Therapeutic Use of Prism in Vision Therapy

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COPE # 54046-FV

Course Description:
This course provides training on the use of prism in order to improve sensory perception and oculomotor control. We will discuss prism optics and clinical applications for vision therapy. This workshop will provide hands-on experience and demonstration of vision therapy procedures. Participants will complete training using prism bars, prism flippers, loose prism, Risley Prism, prism glasses, and yoked prism. Techniques will include monocular, bi-ocular, binocular and yoked prism activities.

Learning Objectives:
1. Develop functional understanding of a prism diopter
2. Understand spatial perception changes caused by viewing through prism
3. Learn about therapy techniques that utilize prisms
4. Understand the purpose and techniques of monocular prism training
5. Utilize bi-ocular vision training using dissociating prism
6. Understand how to build fusional vergence by using binocular prism techniques
7. Reorganize spatial and oculomotor skills by using yoked prism during therapy activities

Speaker Biography:
Dr. Jen Simonson is the clinical director of the Boulder Valley Vision Therapy center. She is a graduate of the Ohio State University College of Optometry and a Fellow of the College of Optometrists in Vision Development (COVD). Dr. Simonson was the recipient of the 2007 Colorado Young Optometrist of the Year. Dr. Simonson is active on the International Examination and Certification Board, the Colorado Vision Training Conference planning committee, and as a classroom volunteer at Erie Elementary School. Her primary interests in practice include pediatric vision care, vision therapy, sports therapy, and vision rehabilitation. Dr. Simonson is part of the creative team of G-Labs which developed the Opto App and Stereoscope for iPad in 2014. Dr. Simonson has authored three children’s books about vision therapy - “My Perfect Vision” “My Double Vision” and “My Jumbled Vision.”

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Therapeutic Use of Prism in Vision Therapy

1) How Prisms are used in Patient Care: Compensatory and Therapeutic
   a) Compensatory – reduces work, moves the image to where the eye sees
   b) Therapeutic – increases work, moves the image to where we want the eyes to look

2) Therapeutic prism is used to challenge and build the visual system. The goal of these exercises is to use prism in order to improve sensory perception and oculomotor control.
   a) Where is it now?
   b) Does it look the same?
   c) How quickly can I readjust my eyes?
   d) Can I regain single vision?

3) Prism uses in Vision Therapy
   a) Monocular Prism
   b) Dissociating Prism (Bi-ocular training)
   c) Binocular Prism
   d) Yoked Prism

4) Definition of a prism: A transparent solid with sides that converge at an angle
   a) Prisms cause a deflection of a ray of light toward the thickest portion (the base) - this causes the image to appear toward the apex.
   b) Prism splits white light into its component colors
   c) A prism alters the apparent location of objects
   d) Develop functional understanding of a prism diopter:
      i) Prism Diopter: deviation of 1 cm at a distance of 1 meter
      ii) Demonstration of prism optics:
         (1) Calculation of image deviation at different distances
         (2) Calculation of prism power by measuring distance and image deviation
      iii) Demonstration of prism optics: Clinical: concomitancy Testing
      iv) Demonstration of prism optics: Determining prism diopter power of unknown prism

5) The Near Triad: Vergence, Accommodation, and Pupillary Constriction
6) The AC/A (Accommodative Convergence/Accommodation)
   a) **Plus Lenses**
      i) Relax focus to clear the image.
      ii) Eyes reflexively diverge.
      iii) Converge eyes to regain single vision.
   b) **Minus Lenses**
      i) Increase focus to clear the image.
      ii) Eyes reflexively converge.
      iii) Diverge eyes to regain single vision.

7) The CA/C
   a) **BI Prism**
      i) Diverge to fuse the image.
      ii) Eyes reflexively relax focus.
      iii) Accommodate to regain clear vision.
   b) **BO Prism**
      i) Converge to fuse the image.
      ii) Eyes reflexively focus.
      iii) Relax accommodation to regain clear vision.

8) How does the Visual System Respond?
   a) No response or incorrect response – image is double and blurry
   b) Blurry and Single
   c) Clear and Double
   d) Clear and Single

9) Clinical applications:
   a) measuring the Gradient AC/A
b) Determining best lens or prism to decrease the difficulty of a therapeutic exercise.

c) Determining lens or prism power to increase the challenge of a therapeutic exercise.

10) Vision Training Techniques:

a) Stimulate eye movement toward apex of prism

b) Stimulate convergence

c) Stimulate divergence

d) Decrease suppression

e) Reorganize spatial perception: There are three dimensional perceptual shifts; the base expands space and the apex constricts space.

i) May see BO prism cause images to appear SMALLER and CLOSER

ii) May see BI prism cause images to appear LARGER and FURTHER

11) Monocular Prism Therapy:

a) Saccadic Accuracy in direction and amplitude (oculomotor)

b) Just Noticeable Differences (sensory localization: direction and amplitude)

c) Understanding spatial perception changes caused by viewing through prism

i) Spatial Awareness: Robert Nurisio, COVT: The patient should have some awareness of the prism “moving the world” in the direction of the prism apex, as the light is bent towards the base of the prism.

1) Direction

2) Amplitude

3) Size

4) Distance

5) Distortions

6) Clarity

7) Color

ii) Demonstrations with Fresnel prism

iii) Demonstrations with loose prism/prism bar
Therapy Techniques using Prism: Monocular

MONOCULAR: Understand the purpose and techniques of monocular prism training

a) Patch and Monocular Prism
   i) Monocular Saccades I
   ii) Monocular Saccades II
   iii) Esotropia Manual: BI prism over esotropic eye
       (1) to change posture – stretch medial rectus, activate lateral rectus
       (2) sensory stimulation – stimulate light to fall on temporal retina of esotropic eye

b) Demonstration and Practice session of Monocular Saccades activities
   i) BU/BD/BI/BO with 10°
   ii) BU/BD/BI/BO with 2°
      (1) Direction
      (2) Amplitude
      (3) Accuracy
      (4) Field Expansion/Constriction

12) Yoked Prism Therapy

   Therapeutic Yoked Prism: Reorganize spatial and oculomotor skills by using yoked prism during therapy activities
   a) Base-Left
   b) Base-Right
   c) Base-Down
   d) Base-Up
      i) Group demonstration and practice using yoked prism: bean bag toss

13) Dissociating Prism Therapy: Concept Introduction
   a) Bi-ocular Training using BU/BD prism or enough BI prism to create diplopia.
   b) Two eyes see the image, but not fused in the same place. Double vision is perceived.
   c) Motor Alignment
i) Howell Phoria Card: Allows direct measurement of the distance and near phorias in real space. Any odd number (in yellow) shows esophoria while the even numbers (in blue) shows exophoria. An AC/A can quickly be determined with trial lenses.

ii) Voluntary Vergences: Awareness of vision perception from each eye, Anti-suppression, Biofeedback on eye position, motor alignment accuracy, stability of eye alignment.
   
   (1) Marsden Ball
   
   (2) Near Prism Stick

iii) Split Prism Ring (Fox)
   
   (1) Clinical application: how to modify activity to increase or decrease difficulty.

iv) Split Prism Dowel Touch (Fox)

e) Prism Eye Rotations

d) Accommodation and Vergence Relationships (the AC/A)

   i) Valenti Cross-Cylinder: adding cross cylinder lenses to engage both the accommodative and vergence systems

   ii) G-560: adding plus and minus lenses to learn accommodative and vergence control and accuracy

e) Adding tactile, auditory, and visually-guided motor activities to vision training

   i) Squinchel

   ii) R-K Diplopia

   **Therapy Techniques using Prism: Biocular**

BIOCULAR: Utilize bi-ocular vision training using dissociating prism

   Howell Phoria Card

   Voluntary vergences

   Purpose: To develop the ability to voluntarily align the eyes in free space at all distances

   (a) Awareness of vision perception from each eye, anti-suppression

   (b) Biofeedback on eye position, motor alignment accuracy and stability
(1) Near: Bi-Ocular Popsicle Sticks

(2) Distance: Materials: Marsden ball, vertical prism glasses (6PD base up/6PD base down)

(3) Demonstration and Practice Session of Voluntary Vergences at Distance and Near
   (a) Target Creation Stations
   (b) Demonstration Stations

c) **Valenti Crossed Cylinder Rock Technique**
d) **Split Prism Ring Game**
e) **G-560 Biocular activity**
   (1) Demonstration and Practice Session of G-560
   (2) +2.00/-2.00, +2.00/-4.00
      (a) Size
      (b) Clarity
      (c) Distance
      (d) Alignment
      (e) Conscious Control
f) **Squinchel and R-K Diplopia**
   (1) Group practice session
      (a) Tactile Match
      (b) Auditory Match
      (c) Visual-Motor Accuracy: Golf Tee and Loop

g) Biocular Pursuits [http://www.oepf.org/sites/default/files/22-5-FOX.pdf](http://www.oepf.org/sites/default/files/22-5-FOX.pdf)

14) Binocular Vision Therapy
   a) Prism Flipper
   b) Prism Rock/Prism Recoveries
   c) Prism Rotations
   d) Loose prism and Prism Bar training
e) Prism Walk-aways

f) Risley Prism use with stereoscopes

g) BIM/BOP = Base-In with Minus/Base-Out with Plus

BINOCULAR: Understand how to build fusional vergence by using binocular prism techniques

a) Prism Flipper Reading
   i) Base-Out
      (1) Binocular base out prisms stimulate vergence to keep the target single:
          Convergence
      (2) Must relax accommodation to keep accommodation at the plane of the target to
          achieve clear and single vision.
   ii) Base-In
      (1) Binocular base in prisms relax vergence to keep the target single: Divergence
      (2) Must stimulate accommodation to keep accommodation at the plane of the target to
          achieve clear and single vision.

b) CUSTOM FLIPPERS
   i) Options:
      (1) One side BI/other BO
      (2) Both sides BI, but different powers
      (3) Both sides BO, but different powers

c) Prism Recoveries or Prism Rock
   i) Lollipop prism
   ii) Loose prism (trial lens)
      (2) Options:
          (a) Add and Take away
          (b) Flip BI to BO
(i) Fixi-Tic
(ii) Vergence Facility
   1. Speed
   2. Amplitude
   3. Comfort
   4. Automaticity
d) **Prism Rotations**
   i) Horizontal and Vertical fusion ranges
e) **Prism Bar Training**
   i) Demonstration and Group Practice with Marsden Ball
      (1) Building fusion – Left-Right gaze
      (2) Building fusion – Near-Far
      (3) Building fusion ranges – Orbit – all gazes and distances
f) **Prism Walk-Aways**
g) **Prism with Stereoscope**
   i) Add prism to other procedures to increase vergence skill
15) In therapy we may need to start with compensatory lenses to encourage a fusion lock and then reduce power until not needed. Can do training OVER compensatory prism with the goal of reducing amount of compensatory prism in prescription

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5. **The Rationale for the Use of Prism in the Vision Therapy Room** by Dr. Rob Fox
7. VT and Prism by Robert Nurisio, COVT [https://vtworks.wordpress.com/2014/03/31/vt-and-prism/](https://vtworks.wordpress.com/2014/03/31/vt-and-prism/)