Oculomotor Function & Dysfunction

Binocular Coordination requires effective…	**Binocular Dysfunctions** due to TBI may results in…
- Smooth pursuits/tracking	- Inadequate gaze stabilization and bifocal fusion
- VOR	- Poor eye-head dissociations
- Saccades	- Strabismus
- Convergence	- Diplopia with or without changes in gaze
- Divergence	- Suppression (brains response to diplopia)
- Stereopsis/Spatial localization	- Vergence Insufficiencies (usually convergence)
- Focal and Ambient Visual Processing (Physiological diplopia)	- Accommodative Insufficiency (CN III)
	- Visual fatigue due to poor oculomotor control

Post-Concussion Syndrome

Signs or symptoms following a blow, hit, bump, jolt or any identified trauma to the head that persist >4 weeks include:

Dizziness	Slurred Speech
Headaches	Poor judgement & decision making
Blurred Vision	Memory problems
Nausea	Sleep disorders
Vomiting	Emotional instability

- Nearly 1 in 5 persons with concussion end up having PCS
- Symptoms may last months or even years
- **Controversial: pre-morbid characteristics can contribute to persistent PCS such as history of mental health problems and substance abuse**

Patient presentations- skilled observation

Easily irritable or changes in personality -> “I feel crazy.”

Rigid and stiff body movement

Changes in speech: stammering, difficulty with cohesive thoughts

Avoids stimuli: wears sunglasses, “I cannot go to the grocery store anymore.”

Forgetful & unable to concentrate

Avoidant behaviors (Self-isolates from others, decreased socialization; Stops participating in hobbies & extracurriculars)

Differential Dx: 3 Takeaways

Needle in a haystack: Visual diagnoses often look like other diagnoses

Be careful of jumping to conclusions.

Certain diagnoses are more well-known by those who have influence (e.g., ADHD)

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What do people with oculomotor deficits feel?
I have a vision problem?
Fatigued, stressed.
Missing out on experiences.
Stigma
Self advocates, over explainers.
Adapters – Not always beneficial long term.

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Why OT instead of "Vision Therapy?"

Occupational and physical therapy understand movement and function

Advanced trainings or certifications can overlap with the same skill set as vision therapists

OT collaborates with neuro-optometrists for guidance for vision-based therapy

Insurance often does not cover Vision Therapy services!!!!!!!!!

Must perform adequate and efficient visual and vestibular screenings during the evaluation process

Pediatric-based nature

How to help manage symptoms within daily routine?

Many individuals with Mild TBI push themselves beyond a point of recovery, which often can leave them "helpless" for hours or even days.

"Functional Activities Log"- Tracking specific activities that are perceived triggers for onset of symptoms; E.g. computer or screen-time, reading, scanning for grocery items, eating in a crowded restaurant, riding as a passenger in the car, etc.); Stigma, metal health concerns

Goal: reduce onset of symptoms by participating in short spurts of activity over a longer period of time

Functional Activity Log

1. **Establish a baseline:** Determine length of time an activity occurred resulting in onset of symptoms

2. **Establish the most effective strategy for reducing symptoms:**E.g. meditation, laying down in a dark and quiet environment, covering eyes with palm of hands with slight application of pressure

3. **Establish a "Pacing" Plan**: Terminating or pausing an activity prior to onset of symptoms; then resuming activity after symptoms subside

- If onset of symptoms occur at 20 minutes, then pausing, terminating, and switching to a different task should happen prior to 20 minutes

Every individual has different triggers, thresholds, and psychosocial supports that should be taken into consideration when developing an activities log and "pacing" plan.

Visual Perceptual Activities

Functional Activities	Therapy Activities
Dressing with or without AE	Parquetry
Applying make-up	Puzzles
Grocery shopping	Tangrams
Organizing spice rack and or pantry	Mazes
Sorting and organizing dishes from the dishwasher	"Where's Waldo?"
Navigating Apps on phone or web browsers	Graphing
School and work-based tasks	Line or design completion

Visual Perceptual Strategies

Environment	Person	Occupation
- Organization	- Scanning strategies	- Task analysis (grade up/down)
- External cues (e.g., increase contrast)	- Cognitive strategies	-

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Visual Perceptual Strategies (cont)

- Oculomotor strategies -

Vision Therapy Activities

"White-board" Activities	Eye-hand coordination, peripheral awareness
Walking Trails	Visual tracking, spatial and peripheral awareness, gaze stabilization, and balance
Dowel Stick or Bunting using a Marsden Ball	Peripheral awareness, eye-hand coordination, and stereopsis or depth perception
Vectograms	Convergence and divergence
Red/Green Activities	Reduce suppression of one eye while working both eyes simultaneously

Dynavision

Objective measurement for reaction time and can be used daily

Applied specifically for individuals returning to driving following TBI and stroke

Visual speed of processing and reaction time do not solely determine drive readiness

Contraindications: history of seizure-like activity

Functional Therapeutic Activities

Activities may be done in clinic or given as therapeutic home programs:

- Speed Typing Tests (several resources online)
- Structured Internet Searches (i.e. locating a current event article, read it, and write or type a brief summary)
- Car Scans (i.e. locating street signs, speed limit, etc. with or without moving head)
- Reading a bedtime story to your kids
- Scanning and clipping grocery store coupons
- Grocery shopping (i.e. establish a grocery list of 5 items and increase by 2 items each trip)
- Send email to therapist every Friday of new activities to add or replace on "functional activity log" for the next week

Where OT splits from Vision Therapy!

Electronic Vision Therapy

Pros	Cons
Advanced vision therapy option for higher level goals (driving)	Fatiguing
Great for individuals who like objective measures and goals	Photosensitivity
Gamers like it	Screen sensitivity
Can provide experiences pen and paper can't (dynamic reader;Tic-tac-toe-tack)	May be challenging for more severe TBI
	Seizure contraindications

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