Beyond Rest: Concussions are Treatable

Lafayette Area Sports Medicine Symposium 2019

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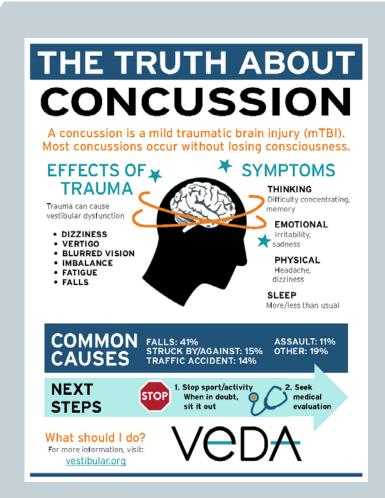
Objectives

- Discuss common symptoms following a concussion
- Discuss benefits of therapy following post concussion symptoms
- Discuss when to refer to PT/OT/ST
- Discuss PT/OT/ST evaluation and treatment



Common Symptoms After Concussion

- Headache
- Dizziness
- Mental fogginess
- Amnesia
- Emotional lability
- Depression
- Nausea/vomiting
- Unsteadiness
- Irritability
- Fatigue
- Slowed reaction time
- Sensitivity to light/noise
- Sleep disturbances
- Vision deficits
- Neck pain



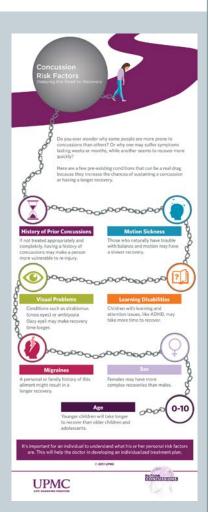
General Population vs Concussion Symptoms

Most Common Symptoms of Mild TBI Compared to Symptoms of Everyday Stress

Symptom	Symptoms of Mild TBI % of Patients	Symptoms of Everyday Stress % of People
Poor concentration	71%	14%
Irritability	66%	16%
Tired a lot more	64%	13%
Depression	63%	20%
Memory problems	59%	20%
Headaches	59%	13%
Anxiety	58%	24%
Trouble thinking	57%	6%
Dizziness	52%	7%
Blurry or double vision	45%	8%
Sensitivity to bright light	40%	14%



- Number and severity of symptoms in the first day (or first few days)
 - **Dizziness**
- History of previous concussion
- History of migraines
- History of depression/mental health diagnosis
- Age
- Female sex



Symptoms to Refer to PT

- Headaches
- Dizziness
- Balance/gait impairments
- Neck pain,
- Vestibular deficits
- Vertigo/BPPV

How are Concussions Assessed in PT?

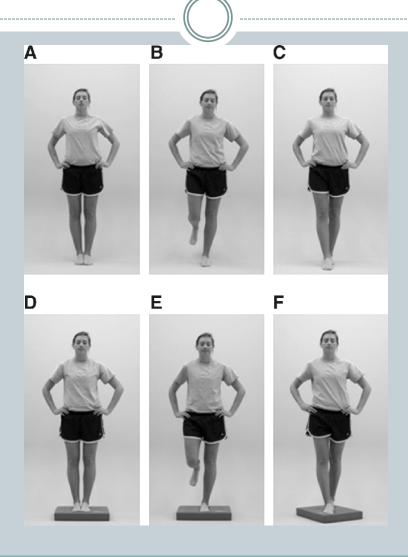
- Cervical spine screen
- Oculomotor exam
 - O VOMS
- Dynamic balance
- Static Balance
 - o BESS/modCTSIB
- Computerized Dynamic Posturography
- Dynamic Visual Acuity
- Gaze stabilization
- Positional testing (BPPV)
- Cervicogenic dizziness
- Concussion Grading Scale



Vestibular/Ocular-Motor Screening (VOMS) for Concussion

Vestibular/Ocular Motor Test:	Not Tested	Headache 0-10	Dizziness 0-10	Nausea 0-10	Fogginess 0-10	Comments
BASELINE SYMPTOMS:	N/A					
Smooth Pursuits						
Saccades – Horizontal						
Saccades – Vertical						
Convergence (Near Point)						(Near Point in cm): Measure 1: Measure 2: Measure 3:
VOR – Horizontal						
VOR – Vertical						
Visual Motion Sensitivity Test						

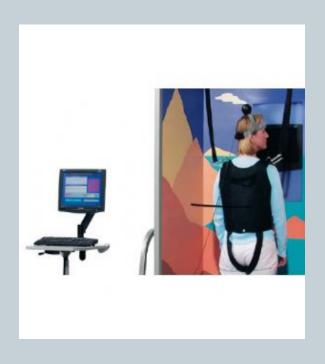
Static Balance



Computerized Dynamic Posturography (CDP)

- Sensory Organization Testing (SOT)
- Head shake SOT





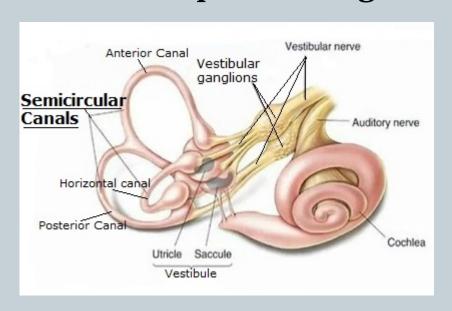
InVision Testing

- Dynamic Visual Acuity
- Gaze stabilization



BPPV

- Calcium carbonate otoconia become dislodged from the utricle and migrate into one or more semicircular canals causing vertigo
- Treated with canalith repositioning maneuvers



Cervicogenic Dizziness

- A musculoskeletal disorder characterized by dizziness and disequilibrium associated with neck pain and aggravated by neck movement; relieved by
 - positional change
 - Cervical AROM
 - Head-neck differentiation test
 - Cervical proprioception testing
 - Cervical joint assessment









PT Intervention

- Cervicogenic dizziness: mobilization, ROM, strengthening, proprioception retraining
- BPPV: canal specific repositioning maneuvers
- Impaired VOR: gaze stabilization exercises
- Visual motion sensitivity: habituation/desensitization
- Impaired balance function: sensory organization training, dynamic balance exercises, gait training
- Oculomotor impairment: exercises for convergence, pursuit, and/or saccadic eye movements
- *Progress to dual tasking with cognitive challenge, dynamic movements

Neurocognitive Testing

- ImPACT
- Age 5 to 11 age range
- Age 12 to 59 age range



 Sequencing/Attention, Word Memory, Visual Memory and Reaction Time

Return to Sport Progression

Brief Rest (24-48 hours)

- "After a concussion, initial reductions in physical and cognitive activity can be beneficial to recovery, but prolonged restrictions on physical exertion or removal from school can have negative effects on recovery and symptoms."
- Symptom guided progression

Consensus statement

Table 1	Table 1 Graduated return-to-sport (RTS) strategy							
Stage	Aim	Activity	Goal of each step					
1	Symptom-limited activity	Daily activities that do not provoke symptoms	Gradual reintroduction of work/school activities					
2	Light aerobic exercise	Walking or stationary cycling at slow to medium pace. No resistance training	Increase heart rate					
3	Sport-specific exercise	Running or skating drills. No head impact activities	Add movement					
4	Non-contact training drills	Harder training drills, eg, passing drills. May start progressive resistance training	Exercise, coordination and increased thinking					
5	Full contact practice	Following medical clearance, participate in normal training activities	Restore confidence and assess functional skills by coaching staff					
6	Return to sport	Normal game play						

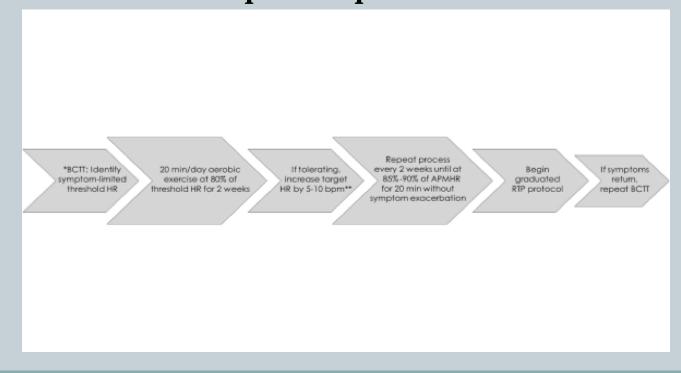
NOTE: An initial period of 24–48 hours of both relative physical rest and cognitive rest is recommended before beginning the RTS progression.

There should be at least 24 hours (or longer) for each step of the progression. If any symptoms worsen during exercise, the athlete should go back to the previous step.

Resistance training should be added only in the later stages (stage 3 or 4 at the earliest). If symptoms are persistent (eg, more than 10–14 days in adults or more than 1 month in children), the athlete should be referred to a healthcare professional who is an expert in the management of concussion.

Buffalo Treadmill Test

- Used to establish a safe aerobic exercise program
- HR and BP are recorded at symptom exacerbation to determine exercise prescription threshold



Lower Extremity Injuries & Concussion

- Athletes are more likely to have lower extremity injuries post concussion
 - 2x more likely within one year post concussion (Lynall et al)
 - o 3.39x more likely within 90 days (Herman et al)



When to refer to Occupational Therapy

- Visual deficits (Double vision, blurry vision, trouble seeing the board, light sensitivity)
- Concentration issues (School, Work, Home or on the Sporting field)
- Coordination difficulties (Multitasking issues)
- Memory issues
- Multisensory processing difficulties (Driving, Being in large crowds, Classroom)
- Trouble with ADL/IADL

Occupational Therapy Concussion Management

- Evaluation
- Individualized plan of care
- Return to occupation
 - School, extracurricular, driving, work

Occupational Therapy Evaluation

- Cognition/ Fatigue
- Vision/ Visual perceptual
- Coordination/strength
- Affect
- Sleep

Cognition

- "Thinking skills"
 - Memory
 - Problem solving
 - Processing speed
 - Planning
 - Attention
 - Executive functioning



"I don't think it's a concussion ... althoug the smoke has me a little concerned."

Standardized Assessment

- BehavioralAssessment ofDysexecutiveSyndrome
- Cognitive LinguisticQuick Test
- Rivermead BehavioralMemory Test

Vision

- Blurry/double vision
- Visual acuity, Eye dominance
- Nystagmus, Ocular alignment, Pupillary function
- Visual processing/perceptual skills
- Standardized Assessments: MVPT-4, BiVaba, Berry VMI

Coordination

- Bilateral Coordination- catching a ball, tying shoes
- Fine Motor Coordination: Hand writing, painting finger nails, buttoning a button
- Standardized Assessment: Nine Hole Peg Test, Berry VMI
- Intervention: Bal-A-Vis-X training, Multisensory integration tasks









Affect/Mood

- Emotional regulation
- Irritability
- Anxiety
- Behavior changes
- Sleep disturbances

Occupational Therapy Treatment

- Remediation- "Brain Efficiency"
- Compensation- memory strategies
- Adaptation- environmental, schedule
- Individualized Program

Interactive Metronome

- The Interactive
 Metronome (IM) is a
 computer-based program
 designed to improve
 timing, attention,
 memory, problem solving
 and coordination.
- Used with children and adults with a wide range of cognitive and physical difficulties



Interactive Metronome: Divided Attention

- "Multitasking"
- Switching back and forth between activities
- Communication within the brain, neural timing



Functional Vision Training

- Visual-motor activity
 - Visual scanning
 - Processing speed
 - Divided attention
 - Working memory
- Eye teaming



Graded/Modified Return to Activities

- "Return- to-learn"
- "Return-to-play"
- Environment modifications (sensitivity to sound and light) 504/ IEP
- Interdisciplinary team



Why Does Return to Learn Matter?

- Academic Consequences
 - Grades
 - College readiness
 - Scholarship eligibility

- Social Consequences
 - Missing friends
 - Missing important school events/milestones
- Both of these aspects can affect mood and overall well-being.

Timing of Return to Learn

- It is possible to return to school too early!
 - Academic failure
 - Impaired social interactions
 - Frustration
 - Exacerbation of concussion symptoms
- Following a specific protocol tailored to the student/family is key for academic and social success.

Essential Modifications

Timetable Curriculum Return to Learn **Modifications Environmental** Activity

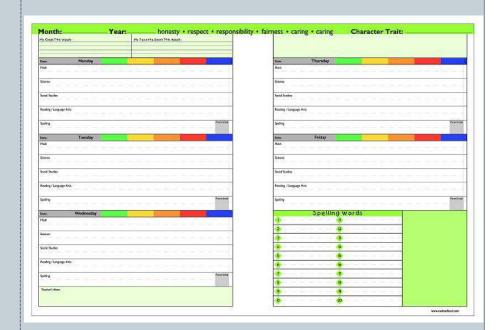
Timetable Modifications

- Introduce shorter time periods of class
 - Half days to start
 - 2 full days combined with half days
 - Consider alternate methods of learning (elearning; schoolwork at home?)





- Negotiating with student/school personnel to prioritize courseload
 - How much
 - What type
- No homework with initial return to learn
 - Increase by 15 minute increments—maximum of 45 minutes per day



Environmental Modifications



- Work in a quiet space
- Preferential seating in classroom
- Avoid busy areas
 - Hallways
 - Lunchroom
 - Auditorium
 - Gymnasium

Activity Modifications

- Limit screen time
 - o TV
 - Phone
 - o iPad
 - Computer
- 15 minutes blocks at a time, maximum 1 hour/day



The Role of the SLP

- SLP evaluation is indicated if pt reports difficulty with:
 - Focus/attention to task
 - Short-term memory recall
 - Word finding in writing or conversation
 - Organizing/maintaining schedule
 - Processing speed
- SLP will focus on cognitive-linguistic tasks

Standardized Assessments: SLP

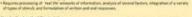
- Scales of Cognitive Ability for Traumatic Brain Injury (SCATBI)
 - o Perception/Discrimination, Orientation, Organization, Recall, and Reasoning
- Functional Assessment of Verbal Reasoning and Executive Strategies (FAVRES)
 - Verbal reasoning, complex comprehension, discourse, and executive functioning
- Montreal Cognitive Assessment (MoCA)
 - Attention and concentration, executive functions, memory, language, visuoconstructional skills, conceptual thinking, calculations, and orientation
- Detroit Test of Learning Aptitude
 - Cognitive assessment specific to pediatric patients (6-17 years)
- Individual Tasks
 - Card sort
 - Attention to task, processing speed
 - Number/letter trail
 - **Executive function, working memory**
 - Patients may bring their own tasks (homework, study prep, planner, etc.)

Standardized Assessments: SLP





Executive Strategies By Sholla MacDonald M.Cl.Sc. SLP(C)



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2. Eliminating Instrument Information - Care the person identify and ignore less returned information or

3. Weighing the Facts - Can the person compare or weigh competing options or orthogo-

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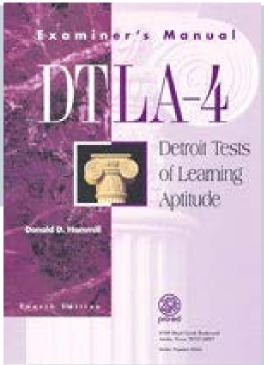
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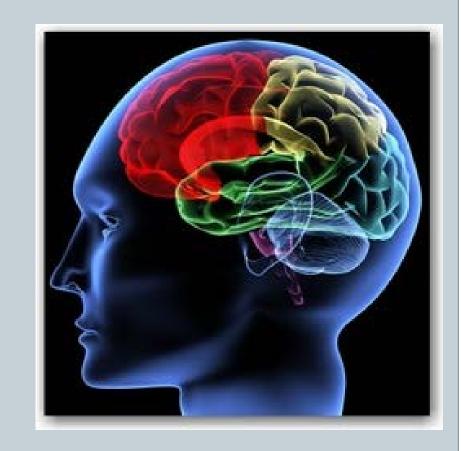


The Role of the SLP

- SLPs can help patients by providing therapeutic strategies:
 - Use of memory recall strategies (association, repetition, writing things down)
 - Spaced retrieval training (increasing time increments of recall)
 - Use of organization strategies (planner, phone calendar)
 - Simulation of cognitive tasks (sort cards with music playing)
 - Use of reading comprehension strategies (highlighting important information in reading passages, pre-reading skills)
 - Test-taking strategies (for tests in school or for college admission tests like ACT/SAT)

The Role of the SLP

- SLPs can also support families when deciding how to approach modifications of curriculum, timetable, etc.
 - Provide progress notes, letters, etc. to school administrators
 - Communicate with school therapists as appropriate



When to Refer to Therapy

- Refer to PT: for headaches, dizziness, balance/gait impairments, neck pain, vestibular deficits, vertigo/BPPV
- Refer to OT: for headaches, visual deficits, concentration issues, coordination difficulties, memory issues, multisensory processing difficulties and trouble with ADL/IADL tasks
- Refer to ST: for memory deficits, academic concerns, problem solving issues, concerns about return to work/learn, word-finding deficits, issues with reading/writing

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