

Neuro-Optometric Management of Visual Snow Syndrome

2 hours

M.H. Esther Han, OD, FOVDR, FAAO, Dipl ABO

Description: Visual Snow Syndrome (VSS) includes visual and non-visual based problems. Visual snow is the perception of “snow” and/or television monitor “static”. This course reviews a specific diagnostic protocol and reviews common therapeutic options.

Course Objectives:

1. Upon completion, the participant will be able to recognize and diagnose a patient with Visual Snow Syndrome.
2. Upon completion, the participant will be able to recognize the common symptoms associated with Visual Snow Syndrome.
3. Upon completion, the participant will be able to perform the Visual Snow Syndrome (VSS) Symptom Survey.
4. Upon completion, the participant will be able to recognize the common clinical findings associated with the patient with Visual Snow Syndrome.
5. Upon completion, the participant will be able to recognize and recommend the common treatment options for the patient with Visual Snow Syndrome.
6. Upon completion, the participant will be able to understand the clinical efficacy of the different treatment options as described in the research literature.

PART 1: WHAT IS VISUAL SNOW SYNDROME (VSS)

- A. What is Visual Snow?
 1. “The perception of “snow”, dots, pixelated fuzz, bubbles, and/or television monitor “static” in the visual field foreground.
 2. Visual Snow Simulator: <https://visionsimulations.com/visual-snow.htm>
- B. Neuro-imaging: Review of the Literature suggesting VSS is a visual information processing dysfunction
 1. MRI
 - a. Structural MRI
 - b. fMRI - Blood Oxygenation Level Dependent (BOLD)
 - c. fMRI – Perfusion
 - d. fMRI – Proton magnetic resonance spectroscopy (MRS)
 - e. fMRI – resting state
 2. Computed Tomography (CT)
 3. Single photon emission computed tomography (SPECT)
 4. Positron emission tomography (PET)
- C. Neuro-anatomy of significant areas
 1. Significance of right lingual gyrus
 2. Significance of right anterior insula

- D. Characteristics of patients with Visual Snow Syndrome (VSS)
 - 1. Prevalence: 2.0-3.7% (United Kingdom)
 - 2. Gender preference: None
 - 3. Mean age of onset: 26 years
 - 4. Constant (91%) or episodic symptoms
 - 5. Chromatic or monochromatic (92%) symptoms
 - 6. Co-Morbid Conditions: Mild TBI (48-56%)
 - 7. Provoking environments (65%)
 - a. Bright illumination (27.5%)
 - b. Dim illumination (27.5%)
- E. The VSS Symptom Survey: Academic Optometric Setting
 - 1. Primary Visual Symptoms
 - a. Palinopsia
 - 1. Academic: 67.5%
 - 2. Private Practice: 85.2%
 - b. Entoptic Phenomena
 - 1. Academic: 82.5%
 - 2. Private Practice: 51.2%
 - c. Photosensitivity
 - 1. Academic: 82.5%
 - 2. Private Practice: 74.1%
 - d. Nyctalopia
 - 1. Academic: 55.0%
 - 2. Private Practice: 33.3%
 - 2. Secondary Visual Symptoms
 - a. Photopsia
 - 1. Academic: 55.0%
 - 2. Private Practice: 29.6%
 - 3. Non-Visual Symptoms
 - a. Migraine
 - 1. Academic: 60.0%
 - 2. Private Practice: 55.0%
 - b. Tinnitus
 - 1. Academic: 73.0%
 - 2. Private Practice: 48.1%
- F. VSS Differential Diagnoses?
 - 1. Floaters? Flashes?
 - a. Vitreous floaters
 - b. White blood cells traveling through the retinal blood vessels
 - c. PVDs, retinal tears, AMD, RP
 - 2. Photophobia/photosensitivity & visual scintillations?
 - a. Autoimmune Retinopathy
 - b. Charles Bonnet Syndrome
 - 3. Palinopsia? Afterimages? Flashes of different colors?
 - a. Hallucinogen-Persisting Perceptual Disorder (HPPD)

PART 2: EVALUATION OF VISUAL SNOW SYNDROME: Basic Considerations

- A. Case history, Visual Snow Syndrome Survey, BIVSS, CISS, VLSQ-9
 - 1. Previous evaluations?
 - a. Previous examinations by ophthalmologists, neuro-ophthalmologist, neurologist
 - 2. Previous treatments?
 - a. Medications?
 - b. Lenses?
- B. Medical History
 - 1. History of neuro-inflammation, infections, concussion, migraines, dysautonomia, POTs, Ehlers Danlos, MCAS,
 - 2. Anxiety
 - 3. Neuro-developmental: Spectrum disorders (Autism)
- C. Refractive considerations (Han retrospective)
 - 1. Normal uncorrected visual acuity (22%)
 - 2. Myopia (48%)
 - 3. Hyperopia (33%)
- D. Sensorimotor Considerations (% of each based upon Han and Tannen's different publications)
 - 1. Accommodative Insufficiency
 - a. Academic: 63.6%
 - b. Private Practice: 54.5%
 - 2. Vergence
 - a. Academic:
 - 1. Convergence Insufficiency: 37.5%
 - 2. Convergence Excess: 10.0%
 - b. Private Practice:
 - 1. Convergence Insufficiency: 51.9%
 - 2. Convergence Excess: 33.3%
 - 3. Oculomotor (Based upon Right Eye Test, DEM, Visual Tracing Test)
 - a. Academic: 37.5%
 - b. Private Practice: 59.3%
- E. Neuro-Optometric Rehabilitation Specific:
 - 1. Sensitivity Considerations
 - a. Photosensitivity:
 - 1. Chromatic filter evaluation and trial: Concept of percent reduction
 - i. Brain Power Incorporated (BPI) tints
 - a) FL-41 and Omega
 - b) Dyslexia Research Lorgnete Set
 - ii. Eschenbach Rose and Dark Rose (FL-41)
 - iii. Cerium Intuitive Colorimeter
 - iv. General ophthalmic chromatic tints (rose, brown, gray, blue, yellow)

2. Tint Efficacy: Literature Review
 - i. Hepschke et al., 2021: VS relieved by Orange-Yellow and Turquoise-Blue
 - a) Thalamocortical (TC) pathway mechanism
 - ii. Tannen et al., 2022: FL-41 and BPI Omega
 3. Optometric phototherapy evaluation
 - i. Works best with cases involving dysautonomia
 - b. Motion Sensitivity: Vestibular
- F. Common Treatment Modalities:
1. NORT Clinical Pearls
 - a. Opaque patches
 - b. POTS patients: Not standing and may even need to have them lie down for a break
 2. Chromatic Filters or Overlays
 - a. Color tint settings on electronic devices
 3. Non-optometric Considerations: Other referrals?
 - a. Anxiety
 - b. Auditory sensitivity
 - c. Diet, nutrition
 - d. POTS, Long COVID, Ehlers Danlos Syndrome
- G. Treatment Efficacy:
1. Saccadic Suppression Therapy
 - a. Tannen (2022): Using both NORT & chromatic filters 81.5% reported a 50% reduction in VSS related symptoms
 2. NORT
 - a. Tsang & Shidlofsky (2022): Improvement in quality of life (QOL) in 6 weeks
 3. Non-optometric treatments
 1. Pharmacological Treatments: Partially therapeutic with lamotrigine, acetazolamide, and verapamil

PART 3: CASE REVIEW

A. Case 1: 35-year-old female

1. Chief Complaint: VS started in her 20s when she was in college. Eye pain above and below both eyes which she noticed about 1 year prior. Difficulty reading, near vision blur with associated pain (8/10). Sees afterimages on backgrounds; Constant static, Palinopsia, Sensitivity to blue light; Dark things against light surfaces.
2. Medical History: Migraines which increase infrequency with increased stress levels. High blood pressure. Dry eyes. Born pre-mature and there were complications during the pregnancy.
3. Previous Treatment: Theraspecs (blue blocking lenses) and amber fit overs when using the computer.
4. Pertinent Clinical Findings/Diagnoses:

- a. Refractive amblyopia OD (Best-corrected VA 20/300)
 - b. Constant right exotropia (A pattern 45 right XT)
 - c. Subjective Visual Disturbance
5. Treatment Recommendations:
- a. Cerium Tints: Green 3, Turquoise 4+2

REFERENCES:

Ciuffreda KJ, Han ME, Tannen B, Rutner D. Visual snow syndrome: evolving neuro-optometric considerations in concussion/mild traumatic brain injury. *Concussion*. 2021; 6(2): CNC89.

Ciuffreda, Kenneth J., and Daniella Rutner. "Visual Snow Syndrome: Therapeutic Implications." *Journal of Clinical Medicine* 14.17 (2025): 6070.

Ciuffreda KJ, Tannen B, Han MHE. Visual Snow Syndrome (VSS): An evolving neuro-optometric clinical perspective. *Vision Dev & Rehab*. 2019; 5(2):75-82.

Han ME, Ciuffreda KJ, Rutner D. Historical, diagnostic, and chromatic treatment in Visual Snow Syndrome: A retrospective analysis. *Optom Vis Sci*. 2023; 100(5):328-333.

Schankin CJ, Maniyar FH, Digre KB, Goadsby PJ. Visual snow – a disorder distinct from persistent migraine aura. *Brain*. 2014; 137; 1419–1428.

Tannen B, Brown J, Ciuffreda KJ, Tannen NM. Remediation of visual snow (VS) and related phenomena in a neuro-optometric practice: A retrospective analysis. *Vision Dev & Rehab*. 2022; 8(2):105-13.

Tsang T, Shidlofsky C, Mora V. The efficacy of neuro-optometric visual rehabilitation therapy in patients with visual snow syndrome. *Front. Neurol*. 2022; 13:999336.