VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION
EXPLORING DIVERSE ISSUES IN BRAIN INJURY
NEW JERSEY BRAIN INJURY ALLIANCE

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DEFINITIONS OF VISION:
The visual system is a sensory-motor system that requires interaction within the surrounding environment to develop the proper feedback mechanisms. When those interactions are disrupted by trauma, cerebral vascular accident or the development of neurological disease, these interactions must be properly re-introduced otherwise aberrant adaptations can and will possibly occur.
Vision is a dynamic, interactive process of motor and sensory function mediated by the eyes for the purpose of simultaneous organization of posture, movement, spatial orientation, manipulation of the environment, and to its highest degree, perception and thought.
This is your brain on football

- NFL concussions up a stunning 58%
- Frightening figures just ‘tip of iceberg’

WHITE HOUSE: HILL HAD TOP-SECRET EMAILS PAGES 6-7
Jets' bitter ending sticks with Woody

ANOTHER

BLOW FOR NFL
League sees reported concussions spike

58%↑
MIND BENDER

JUNIOR SEAU
DEAD
TYLER SASH
DEAD
DAVE DUERSTON
DEAD
MIKE WEBSTER
DEAD
ANDRE WATERS
Late Giants safety Tyler Sash found to have advanced CTE Chronic traumatic encephalopathy (CTE), a degenerative brain disease that is caused by repeated head trauma, has been diagnosed in the brain of former New York Giants safety Tyler Sash. Sash died in September at the age of 27 after an accidental overdose of pain medications.
Post-concussion syndrome is a condition that is typically associated with a head injury. The head injury may be categorized as a concussion or a mild traumatic brain injury. In general terms, post-concussion syndrome, or PCS, is a medical problem that persists for a period of time after a head injury has occurred. This period of time can range from weeks to months.
Symptoms of Post-Concussion Syndrome

- Symptoms of post-concussion syndrome are often vague and non-specific.
- Commonly reported symptoms include:
  - Headache
  - Dizziness
  - Sleep problems
  - Psychological symptoms such as depressed mood, irritability, and anxiety
  - Cognitive problems involving memory, concentration, and thinking
- Such symptoms can affect day-to-day life, and inhibit the ability to perform in situations like work.
FROM A VISUAL STANDPOINT, ONE OF THE MOST IMPORTANT DIFFERENTIATIONS THAT MUST BE MADE EARLY-ON IS WHETHER THERE IS VESTIBULAR INVOLVEMENT OR NOT. THIS WILL DETERMINE THE DIRECTION AND ORDER OF TREATMENT. THIS WILL ULTIMATELY MAKE A BIG DIFFERENCE IN THE EFFICIENCY AND COURSE OF TREATMENT.
VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION
VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION

THE TRIAD OF VESTIBULAR / VISUAL / KINESTHETIC + PROPRIOCEPTIVE INPUTS WHICH COMBINE TO ALLOW US TO ANSWER THE QUESTION: “WHERE AM I WITH RESPECT TO IT AND WHERE IS IT WITH RESPECT TO ME?” THIS PROCESS ALLOWS THE HUMAN BEING TO MOVE EFFICIENTLY THROUGH AND INTERACT WITH THE ENVIRONMENT. DYSFUNCTION IN THE VESTIBULAR SYSTEM LEADS TO AN OVER-DEPENDENCE UPON VISUAL INFORMATION INPUT - MOST OFTEN ATTEMPTING TO DERIVE THAT INFORMATION FROM THE FOCAL, RATHER THAN AMBIENT SYSTEM. EFFECTIVE INTERVENTION INVOLVES INCREASING AWARENESS OF AMBIENT VISUAL PROCESSING.
THE “TEAM” APPROACH

THE TREATMENT OF VESTIBULAR DISORDERS IS ONLY SUCCESSFUL WHEN ALL THE PARTICIPATING MEMBERS WORK TOGETHER TO PROVIDE THE PATIENT WITH THE HIGHEST LEVEL OF CARE POSSIBLE
SIGNs AND SYMPTOMS OF VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION

DIZZINESS / LIGHTHEADEDNESS / DISORIENTATION (DLD):

1. MALLS, STORES, CROWDS, PARTIES, FAMILY GATHERINGS
2. LARGE OPEN SPACES
3. MOVING VEHICLES
   A. LARGE TURNS, SPEED, ACCELERATION / DECELERATION
   B. DRIVER VS. PASSENGER
   C. FRONT SEAT VS. BACK SEAT
4. REPETITIOUS VISUAL PATTERNS
   A. CARPETs, WALLPAPER DESIGNS, FLOOR PATTERNS
5. WINDSHIELD WIPERS
6. SNOW, RAIN
7. CHANGES IN BAROMETRIC PRESSURE / IONIC ALTERATIONS
8. ALTERATIONS IN FLUID BALANCE –COLDs, ALLERGIES, SINUS INF.
SIGNS AND SYMPTOMS OF VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION

9. COMPUTER / TELEVISION SCROLLING OR ACTION

10. LIGHT ALTERATIONS
   A. WALKING ON PATHWAY WITH LIGHT THROUGH TREES
   B. LIGHT TO DARK ADAPTATION

11. DEPTH PERCEPTION PROBLEMS (ESP. AT NIGHT)

12. LIGHT SENSITIVITY (CENTRAL)

13. DIFFICULTIES WEARING GLASSES / CHANGES
   A. BASE CURVATURES / CHANGES
   B. CYLINDER / CHANGES
   C. SIZE OF LENSES / CHANGES
DIZZINESS AND VERTIGO QUESTIONNAIRE

1. DO YOU EXPERIENCE AN ILLUSION OF FALSE MOTION? 
   EX: “THE ROOM IS SPINNING.”, “THINGS ARE WHIRLING.”
   “I AM REELING.”, “EVERYTHING IS SWAYING.”, “THINGS
   ARE PITCHING.”, “IT LOOKS LIKE THINGS ARE ROCKING.”
2. DO YOU EXPERIENCE NAUSEA, VOMITTING, PALLOR AND
   PERSPIRATION DURING THESE ATTACKS?
3. DO YOU NOTE A SENSATION OF RINGING IN THE EARS?
4. DO YOU EXPERIENCE ANY DIZZINESS WHEN IN STORE
   AISLES OR MALLS?
5. DO YOU EXPERIENCE DIZZINESS IN CROWDS?
6. DO YOU EXPERIENCE DIZZINESS IN LARGE OPEN SPACES?
7. DO YOU EXPERIENCE DIZZINESS IN MOVING VEHICLES?
8. DO YOU EXPERIENCE DIZZINESS WITH REPETITIOUS VISUAL
   PATTERNS? (EX. FLOOR TILE, CARPETING IN MOVIE THEATERS)
9. DO YOU NOTE AN INCREASE IN LIGHT SENSITIVITY? (GLARE)
10. DO YOU NOTE DIFFICULTIES WITH MOVEMENT ON A T.V. SCREEN?
11. DO YOU EXPERIENCE DIZZINESS WITH READING OR CONCENTRATING ON COMPUTERS?
GROUP 1 VESTIBULAR DISORDERS

(Vertigo entities that involve primarily the vestibular system)

1. Vestibular Neuritis
   (Acute Labyrinthitis)

2. Benign Paroxysmal Positional Vertigo (BPPV)

3. Nucleo-Reticular Vestibular Syndrome

4. Meniere’s Disease

5. Perilymphatic Fistula
VESTIBULAR NEURITIS

1. ACUTE SPINNING – NAUSEA AND VOMITING
2. VESTIBULAR NYSTAGMUS
3. IMBALANCE
4. NO HEARING LOSS
5. SHORT LASTING
6. SYMPTOMATIC TREATMENT – ANTI-EMETICS
7. STEROID TREATMENT
8. AMBULATE ASAP
BENIGN PAROXYSMAL POSITIONAL VERTIGO (BPPV)

1. SPINNING
2. POSITIONALLY INDUCED
3. NAUSEA, POSSIBLY VOMITING
4. VESTIBULAR NYSTAGMUS
5. TREAT WITH EPLEY AND SERMONT MANEUVERS
MENIERE’S DISEASE

1. INNER EAR
2. ATTACKS OF SPINNING
3. NAUSEA AND VOMITING
4. HEARING LOSS
5. TINNITUS
6. MEDICAL INTERVENTION – POSSIBLY SURGERY
NUCLEO-RETICULAR VESTIBULAR SYNDROME

1. SITE OF LESION: BRAINSTEM
2. MILD IMBALANCE
3. LIGHTHEADEDNESS / DIZZINESSNESS
4. VIRAL OR TRAUMATIC ETIOLOGY
5. NO HEARING LOSS
6. VISUAL SYMPTOMS OF CENTRAL NATURE
7. RX: OPTIMINE, PERIACTIN
8. VESTIBULAR HABITUATION
PERILYMPHATIC FISTULA:

1. **DEFINITION:** A RUPTURE OF THE OVAL AND, LESS COMMONLY, THE ROUND WINDOW WITH SUBSEQUENT DEGISCENCE BETWEEN THE INNER EAR AND MIDDLE EAR RESULTING IN INAPPROPRIATE STIMULATION OF LABYRINTHINE RECEPTORS. THIS, IN TURN, CAUSES DISORIENTATION IN VISUALLY COMPLEX SITUATIONS.

2. **SYMPTOMS:**
   A. VERTIGO
   B. FLUCTUATING HEARING LOSS (LATE COMPLICATION)
   C. TINNITUS
   D. CHRONIC LOW-GRADE NAUSEA
   E. UNCOMFORTABLE IN CROWDS, ESCALATORS, TREE LINED STREETS
   F. HIGH INCIDENCE OF PANIC ATTACKS / ANXIETY DISORDERS
   G. ENDOLYMPHATIC HYDROPS (MENIERE’S DISEASE)
   H. CERVICAL MYODYSTONIA (ABNORMAL MUSCLE TONE)
   I. PERSISTENT OR EXERTIONAL HEADACHE

PERILYMPHATIC FISTULA (CONT.)

3. **DIAGNOSIS:**
   A. CONTROVERSIAL
   B. CLINICAL FINDINGS / TESTS NOT PARTICULARLY SENSITIVE
   C. TRANSTYMPANIC ELECTROCOCHLEOGRAPHY
   D. LASIX TEST
   E. DEFINITIVE AT THE TIME OF SURGERY

4. **TREATMENT:**
   A. HEAL SPONTANEOUSLY – BED REST
   B. SURGICAL – PATCH LEAK
   C. NEURO-OPTOMETRIC INTERVENTION
   D. DIURETICS – LASIX, DIAMOX, DANDELION TINCTURE
PERILYMPHATIC HYPERTENSION

1. EXCESS PERILYMPHATIC PRESSURE
2. SYMPTOMS SIMILAR TO PLF SYNDROME
3. DIAMOX → SURGICAL POSSIBLE (IF NOT ALREADY DONE)
4. VESTIBULAR HABITUATION PROGRAM
5. NEURO-OPTOMETRIC INTERVENTION
TREATMENT OF GROUP I DISORDERS:

1. THESE DISORDERS ARE BEST DIAGNOSED THROUGH THE SERVICES OF A NEURO-OOTOLOGIST

2. DIAGNOSIS / IMPRESSION OF CENTRAL VS. PERIPHERAL DISORDER WILL DETERMINE THE ORDER AND DIRECTION OF THERAPY ADMINISTERED

3. ANALYSIS MAY INCLUDE QUIX, ROMBERG, ENG, LASIX-TESTING, ROTARY CHAIR

4. TREATMENT MAY INCLUDE:
   A. PRESCRIPTION OF ANTI-SEROTONIN MEDICATION (PARTICULARLY WITH BRAINSTEM INVOLVEMENT OR PROLONGED COURSE); CYPROHEPTADINE, PERIACTIN, DROPERIDOL.
   B. SURGICAL INTERVENTION – PLF
   C. DIET RECOMMENDATIONS FOR METABOLIC ABNORM.
   D. ALLERGY MEDICATIONS
   E. POSTERIOR CANAL PLUGGING
   F. MECLYZINE / ANTVERT
Clinical Pearl:

It is so very important to realize that you may or may not have an established vision “problem”, however, it is the interactions with the vestibular system from which you must guide your thinking and treatment of the patient. If you do have a vision problem that may be interfering with the vestibular functioning, then you must take care of that problem first.”
VISUAL -SPATIAL LOCALIZATION AND AWARENESS
- A “DUAL” SYSTEM
SPATIAL LOCALIZATION AND AWARENESS

SPATIAL LOCALIZATION:

1. DEPENDS UPON:
   A. THE AREA OF THE RETINA WHERE THE IMAGE IS LOCATED
   B. THE POSITION OF THE EYE IN THE ORBIT

2. ANSWERS THE QUESTION:
   “WHERE IS IT?”

3. THE VISUAL “ANCHOR POINT” IS THE FOVEA (WHICH CANNOT BE SEPARATED FROM THE TOTAL BODY)
SPATIAL LOCALIZATION AND AWARENESS (CONT.)

SPATIAL AWARENESS:

1. EGOCENTRIC LOCALIZATION

2. IS A FUNCTION OF VISUAL, VESTIBULAR & POSTURAL COMPONENTS

3. VISUALLY IS DEPENDENT UPON INFORMATION FROM THE EXTRAOCULAR MUSCLES AND AMBIENT VISUAL PROCESS

4. “WHERE IS IT IN REFERENCE TO ME OR WHERE AM I IN REFERENCE TO IT?”

5. THE SPATIAL “ANCHOR POINT” IS THE STERNUM
SPATIAL LOCALIZATION AND AWARENESS (CONT.)

PROPRIOCEPTIVE \rightarrow CORTEX (VIA SUPERIOR INFORMATION COLICULUS)
FROM
EXTRAOCULAR \rightarrow FLOCCULUS OF THE MUSCLE CEREBELLUM FIBERS
\rightarrow VESTIBULOSPINAL CENTERS THAT INTERACT WITH NECK
DUKE-ELDER:

“TWENTY PERCENT OF THE OPTIC NERVE FIBERS COMING FROM THE RETINA NEVER GET TO THE HIGHER VISUAL CENTERS IN THE OCCIPITAL LOBE BUT GO INSTEAD TO THE SUPERIOR COLLICULUS AND THEN TO THE MORE PHYLOGENETICALLY PRIMITIVE PHOTOSTATIC (POSTURAL) AREAS OF THE HEAD AND NECK”.
THE BIMODALITY OF NEUROLOGY AND VISUAL PROCESSING: AMBIENT-FOCAL

VISION IS A BIMODAL PROCESS - BOTH AMBIENT AND FOCAL IN NATURE. HISTORICALLY, THE AMBIENT PROCESS HAS BEEN OVERLOOKED. EFFECTIVE HUMAN VISUAL FUNCTION REQUIRES BOTH COMPLIMENTARY AND RECIPROCAL INHIBITORY COOPERATION OF THE TWO PATHWAYS.

UNLESS VISION IS VIEWED IN THE CONTEXT OF THE AMBIENT VISUAL MECHANISM AND PROCESS, IT IS DIFFICULT (IF NOT IMPOSSIBLE) TO MEANINGFULLY RELATE BODY ORIENTATION OR GENERAL MOTOR FUNCTIONS WITH THE FUNCTION OF VISION.
# The Bimodality of Neurology and Visual Processing: Ambient - Focal

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<thead>
<tr>
<th>Ambient Process</th>
<th>Focal Process</th>
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<tbody>
<tr>
<td>1. Extensive</td>
<td>1. Intensive</td>
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<td>2. Fibers to Midbrain of Fibers</td>
<td>2. Fibers to LGB &amp; (20% Visual Cortex)</td>
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<td>3. While only 20% of Fibers – Most of Retina</td>
<td>3. Fibers mainly from Fovea &amp; Parafovea</td>
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<td>4. Not dependent upon Inter-Cortex Conn.</td>
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<td>AMBIENT PROCESS</td>
<td>FOCAL PROCESS</td>
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<td>1. CENTIFUGAL PROCESS</td>
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<td>2. RETINAL PROCESSING ADDITIVE</td>
<td>2. RETINAL PROCESSING SUBTRACTIVE</td>
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<td>3. PROCESS: VERY FAST</td>
<td>3. PROCESS: REL. SLOW</td>
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<td>4. PAIRED COMPARISONS</td>
<td>4. SIMULTANEOUS COMP.</td>
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<td>5. EXPANSIVE (WIDE ANGLE)</td>
<td>5. RESTRICTIVE (ZOOM)</td>
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<td>6. TRANSIENT SENSORY AWARENESS</td>
<td>6. SUSTAINED SENSORY AWARENESS</td>
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TREATMENT OF AMBIENT VISUAL PROCESSING DYSFUNCTION
PRISMS - A VALUABLE TOOL

**PRISM:** A REFRACTIVE MEDIUM WHICH ALTERS THE DIRECTION (AND SUBSEQUENT LOCALIZATION) OF LIGHT EMANATING FROM AN OBJECT

**YOKED PRISMS:** TWO PRISMS, USUALLY OF EQUAL PRISMATIC POWER, SET IN FRONT OF EACH EYE WITH THEIR BASES SET IN THE SAME DIRECTION - CAUSING EQUAL SHIFTS IN LOCALIZATION OF THE OBJECT BEING VIEWED. YOKED PRISMS ARE DESIGNATED BY THE DIRECTION IN WHICH THE BASES ARE PLACED. (REORIENTS THE SENSORY COMPONENT OF VISION AS WELL AS THE ENTIRE MOTOR COMPONENT IN THE BODY)
Yoked Prisms

• Image shifted toward the apex end of prism for Focal Visual Process
• Ambient Visual Process does not see image shift
• For Ambient Process it is as if the person moved and the image did not
• This is the key for understanding Neuro-Visual-Postural Therapy and Neuro-Optometric Rehabilitation
YOKED PRISMS:

1. YOKED PRISMS STIMULATE MOVEMENT AWARENESS.

2. MOVEMENT INCLUDES ALL TEMPORAL AND SPATIAL CHANGES IN THE SYNERGIES THAT EXIST IN THE BODY.

3. SYNERGIES ARE THOSE CLASSES OF MOVEMENTS WHICH HAVE SIMILAR KINEMATIC CHARACTERISTICS, COINCIDING ACTIVE MUSCLE GROUPS AND CONDUCTING TYPES OF AFFERTATION (EX. WALKING, TALKING, BREATHING).

4. THE OPTICAL PROPERTIES OF PRISMS CREATE SPATIAL REARRANGEMENTS WHICH, IN TURN, AFFECT TEMPORAL CHANGES FOR THE WEARER. MAN HAS A RICH EXPERIENCE OF MOVEMENT AND, THEREFORE, WHEN CHANGE IS INITIATED, IT BECOMES EASIER FOR HIM TO DISTINGUISH THE QUALITY OF HIS MOVEMENT.
TREATMENT OF AMBIENT VISUAL PROCESSING DYSFUNCTION

1. VERTICAL YOKED PRISMS
2. BASE-IN PRISMS
3. BINASAL OCCLUSION
4. PERIPHERAL AWARENESS TECHNIQUES
   A. CONTINUOUS MOTION
   B. THUMB ROTATIONS
   C. PERIPHERAL AWARENESS CARD
   D. HARMON CIRCLES
5. SACCADIC FIXATOR (CENTRAL FIXATION PT.)
BASE-IN PRISMS

- Moves visual space outward
- Reduces tonicity of posture musculature of upper back and neck
- Expands visual space volume
- Emphasizes background as opposed to figure
- Often used with post-trauma vision syndrome or vestibular dysfunction patients
TREATMENT OPTIONS:

1. CONTACT LENSES
2. LASIK REFERRAL
3. ELIMINATE BIFOCALS (PARTICULARLY PROGRESSIVES)
4. LOW-POWER BASE IN PRISMS
5. PERIPHERAL AWARENESS ACTIVITIES
6. ENHANCEMENT OF OCULOMOTOR SKILLS
7. ENHANCEMENT OF BINOCULAR VISION SKILLS
8. TINTING / LIGHT THERAPY
9. MAGNET THERAPY
10. PATIENT EDUCATION
11. VESTIBULAR HABITUATION THERAPY
VISUAL-VESTIBULAR INTEGRATION DYSFUNCTION

- EMPHASIZE SCANNING AND PERIPHERAL AWARENESS TRAINING
- ROTATABLE YOKED PRISMS
- BINOCULAR FUSION EXTENSION
- ACCOMMODATIVE ROCK PROCEDURES
- HOME PRACTICE: HARMON CIRCLES, CONTINUOUS MOTION, FORM FIELD CARD, THUMB ROTATIONS WITH AWARENESS
WHEN ASSOCIATED WITH DIPLOPIA OR DISRUPTION OF THE FOCAL SYSTEM, YOU MUST ELIMINATE THAT PROBLEM FIRST BEFORE YOU CAN BEGIN TO BECOME SUCCESSFUL IN WORKING WITH THE VESTIBULAR SYSTEM

EX: PONTINE CVA / TRAUMA, PC ANGLE TUMOR, ETC.

1. OCCLUSION
2. SPOT PATCH
3. LOW-POWER FRESNEL NEUTRALIZATION
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DYNAVISION 2000
WAYNE SACCADIC FIXATOR
ANXIETY / PSYCHOLOGICAL

AN INHERENT PROBLEM THAT OCCURS WHEN WORKING WITH PATIENTS THAT PRESENT WITH VESTIBULAR DYSFUNCTION IS THE DIFFICULTIES THAT THEY HAVE WITH ANXIETY AND NERVOUSNESS. THEY ARE OFTEN TOLD THAT THEY ARE “CRAZY” AND THAT THEIR SYMPTOMS ARE “ALL IN THEIR HEAD”. THIS IS NOT TO MENTION: “YOU LOOK GREAT!” (IE. YOU WALK, YOU TALK - THEREFORE YOU MUST BE DOING VERY WELL!).

PATIENTS WITH VESTIBULAR DYSFUNCTION EXPERIENCE AN INSECURITY / DISTRUST REGARDING THEIR POSITION IN SPACE - LEADING TO A DISTRUST IN MOVEMENT, DIFFICULTY IN INTERPRETATION OF THEIR PLACE IN THE WORLD AND DIFFICULTY IN INTERPRETING THE WORLD IN GENERAL.
NUTRITIONAL TREATMENT:

1. LOW SALT
2. REMOVE CAFFEINE
3. COPPER SUPPLEMENTS (3 MG / DAY)
4. OTOSPONGIOSIS = OTOSCLEROSIS
   A. DIDRONEL + CALTRATE + MONOCAL
      2 WEEKS........4 WEEKS........5 WEEKS
   B. FULL PROTOCOL: 2 YEARS; MORE COMMON IN WOMEN
5. TINCTURE OF DANDELION
MEDICATIONS: NOTE

1. MECLIZINE (ANTIVERT)
2. ATIVAN, VALIUM (ANTI-ANXIETY)
3. OPTIMINE
4. CYPROHEPTADINE (PERIACTIN)
5. LASIX / EDOCRINE; POTASSIUM
6. RESPONSE? DOSAGE? SYMPTOMS VS. CAUSE?
Photophobia / light sensitivity

- COenzymeQ10 + Magnesium

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Inflammation

- Curcumin Phytosome
  Mesiva - 500 mg. bid
LEAVIN’ ON A JET PLANE?

- EARPLANES
- “LIGHT”
- BONINE - 1 HR. BEFORE
- LEAVE EARLY
TINNITUS:

BIOFLAVONOIDS

(B’S AND C’S)
CONCLUSION

No one technique may be successful in treating patients with vestibular dysfunction, however, the more tools that we have in our armamentarium, the better.

The “normalization” and maximization of visual efficiency will always support the functional aspects of vestibular dysfunction and alleviate - to some degree - the symptomology suffered by our patients.
HISTORY: L.H.

- 11/20/11 15 Y/O FEMALE - PLAYING SOCCER
- STRUCK IN HEAD BY FAST-MOVING BALL
- DAZED / NO LOC.
- FIRST EVALUATED BY THIS PRACTITIONER: 4/28/12
IMMEDIATE SYMPTOMS

- PROBLEMS READING MUSIC AND PLAYING CELLO
- DIFFICULTIES WITH MATHEMATICS (ex. graphs)
- DID NOT FEEL WELL / BAD HEADACHE
- DIFFICULTIES WITH BALANCE AND REACTION TIME
- DX: "MINOR CONCUSSION" BY M.D.
- HEAD PAIN WITH AIRPLANE FLIGHT
- HEADACHES BECOMING SEVERE AND INCREASING WITH INCREASED ACTIVITY AND READING - UTILIZING BOOKS-ON-TAPE
- REDUCTION IN IN-CLASS TIME NECESSARY
HISTORY

- MEDICATIONS: ELAVIL, MULTIPLE VITAMINS, MAGNESIUM, OMEGA-3'S
- PMH: (-)
- PVH: (-)
AREAS THAT NEED TO BE ADDRESSED

- TREATMENT OF HEADACHES
- TREATMENT OF PROBLEMS WITH BALANCE AND REACTION TIME
- TREATMENT OF READING PROBLEMS
- RETURN TO CLASSES
VISUAL ANALYSIS

- Unaided visual acuities: 20/20- O.D.; 20/20- O.S.
- Refractive status: no significant in either eye with BVA: 20/20- O.D. and 20/20- O.S.
- Nearpoint visual acuities: 20/20- O.D., 20/20- O.S.
- PERRL
- right handed / left eye dominant
Visual analysis:

Motor analysis:
EOM full and sm. to all. (+)mild dizziness
CT- distance: orthophoria
CT- near: orthophoria
Von Graeffe phorias: 1 eso / orthophoria at distance
Maddox phoria at near: 1 exo / orthophoria
Nearpoint BI vergences: 12/20/16
Nearpoint BO vergences: 18/30/20
NRA / PRA: +2.50 / -2.50
Stereopsis: 20 seconds of arc
Fused X-cyl: -0.25 / unfused X-cyl: -0.25 O.D. / -0.25 O.S.
NPC: 5 inch blurpoint
Visual Analysis:

- **Ocular health**: normal color optic nerves, well delineated, C/D: 0.3 / 0.3 O.U.; retinal eye grounds: normal
- **Visual fields**: (Central 30-2) - within normal limits: O.U.
- **OKN**: excellent and equal responses in both horizontal directions
Visual analysis:

- **Balance and Posture:**
  - Forward flexion of neck
  - Touching walls as walks down the hallway
Diagnosis:

Central vestibular dysfunction with visual-vestibular integration dysfunction secondary to traumatic brain injury
Treatment Recommendations:

- **Two sets of prisms:**
  - 0.5 base-in O.U. for walking and movement purposes
  - 2 base-down O.U. yoked for reading and nearpoint activities
- **Occupational therapy:** rotatable yoked prisms with movement, saccadic fixator, scanning the environment
- **Physical therapy:** continued cranio-sacral therapy
- Add in Cawthorne-Cooksey and Brandt-Daroff procedures for vestibular habituation and assess with Physical Therapy
Results:

- Utilizing prisms for full-time in school (base-in for movement and base-down for nearpoint work).
- No longer experiencing headaches.
- Accomplishing all her schoolwork.
- No longer difficulty with Math graphs.
Future considerations

- Already finding that she does not need the prisms (base-in) all the time.
- Base down prisms will likely be of a more permanent nature - depending upon visual demand and postural changes
- Sports in future?
PATIENT: K.D.: History

- 2009: third trimester of pregnancy - lost vision in right eye
- MRI Analysis: negative; dx: optic atrophy
- Delivered baby, vision improved; only when driving and looking over shoulder symptoms noted
- 2/2011: Contrast MRI: meningioma compressing optic nerve and second tumor that was asymptomatic
- Surgical resection to remove sphenoid wing tumor - some residual on f/u MRI
- OT sessions: 1/2012
- Out of work: 4 months
- Experiencing shaking of the hand - mistakenly thought to be due to anxiety (but denied by psychology)

/
• Sensitivities continued to worsen and in July of 2012 experienced true vertigo symptoms and losing cognitive processing ability
• Began working with an O.D. who worked on convergence issues
• Worked with O.T.R. on vestibular issues - specifically utilizing a treadmill
• Vertical eye movements were difficult
• Otology felt ECOG (evoked potentials), VEMP and ENG were all negative for peripheral lesion
• Continues to note difficulties in stores, malls, crowds, walking in dark, riding in a moving vehicle, near-to-far changes in focus,
• Does not note problems with repetitious visual patterns and weather changes
2. NO SIGNIFICANT REFRACTIVE ERROR O.U.
3. PUPILS: PERRL; LARGE
4. MOTOR: EOM FULL AND SMOOTH TO ALL;
   COVER TESTING: ORTHOPHORIA AT DISTANCE (VON GRAEFFE: ORTHO VERTICAL AND HORIZONTAL; MODERATE EXOPHORIA NEAR (Maddox 2 to 3 exo); convergence reserves: intermittent splitting and refusing; NPC: 5/3/4 OKN: absent in both horizontal directions.
5. Ocular Health: normal
6. Visual Fields: normal
Diagnosis:

1. Visual vestibular integration dysfunction
2. Convergence Insufficiency
Treatment:

Rx: ½ In O.U. with 12% Anifra (blue-green) tinting
• 4/8/13: “Prisms helped almost immediately”; much better for turning of the head.
• Working with O.T.R. (Beth): any time there is a lapse in therapy time (insurance), will relapse (can even get a dysfluency of speech)
• Cannot do fire drills (is a teacher) or assembly programs
• Recommended: Cambridge Psychological

• Follow up findings:
  1. Cover testing at near: orthophoria
  2. Nearpoint of convergence: 4 inch blur
  3. OKN: excellent responses in both horizontal directions
  4. Base-out vergences: 20/ >35
  5. Base-in vergences: 14/18/14
Recommendations:

1. Keep walking with the prisms
2. OTR: begin work with rotatable yoked prisms (very difficult to date)
7/16/13 - follow-up:

1. Working with 2 prism diopter and 4 prism diopter yoked prisms with movement - with O.T.
2. Working with treadmill and various eye movements laterally and vertically
3. The prisms have “made me able to multi-task”
4. Fluorescents and outdoor very difficult - utilize anifra indoors and polaroid gray #3 Outdoors
5. Binasal occlusion worked well with reading
10/17/13: follow-up

- Uses a small amount of Xanax (0.5 mg.) and helps her significantly
- Has worked up to 12 prism diopters of rotatable prism
- Light sensitivity has improved
- Add syntonics
- Add split hart charts / near-far charts, ball-chart activities, midline tapping
- Consider cranio-sacral therapy
Patient: A.P.

- Birth: 8/7/96; grade: 12
- 12/2/13: showering before school - straight down on the floor - concussion
- Stresses the day before with college applications
- Taking Vivance (appetite suppressant - low blood sugar?)
- Audition for the school play that afternoon - could not dance
- Problems during with going up stairs
- Increased light sensitivity and sound sensitivity
- Physical medicine recommended limited school schedule
- Concussion induced headaches since the beginning
- Music coaches located in NYC - ride in was palatable - ride home was difficult
Symptoms:

- Auditioning - dancing - resulted in nausea and dry heaving
- Dizziness in large crowds, malls, stores, crowded hallways
- Partial in-school / partial home study
- History of motion sickness, acid reflux as a child, anxiety disorder, chronic ear infections as a baby - bilateral myrengotomies at 18 months
- Problems with depth perception and feels most comfortable on the floor
- Reads for 30 to 45 minutes → headaches
- Memory and word retrieval issues
- Had been doing a lot of texting and t.v. watching - curtailed
- Current medications: Allegra-D, Lorazepam and Amoxycillin
Visual analysis:

2. Refractive: no essential refractive error o.u.
4. pupils: perrl; right handed / right eye dominant
5. eom: full and smooth to all positions of gaze, no nystagmus
6. Cover testing: distance and near: orthophoria;
   - Von Graeffe phoria: orthophoria in vertical and horizontal planes
   - Maddox Phoria: 2.5 - 3.0 exo
   - Stereopsis: 20 seconds
   - Nearpoint vergence ranges: narrowed
   - Nearpoint accommodative ranges: PRA: +0.50 / NRA: +2.00
7. ocular health: normal
8. visual fields: normal
9. okn responses excellent in both horizontal directions of rotation
Diagnosis:

1. Visual vestibular integration dysfunction
2. Accommodative insufficiency
3. Photophobia
Recommendations:

1. Plano = $\frac{1}{2}$ in O.U. (grind in)
2. +0.25 O.U. = 2 down O.U.
3. Cranio-sacral massage
Recommendations:

1. Keep walking with the prisms
2. OTR: begin work with rotatable yoked prisms (very difficult to date)
Working with 2 prism diopter and 4 prism diopter yoked prisms with movement - with Beth
Working with treadmill and various eye movements laterally and vertically

The prisms have “made me able to multi-task”
Fluorescents and outdoor very difficult - utilize anifra indoors and polaroid gray #3 Outdoors
Binasal occlusion worked well with reading