Primary Care Management of Binocular Vision Anomalies with Prism

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Disclosures

- No financial interests in materials or methods presented
Overview

- Types of prism
- Ideal candidates for prism
- Prescribing methods
- Prism implementation
Types of Prism

- Neutralizing (Corrective)
- Relieving (Partial)
- Overcorrective
- Inverse
- Sector
- Yoked
Relieving Prisms

- Stabilize normal sensorimotor fusion by decreasing vergence demand

15BO eso-deviation
Ideal Candidates

- **Phorias**
  - Esodeviations
  - Divergence Insufficiency
  - Basic Eso
  - Verticals

- **Strabismus**
  - Intermittent
  - Constant with normal sensory fusion

- **Noncomitant Deviations**
Ideal Candidates

- Normal sensory fusion is the key!
- Worth 4 Dot / Red Lens
  - If fusion is attained with prism (confirm alignment with UCT), suggests normal sensory fusion and deficient motor fusion
Horizontal Prisms

Methods of Prescribing
- Fusion Prism Criterion
- Vergence Reserve Criteria
  - Sheard’s Criterion
  - Percival’s Criterion
  - Saladin’s 1:1 Rule for Esodeviations
- Caloroso’s Residual Vergence Demand
Fusion Prism Criterion
Horizontal Prism

- Minimum amount prism...
  - To eliminate diplopia
  - To establish stable second-degree fusion
  - To establish normal level of stereopsis
  - To eliminate strabismus (UCT)
Vergence Reserve Criteria

Horizontal Prism

- Based on vergence ability necessary to maintain comfortable binocular vision

- Sheard’s Criterion

- Percival’s Criterion

- Saladin’s 1:1 Rule
Sheard’s Criterion
- Compensating vergence should be 2X phoria
- *Thought* to work better for exos
- Prism = \( \frac{2}{3} \) phoria - \( \frac{1}{3} \) compensating vergence
Sheard’s Criterion Example

- Cover Test @ near: 12 XP’
- BI vergence: x/20/15
- BO vergence: 10/15/12

Prism = 2/3 (12) - 1/3(10) = approx 5 BI
Vergence Reserve Criteria
Horizontal Prism

- Percival’s Criterion
  - Patient should be operating in the middle third of the vergence range
  - *Thought* to work better for esos
  - Prism = $1/3G - 2/3L$
    - $G =$ greater of the two lateral limits (BI/BO)
    - $L =$ lesser of the two lateral limits (BI/BO)
    - If $P = 0$ or a negative number $\rightarrow$ prism not required
Vergence Reserve Criteria
Horizontal Prism

- Percival’s Criterion Example
  - Cover Test @ near: 8 EP’
  - BO vergence: 18/20/16
  - BI vergence: x/6/4

Prism = 1/3 (18) – 2/3(6) = 2 BO
Saladin’s 1:1 Rule

- Divergence recovery value should be at least equal to eso
- For esodeviation at distance only or at distance/near
- Prism = \((\text{phoria} – \text{BI recovery})/2\)
Saladin’s 1:1 Rule Example

- Cover Test @ distance: 8 EP
- BO vergence: 18/20/16
- BI vergence: x/6/4

Prism = (8 – 4)/2 = 2 BO
## Residual Vergence Demand

Horizontal Prisms

Caloroso’s Residual Vergence Demand

<table>
<thead>
<tr>
<th>Patient Types</th>
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<th>RVDC</th>
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Vertical Prisms

Methods
- Fixation Disparity
- Fusion Prism Criterion
- Caloroso’s Residual Vergence Demand
Fixation Disparity
Vertical Prisms

- Method of choice for small verticals
- Associated phoria

Saladin Card
Wesson Card
Fusion Prism Criterion
Vertical Prisms

- Minimum amount prism...
  - To eliminate diplopia
  - To establish stable second-degree fusion
  - To establish normal level of stereopsis
  - To eliminate strabismus (UCT)
Caloroso’s Residual Vergence Demand

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Vertical Prisms

- Only Rx for primary verticals
- Tolerance = 2-4Δ of residual vertical deviation
- As little as 0.5Δ may be beneficial
Prism: Noncomitant Deviations

- Anomalous head posture
  - Head typically turned towards gaze with greatest deviation
  - Head typically turned away from the affected eye
- Sector prism
Prism: Noncomitant Deviations

- Yoked Prism
- Prescribe prism base towards greatest deviation

10Δ BI

10Δ BO
Prism: Noncomitant Deviations

- Yoked Prism
- Prescribe prism base towards greatest deviation
Prism Implementation & Patient Education
Ground-In Prism
Prism Implementation

- Approximately 10-12\(\Delta\) per lens
- Small eye size & high index
- Edge treatments & AR coating
- Comitant deviation - split \(\Delta\) equally
- Preferable to Rx BU (vs. BD)
Fresnel Prism
Prism Implementation

- Thin, light weight
- 1° to 40°
- Sector
- Fairly inexpensive
Fresnel Prism
Prism Implementation

- Good for temporary use
  - Trial prism
  - When change in prism magnitude is anticipated
  - Sector prism
Fresnel Prism
Prism Implementation

- VA and contrast are reduced
- Less overhead reflection with BD (vs. BU)
Vertical Prism
Prism Implementation

- Slab-off prism
  - Conventional $\rightarrow$ BU
  - Reverse slab-off $\rightarrow$ BD
  - $\sim 1.5\Delta$ to $7\Delta$ limit
  - Great for when need more prism in downgaze

- Contact Lenses
  - BD only
  - RGP $\leq$ 3-4$\Delta$
  - SCL $\leq$ 4$\Delta$
Patient Education

- Cosmetic appearance
  - Thickness
  - Eye appears displaced towards apex of the prism
Patient Education

- Possible visual symptoms
  - Distortion
  - Dispersion
  - Disturbing internal reflection
Summary

- Ideal candidates for prism
- Prescribing methods
- Prism implementation & education
Questions?