Vision in Autism: Research and Clinical Practice

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Course Description:
Patients with autism often have unmet needs for vision care. This course will highlight emerging research in vision and autism. Supports and modifications for providing examinations and therapy will be discussed. Case presentations and video clips from the Nova Southeastern University Vision and Autism Neuro Optometric service will illustrate real-world applications.

Learning Objectives:
1. Identify changes in the diagnostic criteria for autism.
2. Compare corrected binocular visual acuity, binocular vision, and ocular motility findings in patients with autism to that of typically developing peers.
3. Describe the use of yoked prism to address visual spatial deficits in patients with autism.
4. Compare how individuals with autism adapt to spectacles versus typically developing peers.
5. Identify five strategies to modify testing and therapy procedures to increase success for the patient with autism.
6. List three ways that optometrists can improve the quality of life for patients with autism.

I. Autism
   a. Background
      1. Changes in diagnostic criteria - DSM-5
         a. Eliminates separate categories - Autistic disorder, PDD-NOS, Asperger’s syndrome
         b. Two domains – social communication impairment and repetitive/restricted behaviors.
      b. Need for vision and eye care – Individuals with Autism as an underserved population

II. Vision and Autism: Research Update
   a. Eye and Vision Examination: Testability and Findings
Summary: Most patients with ASD can complete most tests within an eye examination protocol. Testability of intraocular pressures is reduced, particularly for nonverbal and minimally verbal patients. Patients with ASD are more likely to have significant uncorrected refractive error, poorer corrected binocular visual acuity, reduced convergence, and less accurate eye movements.

b. Convergence

Summary: A perception of diminished accuracy in convergence test findings in ASD patients is not generally associated with reduced convergence or findings indicating convergence insufficiency.


Summary: Of the surveyed visual behaviors, none reached statistical significance for association with CI, though more parents observed their child to close or cover an eye when a CI was present (p=0.56).

c. Adaptation to Spectacle Correction
Bade, Coulter, Tea, et al. In press. Are there differences between children and adolescents with Autism Spectrum Disorder and typically developing controls in adaptation to glasses?

Summary: Most patients with ASD will wear glasses and successfully adapt them at a rate similar to that of typical peers. Adaptation generally occurs within two weeks after patients receive their glasses.

d. Applications of Yoked Prism

Summary:
Individuals with ASD demonstrated a lowered heart rate and increased electrodermal responses when viewing videos with emotional arousal stimuli through yoked prism lenses compared to placebo lenses. They attributed these physiological changes to increased attention to audio-visual stimuli and attentiveness to affective content.

Coulter, Bade Tea. *In progress*
Prescribing yoked prism in patients with Autism Spectrum Disorder: A study of inter-examiner agreement of the Kaplan Nonverbal Battery

*Aims:* To determine the inter-examiner agreement between two examiners on each task of the Kaplan Nonverbal Battery and its statistical significance.

e. **Colored Light and Filters**
Ludlow A, Allen P, Franklin A, Simmons D, et al. *In progress*
Diagnosis and treatment of visual and visuo-perceptual anomalies in autism spectrum conditions.

*Aims:* Investigate visual stress and whether colored filters alleviate perceptual dysfunction in autism, focusing on perception that is likely to be related to social functioning.

III. **Examination and In-office Therapeutic Treatment**

a. Tools and strategies to tailor delivery of care
   i. DIR/Floortime Model - Profectum Foundation
      1. Receptive language
         a. Visual supports- visual schedule, social story
         b. Instruction set
      2. Expressive language
      3. Sensory processing profile
      4. Motor planning/praxis
      5. Functional Emotional Developmental Level
   ii. Behavioral Strategies
      1. Shaping
      2. Choices
      3. High-probability request/low-probability request

b. Selection of strategies and Clinical Practice

IV. **Case Series and video examples**

A. 8 year old boy who is minimally verbal
   1. Chief Complaint – mom notices an eye turn at times and patient shows great discomfort when he attempts to read or do near
work
2. Evaluation – CI, Deficiencies of smooth pursuit movements and saccadic eye movements
3. Goals
4. Treatment

B. 10 year old boy who is verbal
1. Chief Complaint – “Our son has stalled in reading progress. He can sound out words, but does not sustain attention to reading and does not understand what he reads”
2. Evaluation – CI, Deficiencies of smooth pursuit movements and saccadic eye movements, Visual Spatial Processing Deficits
3. Goals
4. Treatment

C. 14 year old boy who is minimally verbal
5. Chief Complaint – “Our son constantly seeks visual stimuli. He is constantly making videos with his smartphone. He has a history of walking on tiptoes. It has decreased over time, but increases with stress and his parents still observe it everyday.
7. Goals
8. Treatment

D. 17 year old young man presents for evaluation
1. Chief Complaint according to mother, “My son makes As in Chemistry and has memorized the periodic table, but he can’t cross the street.”
2. Evaluation – Esophoria, Suppression of Binocular Vision, Visual Spatial Processing Deficits
3. Goals
4. Treatment

V. The role of optometrists in caring for patients with autism
a. Providers of vision and eyecare (including therapy)
b. Community Outreach
c. Patient and Professional Education