This error has been incorporated into surgical tables as the sum of the two prism values were used when the tables were developed rather than the actual measured deviation.
 - [See actual value of prisms held in the same direction over either eye](#)

Spectacle Induced Errors

- High powered spectacles (generally ≥ 5 D spherical equivalent) create a built in prismatic effect in strabismic patients that must be taken into account when performing cover testing.
- High minus glasses will induce a base in prism effect for esotropes and a base out prism effect in exotropes.
 - In both cases this will have the effect of making the deviation by the PCT appear larger than the true deviation by 2.5 D %.
 - i.e., a patient wearing -10.00 D glasses with a 40Δ esotropia by PCT will have a true deviation of 30Δ .
 - See [True Ocular Deviation with Hyperopic Spectacles Table](#) and
- High plus glasses will induce a base out prism effect for esotropes and base in effect for exotropes.
 - In both cases this will make the measured deviation smaller than the true deviation by 2.5 D % (i.e., a patient wearing +10.00 D glasses with a 40Δ esotropia by cover testing will have a true deviation of 50Δ).
 - See [True Ocular Deviation with Myopic Spectacles Table](#)
- Anisometropic spectacles
 - Prism is induced in the presence of an anisometropic spectacle correction when the visual axis is not aligned with the optical axis of the lenses.
 - This can cause diplopia and account for differences in measurements obtained in

secondary and tertiary gaze positions.

References

1. Comparison of Accommodative and Nonaccommodative Targets For the Assessment of Ocular Deviations. Scott, W.E. et al 1979
2. How to Perform a Basic Cover Test by Christopher Kirkpatrick and Tony Klauer
3. Ophthalmic Prisms: Measurement Errors and How to Minimize Them. Thompson & Guyton 1982
4. Artifacts Introduced by Spectacle Lenses in the Measurement of Strabismic Deviations. Scattergood, Brown and Guyton. 1983

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