The Critical Importance of Optometric Involvement on the Rehabilitation Team – "It is time to put optometry back <u>into NOR</u>"

28<sup>th</sup> Annual NORA Conference Scottsdale, AZ COPE #63677-NO

. Baxstrom, MA, OD, FAAO, FCOVD, FNORA

C	Disclosure Statement
	Nothing to disclose

### Introduction

- Patrick "Accurate Diagnosis = Optimum Prognosis"
- Brenda "95% of vestibular issues are central (visual-vestibular integration), only 5% are peripheral vestibular in origin"
- Curt "Optometry is critical within the evaluation and management of patients, not simply for visual rehabilitation"

### What are NORA's Goals?

- Are we providing the very best optometric care we can? For each and every patient?
- Do we provide clear and appropriate clinical information to those in need? Our colleagues?
- □ Are we growing? How do we gauge growth?
- Have we been emphasizing the continued improvement of optometric care or are trying to understand what other professionals do?

### Are we providing the very best optometric care we can?

- Comprehensive vision evaluation including ocular health, best treatment options...
- Lenses
- Prism
- Selective Occlusion
- Tints/Filters
- Are we improving our understanding of NOR and our tools ?



### How do we provide better care?

- Appropriate knowledge and terminology to aid in patient education and communication to our colleagues and other providers
  - Visual vs. Visual-vestibular therapy
  - Visual midline shift syndrome vs. Egocentric Midline Shift
  - Patient VF loss vs. attentional loss
  - Other Providers need for examination vs. screening
  - Optometrists Prescribing for patient (SV vs. Bifocals)

### **Mission Statement**

"NORA is an interdisciplinary group of professionals dedicated to providing patients who have physical or cognitive disabilities as a result of an acquired brain injury with a <u>complete ocular health evaluation</u> and <u>optimum</u> <u>visual rehabilitation education and services</u> to improve their quality of life."

### Why an Interdisciplinary Approach?

- Team approach vs. isolated individual practitioners – KEY – are we referring?
- Increased speed and accuracy of diagnosis
- Improved collaboration through improved understanding of each others discipline and scope of practice
- Improved outcomes best patient outcomes would be expected as well as shorter time for recovery



### 2019 Joint BI Position Paper COVD-NORA

- Resolved, that the COVD and NORA urge all healthcare professionals to consider the possibility that a patient's ocular or visual signs/symptoms may have been a result of a BI, including concussion, and be it
- Resolved, that the COVD and NORA recommend an optometric evaluation to determine the presence of brain injury-related ocular changes, visual dysfunction and visual processing deficits for persons who have sustained a BI including concussions, and to provide medical and/or functional optometric rehabilitation services.

### Improving optometric care and models, understanding what others do

- Optometric care includes a lot of conditions
- Quite a variety of treatment options for similar conditions – medical, visual, other disciplines
- Do we put emphasis on improving optometric care or look for answers from other professionals?
- Is Visual Midline Shift Syndrome valid, or should we be looking at all of the aspects of ABI and use the diagnosis of Egocentric Midline Shift? This fits well with the research on Abnormal Egocentric Localization.

### Overview of Optometric Care

- $\hfill\square$  Comprehensive Vision Exam including ocular health
- Visual Hygiene and other recommendations
- $\hfill\square$  Lenses compensatory and the rapeutic
- Prism for binocular, postural, visual field
- □ Selective occlusion diplopia/confusion, dizziness
- Tints/Filters photosensitivity, dizziness
- Combinations

### Scope of OD vs. others providing NOR

- Optometrists providing Neuro-Optometric Rehab
   Comprehensive Visual Examination including ocular health
  - Lenses
  - Prism
  - Selective occlusion
  - Tints/Filters
- Other disciplines providing vision rehabilitation
  - Vision screening
     Vision rehabilitation
  - Vision renabilitation
  - Other binasals? prescribing lenses?

### How Much Training Does One Need?

- □ What do you need to understand to prescribe lenses, prism, selective occlusion and tints/filters ?
- □ \*Does one need basic visual science to start with?
- □ Selective occlusion course 2 hrs at AAO
- □ NORA CS 1 and CS 2 weekend courses.
- COVD, OEPF and regional meetings
- Optometric Blogs and Listserves
- □ Vision Education Seminars Scheiman course
- Non-Optometric lectures on vision rehab

### Visual Rehab After www.pesirehab.com Neurological Events Seeing the World Through New Eyes Outline SIS: VISUAL FIELD CUT ISUAL REHAR FOLLOW noview of the visual pathway the diagnosis t, demonstration & lab practice of action ship of a SIS: VISUAL ACUITY & IS: HEMI-SPATIAL NEGLECT in out and ne on & lab n & lab practice MENTATION & ADVOCACY OR COVERAGE

### Should an OD Provide Physical Therapy ?

- Does the OD have experience in this field?
  - I have taken a 2hr class at NORA on mobility issues and fall risk including hands on experience with transfers, also CS 2 course and Padula's Neuro-Visual Postural course (3 weekends/test)
  - Have seen patients at hospital with PT since 1988 weight bearing, gait analysis, mobility therapy, etc. I have taught them as well!
- Outside the scope of practice of an OD?
   Vision is critical for balance, thus also mobility
- Yoked prism for AEL and other conditions
- Does all one need to start are just a few walkers and a variety of canes? Or do I need the therapist science too?

### Should someone other than OD Rx Binasals?

- Legally unable to in my state based upon my state laws
- But...let's look at the physician/other health care provider relationships in patient care.
- \*Example O2 saturation levels drop, what happens?
- This is interdisciplinary care. I work within several rehab hospitals and we communicate closely. Any patients whom have a vision concern may be provided symptomatic treatment, but then are always consulted within the week. We no longer do vision screenings as most therapists can recognize a possible visual concern.

### Visual Screening vs. Visual Exam

- □ Screening is to determine if a possible visual condition is present. Not meant for a diagnosis.
- □ It should direct one to an immediate referral to fully evaluate the patient for ocular health and other visual findings that may be affecting the rehabilitation process. (mission statement)
- \*Visual screenings were taught for many years in clinical skills 1. This helped to emphasize the importance of the optometrist on the team and delineation of scope of practice.

### Testing for one area is not enough!

Patient is found to have diplopia by case history or a screening? Should an individual be given a brock string to recover function?

### Concerns are:

- Ocular and neurological health check?
- Type of deviation eso, exo, hyper or cyclo?
- Supra vs. Infranuclear?
- Range of motion? (monoc and binocular), SFDS?
- A whole host of other concerns that would be addressed in a comprehensive vision examination
- Essentially a CT or Case Hx of diplopia is not enough to treat

### Patients being treated for USI

- Unilateral Spatial Inattention
- Homonymous hemianopsia
- Cataract
- Diabetic retinopathy
- Corneal scar
- Terson's syndrome (vitreal hemorrhage-SDH, ICP)
- Papilledema (ICP)
- □ As a result of the referral from the screening and/ or concern, I addressed these issues.
- □ What if they were not?



### Vision screenings... Taylor & Francis LITY AND REHABILITATION, 2018 Idolorg/10.1080/09638288.2018.14 PERSPECTIVES IN REHABILITATION R Decktoria Vision rehabilitation interventions following mild traumatic brain injury: a scoping review Mary E. Simpson-Jones" and Anne W. Hunt<sup>aJ</sup> \*Department of Occupational Science & Occupa Research Institute, Toronto, Canada IMPLICATIONS FOR REMABILITATION Mild traumatic brain injury may result in visual deficits that can contribute to poor headaches, fatjue, problems reading, difficulties engaging in meaningful daily activitie reduced quality of life.

- reduced quality of life. Promising interventions for vision rehabilitation following mild traumatic brain injury include the of optical devices (e.g., prism glasses), vision or oculomotor therapy (e.g., tangeted exercises to see movements), and a combination of optical devices and vision therapy. Rehabilitation: Professionals (e.g., optometrists, occupational therapists, physiotherapists) have important role in screening for vision impairments, recommending referrats appropriately to v specialists, and/or assessing and treating functional vision deficits in individuals with mild traun train linury. specialists, u brain injury.

### So Where Does One Draw the Line?

- □ Vision screening should always lead to a comprehensive vision examination and thus medical direction
- □ You can't expect any therapist to not include visual or vestibular input. What therapists do all day includes both. The concern is when one begins to apply anything that modifies visual function that is considered a medical appliance which requires medical direction.
- □ This would include lenses, prism, selective occlusion and tints/filters. These would require medical direction (order) and secondarily, the physician needs to be in direct care of the said appliance.

### Neuro-Optometric Evaluation/Treatment

### OVERVIEW

- Comprehensive vision evaluation including ocular health for an appropriate diagnosis
- Lenses
- 🗆 Prism
- Selective Occlusion
- Tints/Filters

### Lenses - Considerations

- □ Therapeutic vs. Compensatory
- Refraction
- Type of Lens Design (SV, BF, Progressive)
- Accommodation not uncommon for 40+
- □ Visual spatial considerations size and distance
- \*Motion processing VOR gain
- Low Vision near and far
- □ When to prescribe? Based upon your model!













### Lens Applications and the VOR Gain

- □ What is the VOR gain? Relationship to DVAT
- Following a TBI the VOR gain is often less than 1.0, resulting in dizziness and/or blurry vision with head movement
- Subcortical and Cortical components
- □ How do you improve it?

Gaze Stabilization

- Ocular motor function pursuits, saccades, OKR, vergence
- Low plus lenses (reducing minus)

### Visual – Vestibular Evaluation

- Comprehensive Optometric Vision Examination
   Case History and Observations
- \*Dynamic Visual Acuity Test (VOR)
- \*Visual-Vestibular-Cervical (VVC) Saccadic Test
- \*OKN Motion Sensitivity Test
- Cervical Joint Proprioception Test
- Additional probes with above tests
  - Blinking
  - Peripheral Visual input
  - Probes (+.50, binasal, 2Bl, tint/filters)

### Case History - Vestibular vs. Visual Motion

- Visual Motion, Crowding
  - With/without head movement
  - Brief vs. sustained
  - Small vs. large movements, Speed, Velocity/Acceleration
- Head Movement Rotational vs. Linear Brief vs. sustained

  - Small vs. large movements, Speed, Velocity/Acceleration
- Also consider
  - Cervical input, injury
  - Orthostatic hypotension

### Dynamic Visual Acuity Test

- Provide comprehensive vision examination including refraction, compare with habitual
- Trial frame refraction vs. habitual, progressive
- Compare static VA vs. dynamic VA (head rotated R and L at 2 cycles per second)
- Drop in two lines is pathognomic for a visualvestibular issue, but any blur may be deemed clinically significant
- □ Compare with lens (+.50) or other probes

### VVC Saccadic Test

- Ask the patient to look in primary gaze and alternately look at right and left sides of the room (eye level) – what about 40+ year olds?
- □ Observe head vs. eyes vs. combination
- □ Rate symptoms 0-10, Observe blinking/fixations
- Modify behaviors and probe with lenses and other tools to determine what may be most helpful
- Again evaluating visual, vestibular and cervical input with lenses, prism, selective occlusion and tints

### **Optokinetic Motion Sensitivity Test**

- Have patient look at far with target (compare with no target).
- Hold OKN drum to the side, slow rotation, note any discomfort or motion sensitivity, rate 0-10
- Modify behaviors and probe with lenses and other tools to determine what may be helpful
- Helps to differentiate head movement or visual motion as primary factor





### Pearls in Visual-Vestibular Processing

- Your symptoms and case history should guide your evaluation. If world is spinning with no head movement or lateropulsion, you should consider a referral to an AudD, ENT or Neuro-Otologist.
- Likewise, if your probes provide relief of symptoms, you will likely prescribe them. If you hit a wall in therapy and not progressing after two weeks, consider a referral.
- □ OK, now let's take it a step further...

### UPMC – Six Subtypes of Concussion

Knee Surg Sports Traumatol Arthrosc DOI 10.1007/s00167-013-2791-6

SPORTS MEDICINE

A comprehensive, targeted approach to the clinical care of athletes following sport-related concussion

Michael W. Collins - Anthony P. Kontos -Erin Reynolds - Christopher D. Murawski -Freddie H. Fu

Received: 4 November 2013 / Accepted: 20 November 2013 © Springer-Verlag Berlin Heidelberg 2013

### 6 Trajectories of Concussion 1 - Vestibular 2 - Ocular (Visual) 3 - Cervical 4 - Cognition/Fatigue 5 - Anxiety 6 - Migraine Isolated vs. Mixed Medical, Non-medical Therapy







### **Concerns of Lenses**

- Therapist prescribing lenses
- Therapist providing reading glasses
- Should one really prescribe lenses without a comprehensive vision evaluation?
- I believe it to be the most powerful tool in our toolbox

### Case Example - #1

- 6 months of vestibular therapy with minimal improvement in symptoms
- VA 20/20, DVAT 20/40, symptoms with Optokinetic Motion Sensitivity test and VVC Saccadic test
- Recheck DVAT with +.50 over distance Rx and clears with no motion, cut distance Rx .50 D (less minus) and almost symptom free at followup
- \*Binasal had also helped but not as much as low plus, no improvement with 2Bl or color

### Question ?

- Why might a patient not respond with standard vestibular rehabilitation therapy, but then does with an appropriate lens prescription?
- Example Hemiplegic recovers with therapy, or perhaps needs the support of a cane/walker with therapy to regain function?
- Likewise A patient with a visual-vestibular dysfunction is probably best served when tested with all possible tools to support rehabilitation.

### Case Example - #2

- 4.5 months of vestibular therapy with no benefit, referred as therapist states 'maybe vision related'
- VA 20/20 and DVAT 20/50, symptoms increased from 3-5 with saccades and optokinetic test
- Patient mentioned some diplopia, therapist not sure what to do as they showed some displacement on maddox rod. Decided to give them brock string from a day course on vision rehabilitation
- □ 'Vision related' or is this "Visual-Vestibular Rehab"?



### But then...Binocular Findings

- No palsy noted with 2 R Hyper/esophoria in cover testing, 6 R hyper/esophoria in phoropter
- Maddox Rod testing demonstrated 8 PD cyclo
- Would a brock string be your first choice for treatment?
- Can you change vergence angle or only fusional ranges to maintain single vision?
- \*Post bean bag activity showed 6-2 R hyper and 8-3 PD cyclo



### Prism - Considerations

- Binocular/Strabismus
  - Paresis vs. Developmental (decompensated phorias)
- Yoked Prism Postural-Mobility, USI, HH
- $\hfill\square$  Base In Prism visual spatial attributes
- PELI Prism Visual Field HH, also quadrantopsia?
- □ Therapeutic vs. Compensatory
- Disruptive vs. Integrative
- □ Horizontal vs. Vertical vs. Oblique applications

# Case Presentation – RSR paresis

### Visual Midline Shift Syndrome

- □ Is there really a VMSS ?
- Includes patients with hemiplegia, unilateral vestibular disorders, binocular issues, USI
- It is common to prescribe prism for postural/ mobility concerns
- Egocentric Midline Shift may be a better term because of the multiple components leading into the behavior

### Visual Midline Shift Syndrome

- Test looking at ball (EOM proprioception) or straight ahead (physiological diplopia awareness) or gait pad?
- Egocentric includes personal, peripersonal and extrapersonal space
- □ Cervical Joint Position Error ? Z-Bell test ?
- Effects of cervical and vestibular input







### Cervical Joint Position Error Test

- Patient places red laser on head, directs head toward target
- Closes eyes, rotate to R, then return to where they think the midline point was. Repeat from opposite direction.
- □ Is this truly a cervical test? (cervical midline shift)
- Sound similar to visual midline shift syndrome?
- Rehabilitation Measures www.sralab.org





### Prism Walk with Eyes Closed

- Test patient ability to walk down hall with eyes open and closed
- Repeat with 10PD Base Right or Left, with eyes closed before placing prism on them, walk
- Will the patient walk straight since eyes are closed or will they localize and drift toward apex? Or possibly opposite effect?

What Happens with 10 PD Eyes Closed ?







### VMSS Appears to be Multisensory

- "Egocentric Midline Shift Syndrome" may be a better term (EMSS vs. VMSS)
- Can be modified by visual (prism), vestibular and cervical input
- Should vestibular be first treatment consideration?
- □ When you use Prism Consider -
  - Directional and Rotational (spatial transformation) Component
     Therapeutic vs. Compensatory approaches
- Consider personal, peripersonal and extrapersonal space

### Selective Occlusion - Considerations

- Types and variables of selective occlusion
- $\hfill\square$  Motor vs. sensory aspects
- Penalization
- Central vs. peripheral considerations
- Vergence considerations
- Temporal considerations in therapy
   When to reduce/remove

### Why Use Selective Occlusion ?

- Refraction and Retinal Conditions
- Amblyopia
- Strabismus
- Traumatic Brain Injury
  - Photosensitivity, Motion, Proximal vergence reduced
- Others
- Therapy work monocular, MFBF, peripheral

### Variables of Selective Occlusion

- □ Compensatory vs. Therapeutic
- Form
- Size Symmetry
- $\square$  Location
- Solid vs. Graded
- Part vs. full time
- 🗆 Far vs. near
- Immediate vs. long term changes

### Physiological Considerations-Binasal Width

Basic Considerations of a Narrow Binasal

- More emphasis on sensory input, less proprioception
  More binocular interaction, less abduction required
- Basic Consideration of a Wider Binasal
   More emphasis on proprioception, less sensory
  - Less binocular interaction, more abduction required
- Basic Consideration of Asymmetry
   Modifies sensory and motor aspects, "penalization"













### Visual fMRI Responses

- Enhanced saccadic latencies and attentional effects in TEMPORAL vs. nasal Hemifield
- Superior Colliculus demonstrates this whereas LGN and visual cortex did not
- This supports motor fusion is based more on crossed paths which are faster and stereopsis along the slower uncrossed paths
- Matches split chiasm/agenesis CC studies

### **Binasal Occlusion**

Effect of binasal occlusion (BNO) and BI prisms on the visual-evoked potential (VEP) in mild traumatic brain injury (mTBI). Ciuffreda KJ, Yadav NK

Brain Injury 2014;28(12):1568-80.





### Binocular Example – L CN6 Paresis

- L gaze diplopia, R gaze single
- Traditional Tx Fully occlude eye
- Effects upon balance
- Effects upon improvement of L abduction
- Therapist provided L Temporal Sector
- Sector Tx R Nasal Sector
  - Eliminates diplopia to L
  - Allows opportunity to improve L abduction
  - Provides L visual field for mobility, balance



### Selective Occlusion - Concerns

- Do not use occlusion to treat symptoms in isolation of a comprehensive vision examination with diagnosis
- Incorrect diagnosis and/or placement doesn't help the recovery process
- Diplopia with nasal or binasal
- Recent NIH Research Project

### Oscillopsia or...?

- Therapist calls asking what they can do to help a patient with oscillopsia (bilateral vestibular hypofunction)
- Discuss we might probe with binasal to promote peripheral fusion and decrease proximal vergence
- $\hfill\square$  Scheduled for exam next week
- Call the next day, "It's a miracle, he has no oscillopsia now!"
- I see the patient the next day...

Oscillopsia cured, or Lens Application



### NIH Study

- "The Effect of Binasal Occlusion on Balance Following a Concussion"
- "To allow clinicians to make evidence-informed decisions regarding the management of persistent balance problems post-concussion"
- \*I'll suggest that there may be different reasons for the symptoms our patients present with. And different treatments or combinations may be best for each type.

### Concerns of NIH Study on Fall Risk

- NO comprehensive vision evaluation (no other visualvestibular or ocular health issues are ruled out
- Assumes single factor involved from visual perspective
- Assumes single treatment option is important for reducing fall risk (prism, occlusion, tint/filter, therapy)
- No clarity on placement of binasal
- No mention of possible diplopia from binasal

### Tints / Filters – what are they used for?

### Photosensitivity

- Visual fields
- Circadian Rhythm
- Sleep-Wake Cycles
- Blue Light

### Areas of Investigation

- Cortical hyperexcitability
- Image vs. nonimage visual pathways (ipRGC)
- Elevated dark adaptation threshold
- Binocular vision disorders
- Pattern sensitivity
- □ Accommodative fatigue
- Visual fields
- Pupils

otential Uses of Lig	ght Therapy
Review For reprint orders, please contact: reprints@futuremedicine.com	Concussion
Potential for the development of l therapies in mild traumatic brain i	ight njury
Adam C Raikes <sup>1,3</sup> & William DS Killigore <sup>4,1,3</sup> <sup>1</sup> Soci, Coptinis & Affective Neuroclassis Lab, Department of Nechany College of Medicine, 150 <sup>1</sup> Ocice: 1000.0002 State 2018 <sup>1</sup> Autor Se compositions: Hilgenbeytrategistromastic	University of Amorea, Surson, AZ
Light fifters advects if a spectra of humon physical galaxies and advect and advectories to protone with the spectra of the spectra of various wavelengths of high on these major domains, particular end attracts the spectra and origination suggests that light, particular end attracts the spectra and origination significant enders wavelengths, such and and genes may advect humon and the recommental personalized methods approach to high or hysteric provides and advection spectra to high or patteries recommental personalized methods approach to high or patteries recommental personalized methods approach to his year of light the patteries recommendation of the spectra of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patteries recommendation of light the patterie	Including circadian rhythms, sleep- ing nelevant literature on the effects by a they pertain to recovery from y in the blue wavelength, has pow- ould be useful for treatment. Other hat, if targeted appropriately, might light, more reasont is needed. We rapy as an adjunctive treatment for
First draft submitted: 29 June 2018; Accepted for publication: 1 Au 15 October 2018	gust 2018; Published online:
Keywords: blue light + brain injury + cecadian rhythm + concursion + fatigue	mid TBI • phototherapy • skeep-wake

	HARPY OF OPERATION OF STREET OF STREET	
ELSEVIER	Available online at white operation of the state of the s	Survey of Contributions
Diagnosis, pathop of photophobia Bradley J. Katz, MD, PhD*	hysiology, and treatment	Constant
*Department of Optitudimology and Visu Health Sciences Center, Salt Lake City, U *Department of Neurology, University of	ull Sciences, John A Manun Eye Center, University of Unoh coli, USA Uhah Mealth Sciences Center, Salt Lake City, Uhah, USA	
A BTICLE IN FO Adds hamry Resented 25 June 2015 Boostined in serviced foron 11 January 2016 Amopine 2 February 2016 Analysis of 10 February 2016	A 557 A A CT Protopholia, sa aleacensi intolerasor to Tajot, is associated wi and neurological conditions. In the presence of normal stars manarations, the most common conditions associated with hiphanophanophan, and commonic himological points and any phonophanophanomic alogican calls play s kay mits in the point Albongh phanomic alogican calls play s kay mits in the point Albongh phanomic alogican calls play s kay mits in the point of the second stars and the second stars and the second stars and the second stars and the second stars and the second stars and the second stars and the second stars and the second stars where the second stars are second stars and the second stars the second stars are second stars and the second stars are second stars the second stars are second stars and the second stars are second stars the second stars are second stars are second stars and the second stars the second stars are second stars are second stars are second stars the second stars are second stars are second stars are second stars the second stars are second stars are second stars are second stars the second stars are second stars are second stars are second stars the second stars are second stars are second stars are second stars the second stars are second stars are second stars are second stars the second stars are second stars the second stars are second stars are second stars are second stars are second stars the second stars are second star	ith a number of ophthalmic slogic and ophthalmologic photophobia are migraine, denses that the intrivisionly physiology of photophobia solutive retiral gaugiton orth
	and the neural pathenys that mediate photophobia may be po	osible in the future, current

### Katz BJ and Digre KB - 2019 Dry eye and corneal neuropathy Migraine Other primary headaches Benign essential blepharospasm Traumatic brain injury Photooculodynia Psychiatric conditions

- Nonorganic photophobia
- Medications





### Tint/Filters Considerations

- Color frequency
- Transmission percentage
- □ Narrow vs. wide pass filters
- 🗆 In vs. outdoors
- □ Full vs. part time
- □ Gradient, solid, photochromatic
- Overlays/EZC Reader
- Syntonics

### Possible Considerations of Color

- Image forming Rods, Cones (Red, Green, Blue)
   These are present in 8 4 1 ratio)
- Thus modification of tint may modify ratio of cone usage
- Non-image forming Melanopsin, biphasic
- Effects upon visual spatial processing (Volume = x, y and z axes), should we eliminate C/P?
   Magnification?

### NOR vs. VR and OVT vs. VT

- We should clarify our treatments to all
- Optometrists provide evaluation and management
   Neuro-Optometric Rehabilitation
  - Optometric Vision Therapy
  - Referrals to other professionals for evaluation/management
- Therapists provide screening and referrals for further evaluation and can provide
  - $\hfill\square$  Vision Rehabilitation related to their specialty and law
  - Vision Therapy related to their specialty
- We should respect each others knowledge and background and demonstrate mutual respect

### Interdisciplinary Care Should Provide

- Increased speed and accuracy of diagnosis vs. treatment of symptoms
- Improved collaboration through improved understanding of each others discipline and scope of practice
- Improved outcomes best patient outcomes would be expected as well as shorter time for recovery

### Neuro-Optometric Rehabilitation

- Emphasis on optometric aspects affecting the overall rehabilitation of patients with ABI.
   Including but not limited to:
  - Use of lenses, prism, selective occlusion and tints/filters as tools in therapeutic procedures related to:
    - Visual Acquisition Skills (VAS)
    - Visual Information Processing Skills (VIPS)
    - Visual-Vestibular Integration
    - Posture and Mobility
    - Others six subtypes of concussion

### Case - "Visual-Vestibular" Concussion

- Substitution and Habituation Activities are CRITICAL
- Gaze Stabilization-to improve remaining vestibular function and central preprogramming
  - To foster the use of saccadic or pursuit strategies and central preprogramming
  - To foster central preprogramming (imaginary target)
- □ 5 minute rule recover symptoms quickly!
- □ Modify postural stability, base support, etc.

### Vestibular Course for Therapists

"It's an injustice to not overstimulate your patient, because your goal is to make their daily life as normal as possible."

What does this really mean ?

1-How does the patient cope or recover from the increased symptoms?

2-Assumes a "No Pain, No Gain" attitude



### Gaze Stabilization

- □ Size/Complexity of target
- 10X each, Right/Left and Up/Down, Rotations
- Range narrow to wider
- □ Speed slow to faster
- \*Monitor symptoms
- Add other elements as needed:
- Central/Peripheral, Depth (X,Y and Z)
- Proprioceptive localization
- Near vs. Far targets

### Basic Visual Skills Therapy – VOR gain?

Vision and balance: the optometrist's role in managing patients with dizziness and vestibular dysfunction. Mejia GA. J Behav Optom 2008;19(4):97-102. \*Overview and 2 case reports

Visual-vestibular interaction and treatment of dizziness: a case report.

Brennan M. J Behav Optom 2012;23(3):72-79.

\*Case report of patient who had been helped with vestibular therapy, but had residual dizziness. Vision therapy decreased symptoms, and improved balance.

### Pseudo-Vestibular Syndrome

Six adult cases with a pseudo-vestibular syndrome related to vergence. Yang Q, Jurion F and Bucci MP Neuro-Ophthalmology 2008;32:93-104 \*Eye movement testing can be helpful in differential diagnosis of pseudo-vestibular syndrome. Oculomotor training is suggested for such subjects with vertigo/dizziness symptoms to improve their abnormal eye movements and reduce symptoms.

### Can you treat a CN 3, 4 or 6 paresis?

- Paresis vs. Complete Palsy
- Ron, et.al. EOM studies demonstrating faster and fuller recovery with treatment vs. wait and see – ocular motor subsystem transfer
- With diplopia, consider selective occlusion vs. complete occlusion or using compensatory prism.

### Paresis/Palsy Treatment

- Document monocular and binocular ranges
- Consider selective occlusion
- Provide treatment using multiple OM subsystems
- Once you have reached maximum monocular recovery, consider compensatory prism and reduce over time
- Jump duction (Ludlam) and vestibular input can be used to decrease vergence angle, decrease prism adaptation
- Consider prescribing ground prism if you plateau

# <image><section-header><section-header><section-header>

### Therapists Course at Hospital

- □ "You cannot treat paresis/palsy of EOM"
- Manage simply with unilateral patch
- □ Refers to a study, we pulled it.
- $\square$  N = 206, used 108, other studies >500
- 82% recovered without tx of eyes, only treating the initial cause...diabetes, etc.
   Hemiplegia recovery?
- Success based on testing in primary gaze only
   Hemiplegia-stand vs. walk?

### Therapists Course at Hospital

- Park, et.al. Clinical features and natural history of acquired 3<sup>rd</sup>,4<sup>th</sup> and 6<sup>th</sup> CN Palsy. Eye 2008;22 p. 691-96.
- What does unilateral patching vs. therapy look like?
- Would you suggest placing a cast upon a hemiplegic since they cannot stabilize their leg?
- "The results of this study are limited by its retrospective nature and relatively small sample size."

### OD and Therapist Tools and Treatment

Diplopia-Vision Exam
 Lenses
 Prism
 Selective Occlusion
 Tints/Filters
 NOR
 PT
 Hemiplegia-Evaluation
 Wheelchair
 Walker
 Cane 4 point

### Optometrist has much to offer for Rehab

- Ocular health evaluation including pathway integrity
- Refract and determine appropriate lens for near and far. Adjust accordingly to type of ABI, strabismus, etc. (This sets stage for other applications)
- Prescribes prism for binocular, postural and visual field considerations
- Prescribes appropriate selective occlusion
- Prescribes appropriate color filters
- Prescribes appropriate Neuro-Optometric
- Rehabilitation including the use of lenses and prism in therapy.

### Opportunities for NORA

### Foundational concepts to consider

- Underlying Neurology and Development is critical with regards to pathology and pathway integrity
- Shift concepts of vestibular to visual-vestibular
- Optometrists need to take a more involved approach!
- Visual Midline Shift vs. Egocentric Midline Shift
- Six Subtypes of Concussion helps us to understand how critical vision is to the whole picture

### Summary

- We've come a long way from the beginning of NORA. We should pull together interdisciplinary teams with each professional lending their expertise to patient outcomes, beginning with a diagnosis
- The optometrist as part of the rehabilitation team is critical for the best outcomes for our patients.
- The optometrist has the ability to diagnose and has a unique skill set to offer this patient population, this should complement the therapist

### In Closing...

The care of our patients is a complex subject that should include all necessary disciplines to provide the very best care and help the patient to maximally recover function in the shortest time. A truly interdisciplinary approach is the only way!



Thank you for the opportunity to share this with you, our goal is simple. How do we provide the best care for our patients...