

Multidisciplinary Approach to Concussion Management

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CBMC Outpatient Rehab Introductions

- **Dori Cohen MS, OTR/L**
 - Occupational Therapist/Supervisor: CBMC Outpatient Rehabilitation
 - Specializes in Neuro Rehab
- **Mike Heitzman, PT DPT**
 - Physical Therapist / Supervisor: CBMC Outpatient Rehabilitation
 - RWJBH/CBMC Concussion Program: Clinical Team Leader and System educator
 - Sports Medicine Liaison: Matthew J. Morahan III Health Assessment Center for Athletes
 - Member: APTA, *(former) NJPTA- Vestibular SIG and BIANJ*
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 - Speech Language Pathologist
 - Specializes in rehabilitation for acquired neurological disorders



Financial Disclosure

This team has no financial conflicts of interest to disclose related to this presentation.



Objectives

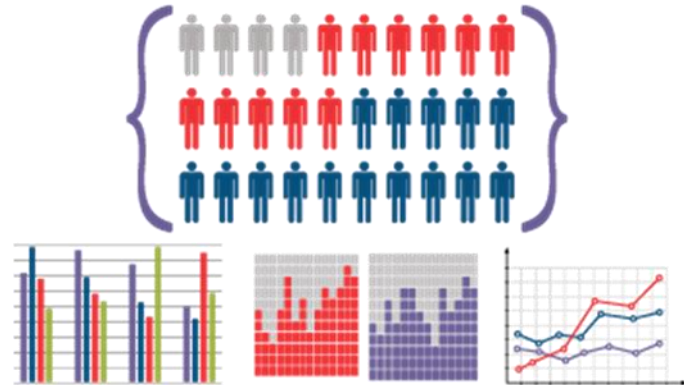
- Understand the basic definition and pathophysiology of a concussion
- Introduction to general demographics of concussive incidence
- Timelines and Prognosis of Recovery
- SCOAT
- Understand the Roles PT, OT, and SLP may play in the rehabilitative process.
- Introduction to Functional Vision Rehab
- Introduction to Functional Cognitive Rehab
- Theoretical Frame work for *When and Why* to refer to Specialists



Concussions



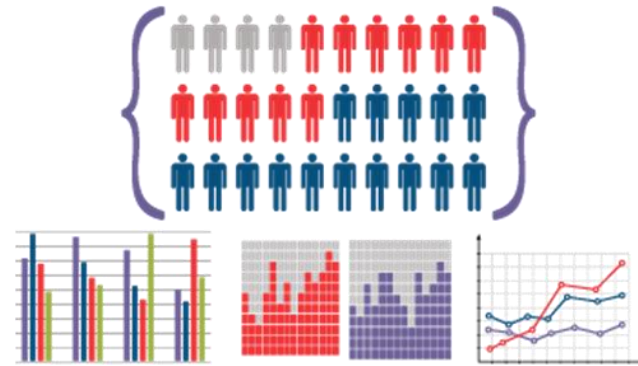
Concussion: Demographics & Incidence



- In 2014, ~2.87 million TBI-related emergency department (ED) visits, hospitalizations, and deaths^{CDC}
- 812,000 children (age 17 or younger) were treated in U.S. EDs for concussion or TBI, alone or in combination with other injuries.^{CDC}
- In 2014, falls were the leading cause of TBI. ^{CDC}
 - Falls accounted for (48%) of all TBI-related emergency department visits.
 - Falls disproportionately affect children and older adults:
 - Almost half (49%) of TBI-related ED visits among children 0 to 17 years were caused by falls.
- Four in five (81%) TBI-related ED visits in older adults aged 65 years and older were caused by falls



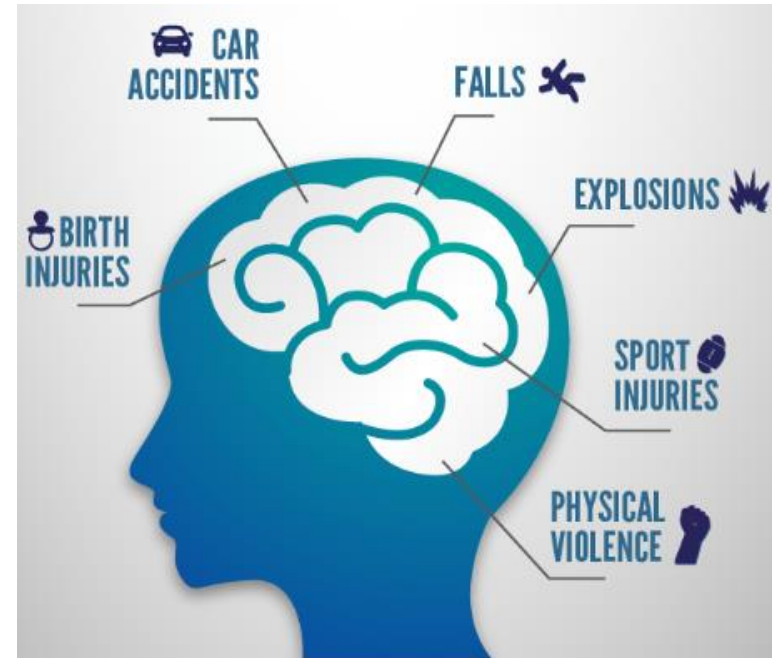
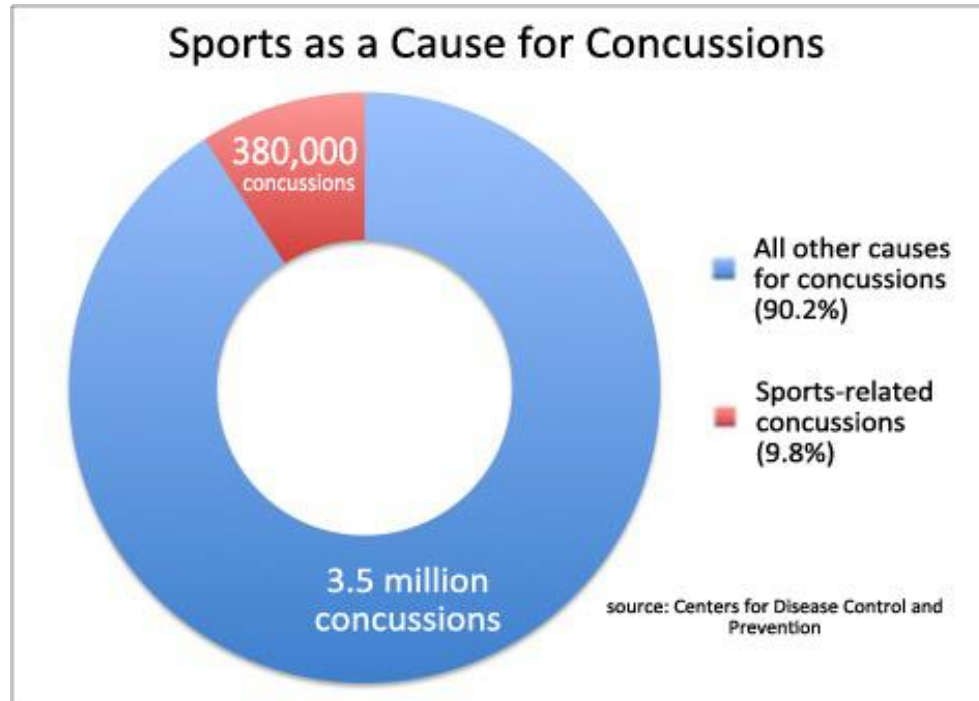
Concussion: Demographics & Incidence



- From 1997 to 2019, there was a 3-fold increase in the diagnosis of concussion ^{Reid}
 - Fall-related head-injury mechanisms were most common in very young (<5 year old) and older (>65 year old) patients.
 - Sports-related injuries were most common in those age 5-24 years old.
 - Conclusions: It remains unclear if the observed two-decade rise in reported concussions represents a true increase in incidence or is indicative of improvements in early detection, diagnosis, and treatment during this time period.



Epidemiology : SRC / SR-TBI vs other TBI



What is a Concussion?

- Sport – related concussion (SRC) is **a traumatic brain injury caused by direct blow** to the head, neck or elsewhere in the body resulting in an impulsive force being transmitted to the brain. This initiates a **neurotransmitter and metabolic cascade**, with possible axonal injury, blood flow change and inflammation affective the brain. **Signs and symptoms** may be present immediately or evolve over minutes our hours, and **commonly resolve** within days, but may be prolonged. **No abnormality is seen on a standard structural neuroimaging** studies, but maybe present on functional , blood flow, or metabolic imaging studies. The term ‘mild’ TBI’ may be used in sport- related concussion when neuroimaging is normal but not clinically indicated. That is, a concussions a form of mild TBI. Then neuroimaging is performed and a trauma related intercranial abnormality is found, the injury would be considered a TBI and not a concussion.

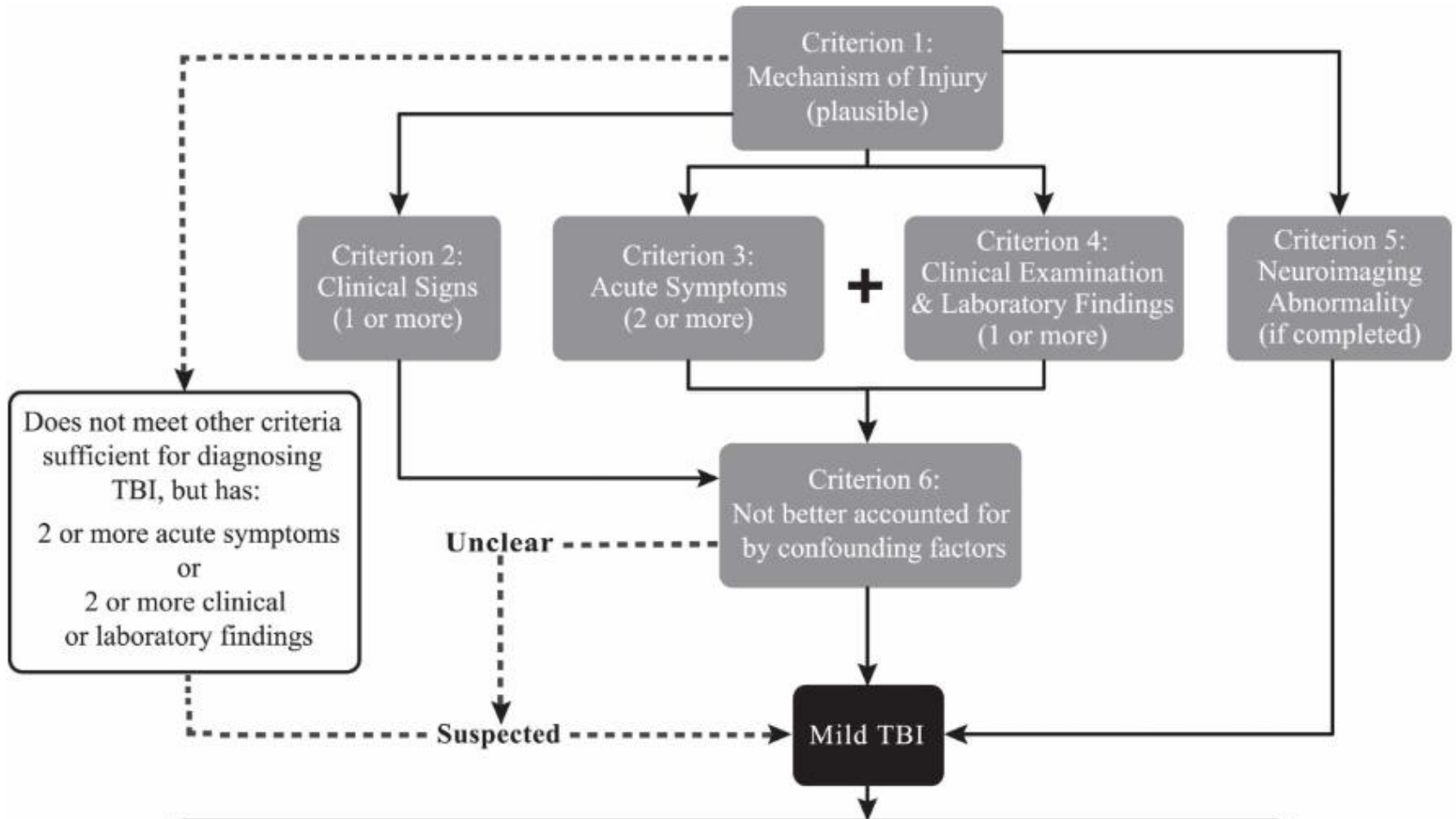
McInnes et al (2017)
McMahon et al (2014)



Definition: Key points

1. Mild Traumatic Brain Injury
2. Caused by biomechanical forces (Trauma)
3. Results in neurologic patho-physiologic disruption
4. Manifests in an array of Signs and Symptoms.
5. Will not be seen on standard imaging.
6. May be accompanied by other injuries
7. **Symptoms should NOT be able to be able to be attributed to 'other' factors.



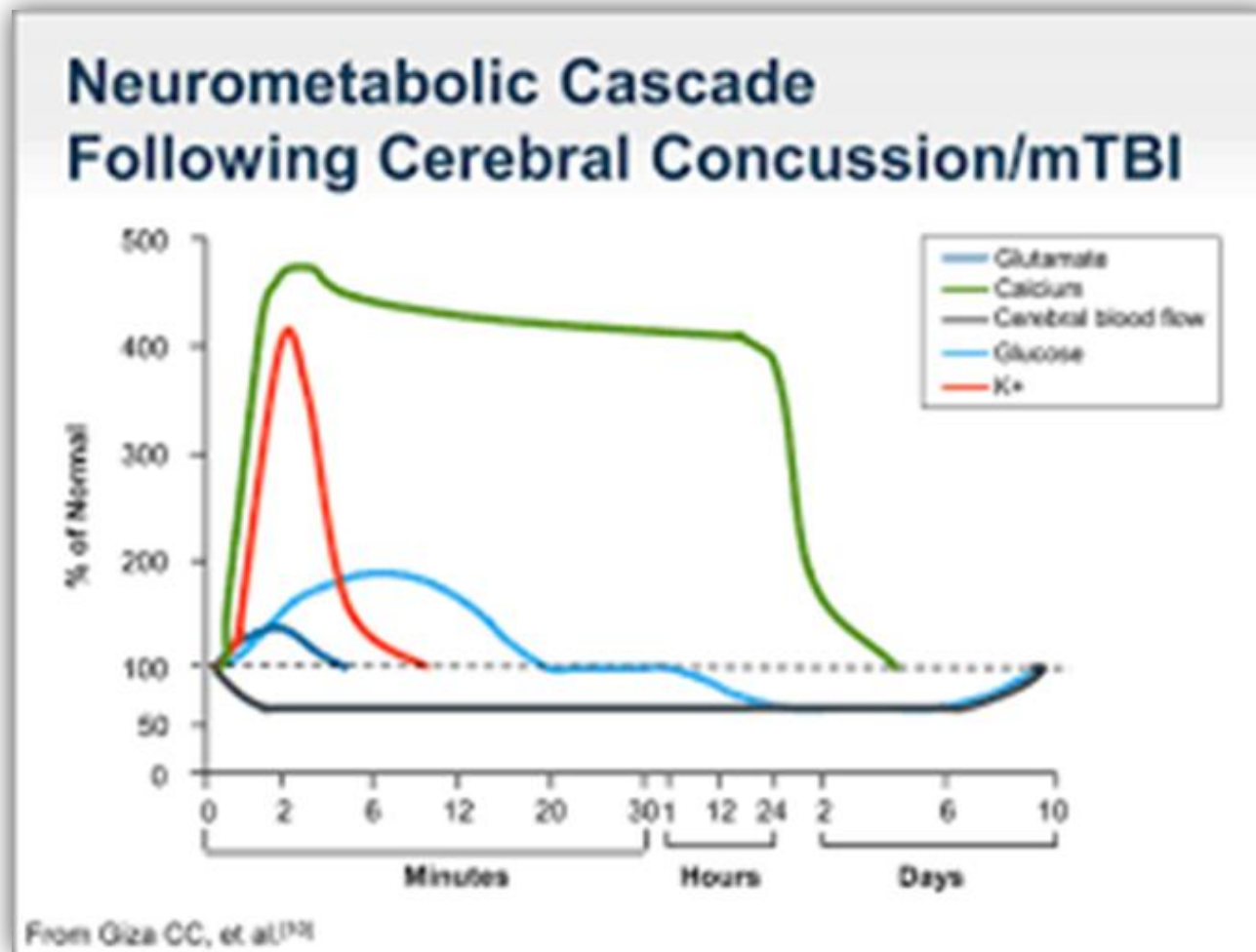


The 'Mild' qualifier is not used if any of the injury severity indicators listed below are present.

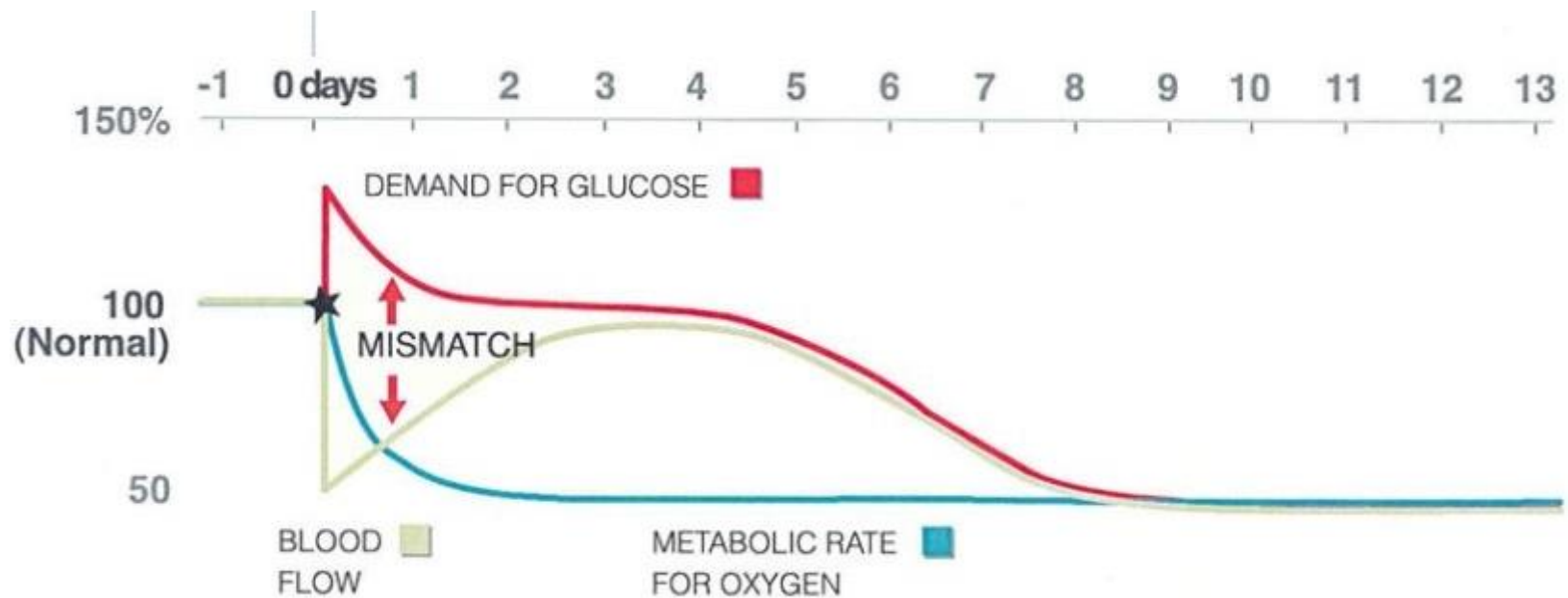
- Loss of consciousness duration greater than 30 minutes.
- After 30 minutes, a Glasgow Coma Scale (GCS) score of less than 13.
- Post traumatic amnesia greater than 24 hours.



Neurologic Pathophysiology



Neurologic Pathophysiology



EVENT: Trauma

Diagnosis: Concussion



What may happen on the sideline or ED

- #1 assess for serious injury – ABCDE
- Close observation – for deteriorating or changes in symptoms
- (For sports)
 - No return to competition same day
 - Sports Concussion assessment tool (SCAT5) 13+ – or Child SCAT (ages 5-12)
 - OR some variation for all Athletes and Adults
- Canadian Head CT rule (Adult); PECARN (pediatric)
- C-Spine clearance



Discharged from Observation or First Contact

- What was the Next step:
 - Home
 - Pediatrician / Primary care MD
 - Concussion center
 - Physical Therapy
 - Other? – School, Coach, Athletic Trainer

What Education did they receive?



Education – Post Concussion Recommendations

15+ year ago

- Cognitive rest / removal from school/ all activities
- Cocooning
- Impact testing
- Asymptomatic prior to return to function
- Rehab only if > 3-4 weeks symptoms

Current:

research supported

- 48 hours relative brain rest only
- Gradual return to exercise and function – sub-symptomatic
- Visual, Vestibular and Physiologic testing
- Early rehab – especially if perceived cervical component



Headache Seeing stars Confusion
 Amnesia Slurred speech Lack of orientation
Fatigue Blurred vision
 Vomiting Mood changes Difficulty sleeping
 Sensitivity to light **Nausea**
 Decreased reaction time Lack of energy
 Knocked out Ringing in ears Loss of consciousness
Lack of concentration Dizziness Irritability
 Sensitivity to noise Reduced coordination
 Inappropriate emotions Feelings of sadness Getting your "bell rung"
Concussion Easily distracted

CONCUSSION U 2014



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Domains

Physical - Thinking/Remembering – Emotional - Sleep

SYMPTOMS	None		Mild		Moderate		Severe	
	0	1	2	3	4	5	6	
	Date:	Date:	Date:	Date:	Date:	Date:	Date:	
Headache								
Nausea								
Vomiting								
Balance Problems								
Dizziness (spinning or movement sensation)								
Lightheadedness								
Fatigue								
Trouble falling asleep								
Sleeping more than usual								
Sleeping less than usual								
Drowsiness								
Sensitivity to light								
Sensitivity to noise								
Irritability								
Sadness								
Nervous/ Anxious								
Feeling more emotional								
Numbness or tingling								
Feeling slowed down								
Feeling like "in a fog"								
Difficulty concentrating								
Difficulty remembering								
Visual problems								
Other								
Total								

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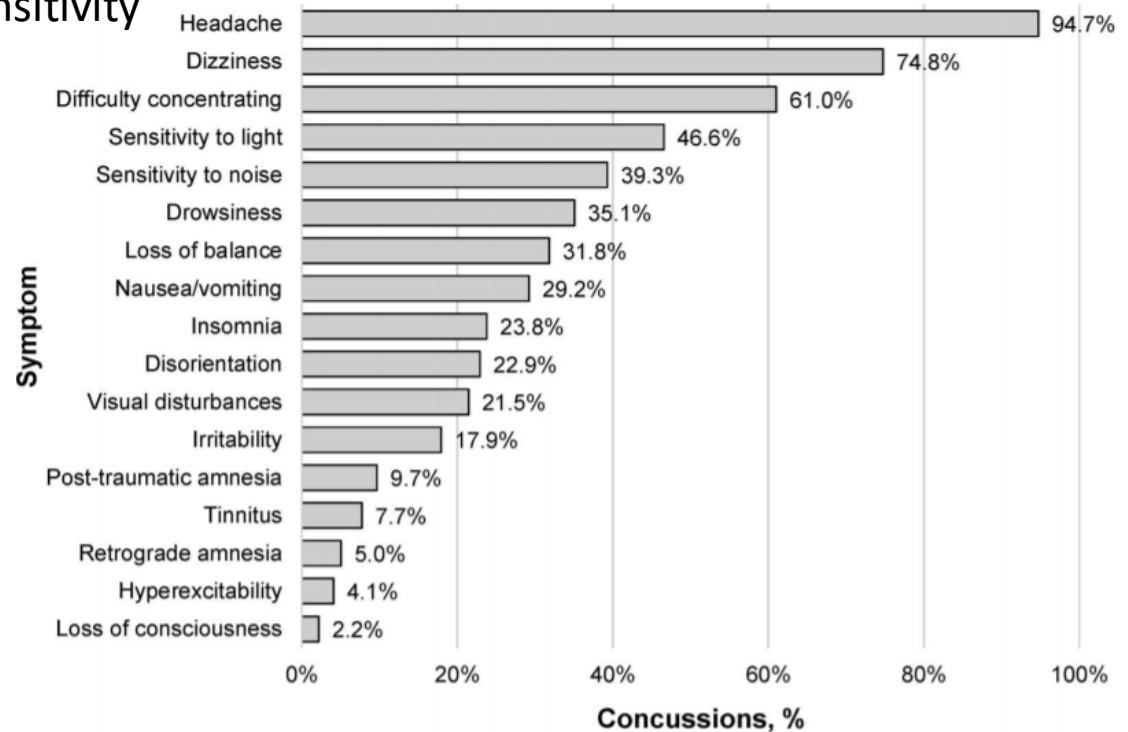


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Concussion Symptoms

- Most Common Concussive symptoms
 - Headache
 - Dizziness
 - Light and /or Sound Sensitivity
 - Difficulty concentrating



CONCUSSION CLINICAL TRAJECTORIES

A Model for Understanding
Assessment, Treatment
and Rehabilitation



COGNITIVE/FATIGUE

Cognitive difficulties include decreased concentration, increased distractibility, difficulty learning/retaining new information or decreased multitasking abilities. Sometimes accompanied by increased fatigue as the day progresses.



VESTIBULAR

Impairments of the vestibular system - the balance center of the brain - affect one's ability to interpret motion, coordinate head and eye movements, or stabilize vision upon head movement.



OCULAR

Ocular dysfunction occurs when the movement of the eyes in tandem, or binocular eye movement, is affected. This may result in difficulties bringing the eyes together, or moving one's eyes to track motion.

POST-TRAUMATIC MIGRAINE

Post-traumatic migraine symptoms include headaches, nausea, and/or sensitivity to light or noise.



CERVICAL

Sometimes, the concussive blow affects the extra-cranial region including the neck and/or spinal cord. An injury of this type may lead to ongoing headaches.



ANXIETY/MOOD

This occurs when someone has a hard time having his or her thoughts off, being particularly sensitive, or suffering from excessive worry or concern.

UPMC LIFE CHANGING
PROGRESS

ReThink
CONCUSSIONS



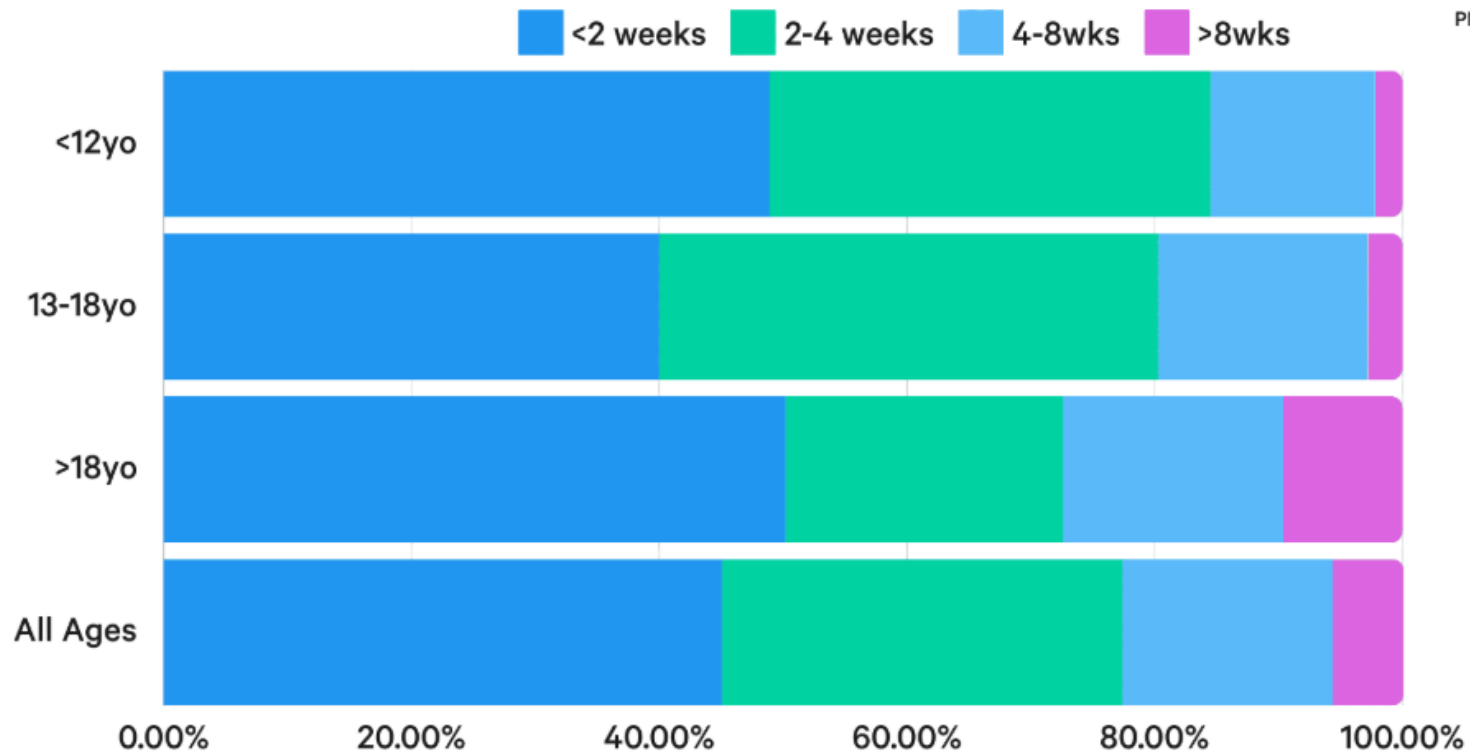
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Recovery Timeline

Less Than Half of Patients Recover Within 2 Weeks of Injury After a Sports-Related Mild Traumatic Brain Injury: A 2-Year Prospective Study

PMID: 32132366

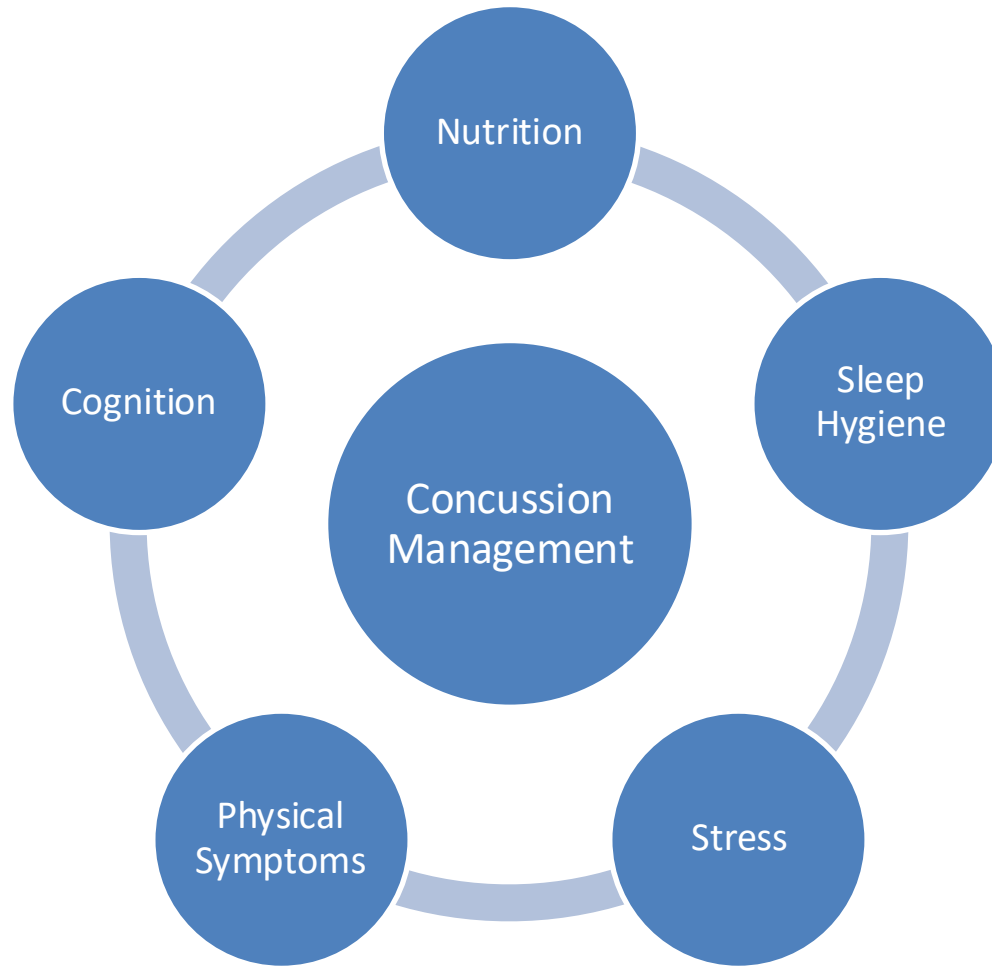


Prognostic indicators of slower recovery

- **Severity of acute and subacute symptoms:**
 - Greater symptom severity immediately and in the first few days following the injury is a strong predictor of slower recovery.
- **Subacute problems and concurrent MSK injuries :**
 - Development of ‘other’ headache syndromes or depression may indicate a risk for persistent symptoms lasting longer than a month.
 - Neck injuries
- **Preinjury mental health history:**
 - A preinjury history of mental health problems, including anxiety and depression, is associated with a higher risk of persistent symptoms.
 - Psychiatric and learning disabilities may be linked with persistent post-concussive symptoms.
- **Age and sex:**
 - Younger age (<18 years old)
 - Female sex may be associated with longer recoveries.
- **Past history of concussion:**
 - A history of concussion,
- **History of Migraines**
 - All types may be linked with persistent post-concussive symptoms.



Factors to consider



Nutrition Considerations following Concussion

Considerations Following Concussion

- Concussions can cause excessive nutrient use by the brain.
- Research shows that nutrients like Vitamin C, D, E, Magnesium, and Zinc, can be significantly depleted immediately following a concussion, impacting brain function and potentially hindering recovery.
- Nutritional supplementation can help reduce the effects of a sports-related concussion.
- After a concussion, one needs to eat enough calories to help repair brain function and recovery.

Ways To Aid In Concussion Recovery

1. Provide early nutrition within the first 24 hours

- Ensure athletes are consuming at least 50% the number of calories they would consume on a regular basis
- Do not restrict protein or calorie intake

2. If nauseous, consume a bland diet of familiar foods

Examples include: bananas, rice, applesauce, and whole grain toast

3. Ensure adequate amounts of protein

Examples include: meats, seafood, poultry, eggs, beans, peas, and lentils

4. Increase intake of Omega-3 fatty acids (EPA, DHA, AND, ALA)



Sleep and Concussion Recovery

Sleep Expectations Based on Age

- Children: 10 to 15 hours
- Adults: 7 to 9 hours

Tips to Improve Sleep After Concussion

Use Sleep Hygiene Strategies

- **Aim to go to bed and wake up at the same time every night, even on weekends.**
- **Create a “wind down period.”** During this time, perform activities that are relaxing and will allow your body to calm down and transition to night time.
- **Minimize screen time an hour before going to bed.** Cell phones, tablets, and computer and television screens emit a wavelength of light that suppresses melatonin release and can interfere with sleep.
- **Keep your bedroom cool, dark and quiet.**
- **Limit your time in bed.** If you can't fall asleep within 15 to 20 minutes, get up and do something relaxing.



Napping

Try to avoid prolonged naps throughout the day. If you do nap, limit daytime napping to less than 60 minutes, and try to avoid napping after 3:00 p.m. so that you can fall asleep at bedtime.



Caffeine Intake

Avoid caffeine (chocolate, soft drinks, tea) after 5:00 p.m.



Exercise

Exercise within a level that your body can comfortably manage throughout the day as it can help sleep quality.



Spend Time Outside

Exposure to natural light helps the brain and body establish a rhythm that promotes sleep.



Melatonin Supplements

Some studies suggest melatonin may help regulate the sleep wake cycle and may improve recovery from brain injuries. Speak to your physician about what is best for you.



Stress Management



Research suggests that stress negatively impacts post-concussion symptoms



There is a role for stress management prescription as part of rehab process to improve functional participation in daily routines



Techniques may include:

- Mindfulness Guided Meditation
- Mindfulness Exercises (The Five Senses Technique)
- Deep Breathing Techniques
- Progressive Muscle Relaxation
- Mental “Vacation”



Physical Therapists Role in Post Concussion Management

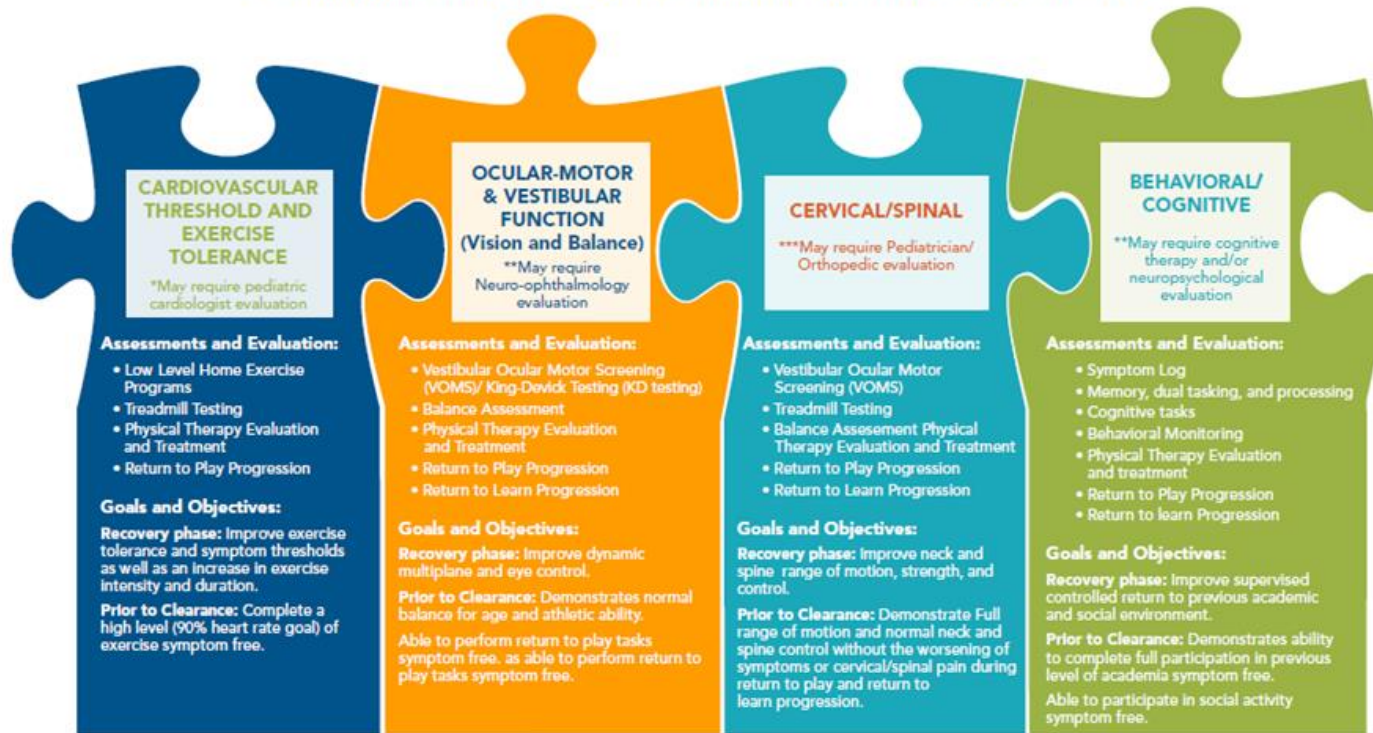
- **Physical Therapist (PT)** - examines, diagnoses, and treats movement dysfunction to improve physical function, manage pain and other chronic conditions, and recover from and prevent injury and chronic disease.
- ***Physical Therapy is most frequently the initial referral after a concussive event is diagnosed by a Physician***



MJM Pillars to Recovery

Concussion Pillars for Recovery

ALL PILLAR GOALS MUST BE ACCOMPLISHED PRIOR TO CLEARANCE TO RETURN TO FULL ACADEMICS AND SPORT.



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Let's be healthy together.



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Sports Concussion Office Assessment Tool

SCOAT - 6

- Global Symptoms Assessment
- Verbal Cognitive Test
 - Immediate memory and Delayed recall, 15 word memory, Digits backward, Months Reverse Order
- Orthostatic Vitals: Supine to Stand
- Cervical Spine Assessment
 - AROM and Palpation
- Neurologic examination
 - Cranial nerves, strength, reflexes, sensation, coordination
- Balance
 - mBESS
- Timed Tandem Gait and complex dual task TG
- mVOMs (Vestibular / Ocular – motor screen)
- Anxiety Screen and Depression Screen
- Sleep Screen
- Graded Aerobic Exercise Testing
 - Buffalo Concussion Treadmill test



Active Recovery Guidelines

- Rule # 1 → No activities putting the patient at risk to hit their head.
 - ie. (group/teams games, activities with contact, activities with potential to fall).
- Rule # 2 → If the patient symptoms increase 2-3 level above baseline at rest then stop and rest until symptoms return to 1 or 0/10 levels above.
- Prescriptive Aerobic Exercise
 - 20-30 min day at 80% at sub-symptomatic HRR on BCTT
- Prescriptive Systems Therapeutic tasks
 - Visual – Vestibular – Cerebellar – MSK



Return to Learn:

Questions to Ask Students

- What is their class schedule?
- What extracurricular activities are they involved in?
- What classes and which environments are easiest/hardest?
- What adjustments do they think they need?
- Who is their support person at school?



Return to School Accommodations



Environmental

Modified Attendance
Frequent rest breaks



Physical

Avoid risk of further injury

- Excused Absence from gym/extracurricular activities
- Leaving class early to avoid crowds



Curriculum

Extra time
Pre-printed notes or Dedicated Notetaker
Limit Screen Time



Testing and Assignments

Delayed Testing or Extended Time
Dictated answers to tests
Lessened homework amounts



Return to Learn Strategy

Step	Mental Activity	Activity at Each Step	Goal
1	Daily activities that do not result in more than a mild exacerbation* of symptoms related to the current concussion.	Typical activities during the day (e.g., reading) while minimizing screen time. Start with 5–15 min at a time and increase gradually.	Gradual return to typical activities.
2	School activities.	Homework, reading, or other cognitive activities outside of the classroom.	Increase tolerance to cognitive work.
3	Return to school part time.	Gradual introduction of schoolwork. May need to start with a partial school day or with greater access to rest breaks during the day.	Increase academic activities.
4	Return to school full time.	Gradually progress school activities until a full day can be tolerated without more than mild* symptom exacerbation.	Return to full academic activities and catch up on missed work.



Return to Work

Perform an Activity Analysis of Occupation and Job demands

Questions to ask:

- What is the typical workday look like for you?
- What does a typical work week look like?
- How much of job is computer-based vs physical?
- What is work environment?
 - Remote/Office/Cubicle/Crowded environment
 - Laptop? Double Screens? Standing desk?
 - What are the sensory environmental challenges?
- What are daily job responsibilities?
- What part of work do you perceive to be challenging?
- What is a person's work readiness?



Examples of Work Accommodations

Gradual Return-to-Work

Scheduled Rest Breaks

Temporary adjustment in
Work Schedule

Temporary Job Modifications

- Reduced workload or productivity expectations
- Extra time to complete tasks
- Camera Off during meetings or Note Taking assistance

Environmental Modifications

- Change of workstation to reduce noise/distractions

Review of Ergonomic
Principles in workstation

Discussion of possible
short/long term disability

*Return to work is associated
with decreased anxiety,
depression, anger, QOL*



Return to Sport

- Physical Activity Checklist
 - Cardiovascular – Strength – Balance
 - *Note: no heavy lifting or plyometric tasks until cleared.*
- Sports Specific Exercises
 - Technique work
 - Hand/Eye/Body Coordination
- Organized Team Activities
 - Observe Practice
 - Observe Games
 - Non-contact participation



'Return to Play' concussion clearance

Step	Exercise Strategy	Activity at Each Step	Goal
1	Symptom-limited activity.	Daily activities that do not exacerbate symptoms (e.g., walking).	Gradual reintroduction of work/school.
2	Aerobic exercise 2A – Light (up to approx. 55% max HR) then 2B – Moderate (up to approximately 70% max HR)	Stationary cycling or walking at slow to medium pace. May start light resistance training that does not result in more than mild and brief exacerbation* of concussion symptoms.	Increase heart rate.
3	Individual sport-specific exercise NOTE: if sport-specific exercise involves any risk of head impact, medical determination of readiness should occur prior to step 3.	Sport-specific training away from the team environment (e.g., running, change of direction and/or individual training drills away from the team environment). No activities at risk of head impact.	Add movement, change of direction.
Steps 4-6 should begin after resolution of any symptoms, abnormalities in cognitive function, and any other clinical findings related to the current concussion, including with and after physical exertion.			
4	Non-contact training drills.	Exercise to high intensity including more challenging training drills (e.g., passing drills, multiplayer training). Can integrate into team environment.	Resume usual intensity of exercise, coordination, and increased thinking.
5	Full contact practice.	Participate in normal training activities.	Restore confidence and assess functional skills by coaching staff.
6	Return to sport.	Normal game play.	



Full Recovery

- Symptom resolution at rest: no symptoms exhibited at rest
- Complete symptom resolution: no symptoms during/after maximal physical or cognitive exertion
 - Return to learn/work: return to pre-injury learning/occupational activities with no new academic/occupational support, accommodations, or adjustments
 - Return to sport: return to pre-injury status, completion of RTS stages without symptoms or clinical findings at rest or during maximal exertion





Post-concussion syndrome

- **Post-Concussion Syndrome (PCS):** Condition where symptoms from a concussion persist longer than expected after the initial injury
 - With PCS, symptoms can last for **weeks, months, or sometimes longer.**
- Can also be called:
 - Persistent post-concussive symptoms (increasingly preferred term)
 - Post-concussive symptoms
 - Post-concussion disorder



Occupational Therapy Role in Concussion Management:

- Purpose of Occupational Therapy is to help people be as **independent** as possible and to improve **quality of life**.
- **Occupations**= Everyday Activities that a person finds to be meaningful and purposeful
 - Includes: Self Care, Household Tasks, Community Mobility, Work, School, Sleep, Leisure, Social Participation



Common Concussion Patient Reported Symptoms: OT

impaired mood when performing
“complex tasks”

Difficulty keeping up at
school/work

Difficulty planning the day

Frequently losing place when reading

Feeling too tired to do
what you need to do

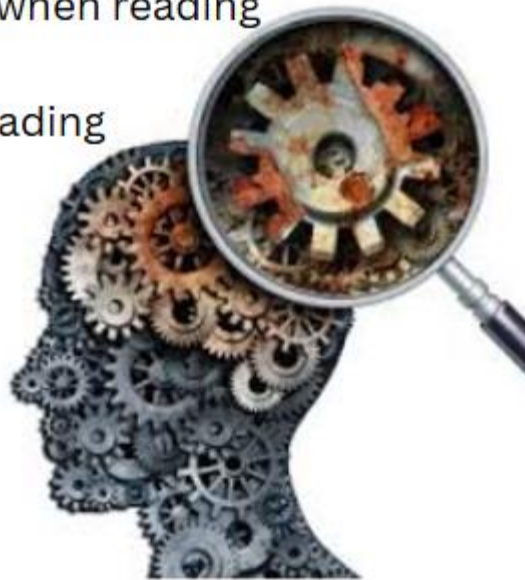
Difficulty concentrating when reading

Getting deadlines confused

Blurred vision

Decreased tolerance for
reading/close work

Difficulty completing
a multi-step task (ie. cooking)



OT Evaluation

- Comprehensive & Holistic Approach to Evaluation includes:
 - History and current presentation
 - Coordination
 - Functional Cognition
 - Fatigue
 - Cofactors of Wellness: Sleep, Nutrition, Stress
 - Safety
 - Functional Vision
 - Participation and performance in usual and desired activities



OT Concussion Treatment

- Meeting a patient where they are and planning for the future
- Restoring function AND compensating for function
- Developing individualized treatment strategies and “exercise snacks” based on PEO Model
 - Person (Intrinsic factors)
 - Environment (Extrinsic factors)
 - Occupational (task performance)
- Interventions include:
 - Functional Cognitive Rehabilitation
 - Functional Vision Rehabilitation
 - Activity Modifications
 - Environmental Modifications



OT Treatment: Symptom Management

- Individualized **Fatigue Management** Prescription
 - Education about post-concussion fatigue (cognitive, visual, physical)
 - Education of energy conservation strategies and exploration of how to functionally incorporate into daily routine
 - Exploration of Generalized Self-Pacing and Specific Activity Pacing Strategy
 - Scheduled rest breaks
 - Exploration of impact of co-factors: Sleep, Nutrition, Stress



OT Treatment: Symptom Management

- Individualized **Symptom Management** Exploration
 - 20-20-20 Rule
 - Palming Technique
 - Mindfulness/Grounding techniques
 - Sensory Supports: peppermint oil
 - Breathing Techniques
 - Cognitive Strategies
 - Environmental Modifications



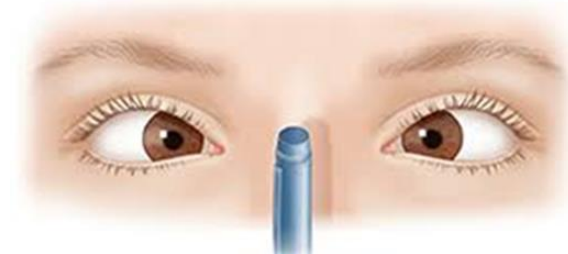
What is Vision?

- **Vision**= dynamic process by which the eyes and the brain work together to interpret and respond to visual information, enabling participation in daily activities.
 - Vision organizes posture, movement, spatial orientation, manipulation of the environment.



Functional Vision Assessment

- Perceived Visual Deficits
- Visual Acuity
 - Near and Far, Binocular and Monocular
- Vergence
- Ocular ROM
- Pursuits
- Saccades
- Depth perception
- Eye Alignment
- Visual Fields Testing
- Ocular Alignment
- Accommodation
- **Specific Assessments:**
 - Convergence Insufficiency Symptom Scale (CISS)
 - NSUCO Oculomotor Test
 - Developmental Eye Movement Test
 - Stereopsis
 - Worth 4 Dot Assessment
 - Trail Making Test



Functional Vision Intervention Considerations:



Creating a “just right” challenge



Neuroplasticity Principles:

- Repetition
- Intensity
- Specificity
- Saliency
- Transference to other contexts



Functional Vision Treatment: Restorative Therapy

Oculomotor Function: Saccadic Eye Movements

- Letter & Arrow Charts
- Small Angled Saccadic Eye Movement
- Paper and Pencil Tasks
 - Connect the dots
 - Find the Differences
- Therapeutic Activities:
 - Multi-Matrix Blocks
 - SET
 - Spot It
- Functional Saccades:
 - License plate Therapeutic Activity
 - Organizing Bookshelf or Spice Cabinet
 - Copying information from paper to spreadsheet



O F N P V D T C H E
Y B A K O E Z L R X
E T H W F M B K A P
B X F R T O S M V C
R A D V S X P E T O
M P O E A N C B K F
C R G D B K E P M A
F X P S M A R D L G
T M U A X S O G P B
H O S N C T K U Z L



Functional Vision Treatment: Restorative Therapy

Oculomotor Function: Smooth Pursuits Movements

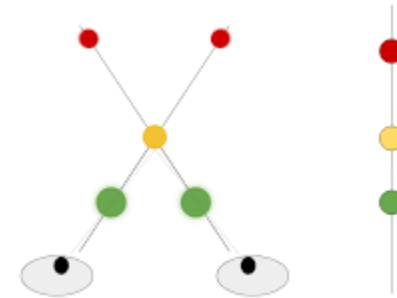
- Thumb Rotations
- Flashlight Tag
- Ball, Marble or Pegboard Tracking
- Beading Activity
- Paper and Pencil Therapeutic Activities
 - Tracing Infinity Lines
 - Visual Tracking Exercises
 - Connect the Dots Worksheets
- Functional Pursuits:
 - Coloring Pages
 - Watching sports game with emphasis on following ball
 - Tracking Swing Movement in playground



Functional Vision Treatment: Restorative Therapy

Vergence/Eye Teaming:

- Brock String
 - Slides
 - Jumps
- Thumb Push Ups
- Letter Chart Jumps
- Straw Piercing
- Functional Eye Teaming Exercises:
 - Toothbrush Push Ups
 - Lego Jumps



Functional Vision Treatment: Restorative therapy

- Progressive Loading Elements:
 - Adding Balance Board
 - Upgrading stance
 - Auditory Stimulation (ie. metronome, conversation)
 - Cognitive Loading
 - Adding Motor components
 - Upgrading environment demands (music, crowds)



Functional Vision: Compensatory Treatment

Assistive Technology Exploration:

- Low tech:
 - Slant Board
 - Screen Overlays
 - Line-Guides
- Computer & Phone Modifications/Software
 - Accessibility Features
 - ie. increasing font size, night mode
 - Voice to Text or Text to Speech options
 - Word Prediction Software
 - Chrome Extensions
 - F. Lux
 - Beeline Reader
 - Visor
- Recording Pen & Specialized Notebook



Read Faster and Easier, All Day Long

Reading on-screen can be tough on your eyes, especially if you have to do it all day long. We're here to help. BeeLine Reader makes reading on-screen easier, faster, and more enjoyable. We use a simple cognitive trick — an eye-guiding color gradient — to pull your eyes from one line to the next. This technique increases reading speed and enhances focus. BeeLine's efficacy has been validated in independent testing by literacy nonprofits, educators, and even CNET. But you don't have to take their word for it — flip through a few above color schemes and see how much faster you can read!

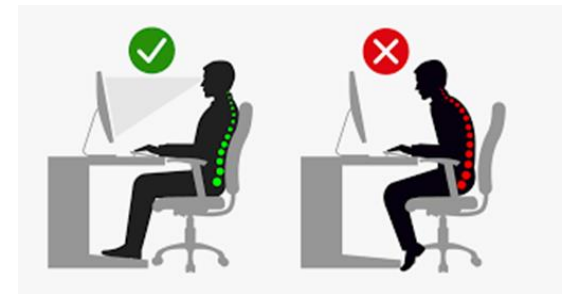


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OT Treatment: Positioning

- Ergonomic Considerations:
 - The Chair
 - Monitor Placement
 - Laptop Considerations
 - Keyboard Placement
 - Phone Placement
- Computer Lenses
- Proper Lighting



OT/SLP Overlap in Concussion Management



Functional Cognitive Rehabilitation



Education



Return to Learning



Return to Work



OT/SLP Overlap in Concussion Management

• OT

- Use a performance-based approach to concussion rehab
- Holistically assess and address higher-level cognitive components impacting function
- Develop occupation-based interventions, designed to increase **independence** and improve **participation**, well-being and quality of life
- Treatment includes restorative care by providing the “just right challenge” AND compensatory care by exploring modifications and accommodations

SLP

- Play a central role in the screening, assessment, and treatment of adults with cognitive dysfunction as a result of acquired brain injury
- Have a critical understanding of typical cognitive processes and language domains, as well as their interrelatedness
- Implement intervention techniques to enhance **participation** in functional tasks while optimizing **independence** by strengthening vulnerable cognitive domains, establishing new patterns of cognitive activity, and developing compensatory strategies
- Provide scaffolded real world activities to support returning to work/school environments



Speech Therapy Role in Concussion Management



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Scope of Practice

- According to the American Speech Language and Hearing Association (ASHA), speech-language pathologists (SLPs) work to **prevent, assess, diagnose, and treat** speech, language, social communication, cognitive-communication, and swallowing disorders in children and adults due to various causes

American Speech-Language-Hearing Association. (2016)



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How can speech therapy help?

- Complete focused testing in acute stages of recovery and more in-depth testing as cognitive recovery allows
- Implement scaffolded activities related to attention, organization, and problem solving skills
- Provide further guidance in a consultation function if an individual is struggling to return to school/work
- Refer to appropriate providers for further support



Cognitive-communication skills commonly addressed for post concussion syndrome

- Complex attention
- Memory
- Word retrieval
- Thought formulation
- Information processing
- Executive functioning
- Reasoning, problem solving, and decision making
- Mathematical skills



Cognitive-Communication Disorder

Impact On Our Patients

- Impact their ability to communicate and engage with their friends, family, co-workers in various social settings as well as impacting their ability to complete everyday living tasks related to home, school, work, or social life



Cognitive-Communicative Disorders Assessment

- Clinical interview
- Standardized assessments
- Patient reported outcome measures



Patient reported outcome measures

Neuro-QOL Item Bank v2.0 - Cognitive Function

Cognitive Function

Please respond to each question or statement by marking one box per row.

How much DIFFICULTY do you currently have...

	None	A little	Somewhat	A lot	Cannot do
HQ00084F keeping track of time (eg, using a clock)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00085F checking the accuracy of financial documents, (e.g., bills, checkbook, or bank statements)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00086F reading and following complex instructions (e.g., directions for a new medication)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00087F planning for and keeping appointments that are not part of your weekly routine, (e.g., a therapy or doctor appointment, or a social gathering with friends and family)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00088F managing your time to do most of your daily activities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00089F planning an activity several days in advance (e.g., a meal, trip, or visit to friends)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00090F getting things organized?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00091F remembering when things were placed or put away (e.g., keys)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00092F remembering a list of 4 or 5 errands without writing it down?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HQ00093F learning new tasks or instructions?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Rivermead Post Concussion Symptoms Questionnaire

Modified (Rag-3 And Rag-13)¹¹ Printed With Permission: Modified Scoring System From Eyles 2005²³

Name:

Date:

After a head injury or accident some people experience symptoms that can cause worry or nuisance. We would like to know if you now suffer any of the symptoms given below. Because many of these symptoms occur normally, we would like you to compare yourself now with before the accident. For each symptom listed below please circle the number that most closely represents your answer.

0 = not experienced at all
1 = no more of a problem
2 = a mild problem
3 = a moderate problem
4 = a severe problem

Compared with **before** the accident, do you **now** (i.e., over the last 24 hours) suffer from:

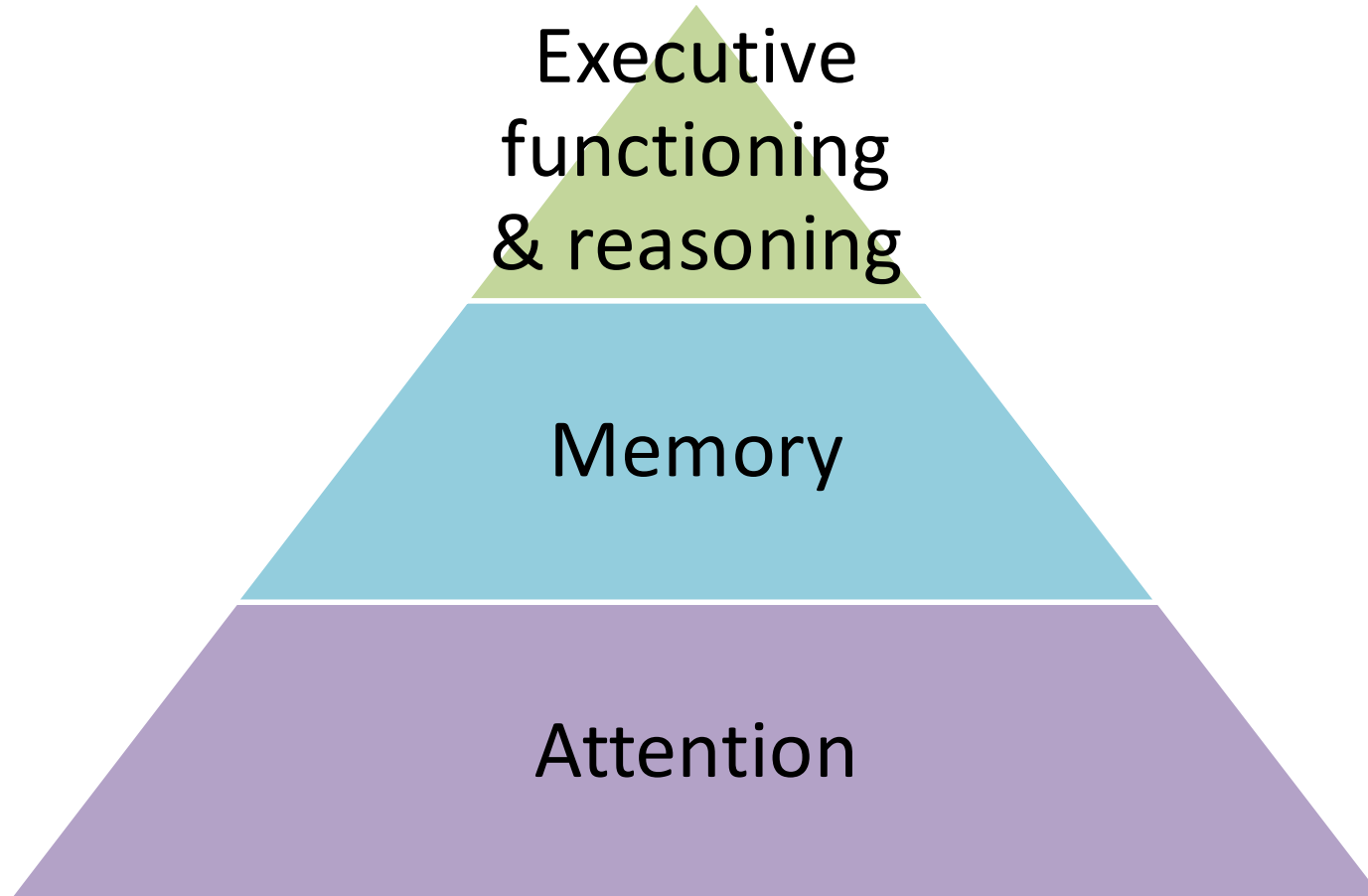
	not experienced	no more of a problem	mild problem	moderate problem	severe problem
Headaches	0	1	2	3	4
Feelings of dizziness	0	1	2	3	4
Nausea and/or vomiting	0	1	2	3	4
Noise sensitivity (easily upset by loud noise)	0	1	2	3	4
Sleep disturbance	0	1	2	3	4
Fatigue, tiring more easily	0	1	2	3	4
Being irritable, easily angered	0	1	2	3	4
Feeling depressed or tearful	0	1	2	3	4
Feeling frustrated or impatient	0	1	2	3	4
Forgetfulness, poor memory	0	1	2	3	4
Poor concentration	0	1	2	3	4
Taking longer to think	0	1	2	3	4
Blurred vision	0	1	2	3	4
Light sensitivity (easily upset by bright light)	0	1	2	3	4
Double vision	0	1	2	3	4
Restlessness	0	1	2	3	4

Are you experiencing any other difficulties? Please specify, and rate as above.

1.	0	1	2	3	4
2.	0	1	2	3	4



Cognitive hierarchy



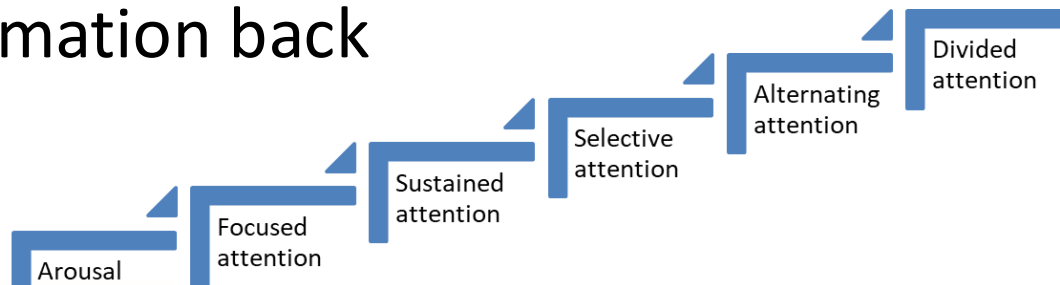
Cognitive-Communicative Treatment

- Early education and reassurance regarding recovery progress
- Set expectations and therapeutic framework
- Use SMART goals
- Therapy is Functional!
- Important to monitor physical symptoms as these can be impacted by task demands and environment



Attention Treatment

- Dual task training
- Teach use of compensatory strategies
- Attention in conversations:
 - Reduce distractions
 - Body language to tell brain to attend!
 - Ask for repetitions, ask clarifying questions, repeat information back



Memory Treatment

Internal Compensatory Strategies

- Verbal rehearsal
- Educate and expand
- Categorization
- Chunking
- Visualization
- Association

External Compensatory Strategies

- Calendar / planner
- Alarms / reminders
- Note-taking
- To-do lists
- Memory log
- Visuals / photographs



Executive Functioning Treatment

- Organization
- Problem Solving
- Reasoning
- Planning
- Initiation



Goal Management Training

Goal

- What do you want to accomplish?

Plan

- What materials are needed?
- Write out steps to accomplish goal
- What helpful strategies will be needed?

Do

- Follow this plan to complete the task

Review

- Rate the success of how the plan went
- How did it go? Did you encounter any problems? What could you have done differently or what changes should you make for next time?



Eisenhower Matrix

1. Do First Urgent and important Tasks	2. Schedule Less urgent but important tasks
3. Delegate Urgent but less important tasks	4. Don't Do Neither urgent nor important tasks



Word Finding Treatment

- Circumlocution
- Describing semantic features of word
- Draw/gesture
- Planning out topics in advanced
- Role-play conversation



Reading Treatment

- Attentive reading and constrained summarization
- Compensatory strategies:
 - Note-taking
 - Underlining and highlighting key information
 - Using a pointer



Family/Caregiver Training

- Essential to include family/caregivers in all components of recovery process
- Can provide insight into pre-morbid status and clarify functional cognitive status within the home/community setting
- Family/caregiver education will lead to better understanding of condition and therapeutic lifestyle changes to facilitate progress and independence



SLP: Importance of Referral to Specialist

Concussion specialist physician

- Pain or other physical symptoms that are not being treated and/or appear to be interfering

Psychiatry

- Concern for mood disorder or other psychiatric condition

Neuropsychology

- Persisting or atypical cognitive complaints or dysfunction



Outpatient Rehabilitation: Symptoms Checklist

Refer to following discipline(s) if the individual presents with any of the following challenges or symptoms:

PHYSICAL THERAPY	OCCUPATIONAL THERAPY	SPEECH THERAPY
<ul style="list-style-type: none"> <input type="radio"/> Muscular weakness <input type="radio"/> Falls, near falls <input type="radio"/> Gait or balance instability <input type="radio"/> Difficulty walking short distances <input type="radio"/> Difficulty negotiating stairs, curbs, ramps <input type="radio"/> Decreased motor control or coordination <input type="radio"/> Decreased cardiovascular endurance <input type="radio"/> Lacks home exercise routine or sedentary lifestyle <input type="radio"/> Requires assistance with transfers, bed mobility, fall recovery <input type="radio"/> Increased physical dependence on care partners <input type="radio"/> Requires new assistive device and/or brace <input type="radio"/> Joint pain, swelling, or spasticity <input type="radio"/> Postural instability, poor righting reactions <input type="radio"/> Headaches <input type="radio"/> Pain in jaw with and without chewing <p>**Services requiring specialty referral: Lymphedema, Pelvic Floor, Vestibular, Craniofacial/TMJ **</p>	<ul style="list-style-type: none"> <input type="radio"/> Upper extremity weakness <input type="radio"/> Difficulty opening bottles and containers <input type="radio"/> Difficulty picking up small objects <input type="radio"/> Tremors <input type="radio"/> Poor handwriting <input type="radio"/> Pain, sensory, and/or perceptual changes <input type="radio"/> Frequently dropping items on the ground <input type="radio"/> Blurry/double vision <input type="radio"/> Losing place when reading <input type="radio"/> Getting fatigued easily while completing daily tasks <input type="radio"/> Difficulty finding motivation to perform the daily tasks that you need and want to do <input type="radio"/> Difficulty managing appointments/or medication <input type="radio"/> Difficulty keeping track of belongings <input type="radio"/> Difficulty with daily tasks (i.e. getting dressed, showering, cooking) <input type="radio"/> Decreased safety navigating at home and in community <input type="radio"/> Increased difficulty performing work/school related tasks <input type="radio"/> Difficulty completing multi-step tasks (i.e. cooking, laundry) <input type="radio"/> Difficulty with time management <input type="radio"/> Upper extremity tightness/spasticity 	<ul style="list-style-type: none"> <input type="radio"/> Difficulty participating in conversation with friends, family, or peers <input type="radio"/> Challenges communicating in the workplace, academic settings, and community <input type="radio"/> Communication challenges in regards to decision making or self-advocacy <input type="radio"/> Difficulty understanding verbal information or staying on track with conversation <input type="radio"/> Difficulty thinking of the right word <input type="radio"/> Reading comprehension or spelling challenges <input type="radio"/> Focusing, multi-tasking or mental flexibility challenges <input type="radio"/> Poor time management <input type="radio"/> Challenges with remembering information (i.e. information stated in work meetings, recent events, etc.) <input type="radio"/> Difficulty with initiating, organizing, prioritizing, or completing tasks <input type="radio"/> Challenges with mathematics related to calculations and financial management <input type="radio"/> Imprecise articulation resulting in reduced intelligibility <input type="radio"/> Voice changes (low volume, hoarseness, breathiness, raspiness, etc.) <input type="radio"/> Experiencing losing breath during conversation <input type="radio"/> Coughing, trouble chewing, or difficulty swallowing food and liquids



Multidisciplinary collaboration

- Concussion special interest groups (SIGs)
- Monthly concussion rounds / Case presentations
- Journal club / Research updates
- Educational Handouts
- Return to Learn and Return to Work accommodations and recommendations
- Yearly live lab skills competencies



Risk Reduction / Prevention

- Parents can:
 - Look for non-contact sports options, such as flag and touch football
 - Read about concussion safety and talk to their child about concussion
 - Make sure their child's sports team has a concussion safety policy
 - Choose a sports program that enforces rules for safety and avoids drills/plays that increase the risk for head impacts
- Coaches can:
 - Talk to their athletes about concussions and teach ways to lower the chances for getting hits to the head
 - Avoid drills and plays that increase risk for head impacts
 - Get informed about school or league concussion policies
 - Take a training on concussion
- Schools and sports programs can:
 - Offer non-contact sports options, such as flag and touch football
 - Make an effort to have certified athletic trainers available at games and practices
 - Enforce rules for fair play, safety, and sportsmanship
 - Inform coaches and parents about school or league concussion policies and offer trainings



Until more prevention strategies are proven effective...

5 key steps to reduce problems caused by concussions:

- **Recognize**
 - Athletes, parents, and coaches should know the signs and symptoms of concussion
- **Report**
 - Athletes should report symptoms to coaches or parents
- **Remove**
 - Athletes with a suspected concussion should be immediately removed from play
- **Rest**
 - After a brief period of rest (one to two days), athletes should gradually return to increasingly more demanding activities
- **Re-evaluate**
 - Athletes should not return to play until evaluated by a health professional competent in concussion care



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THANK YOU!



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