Management of Concussion/Mild Traumatic Brain Injury

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Disclosures

I am a full-time employee at The University of Tulsa

KSHA is providing an honorarium for my participation today

I am a Certified Brain Injury Specialist Trainer through the ACBIS/BIAA

No other financial or non-financial relationships to disclose

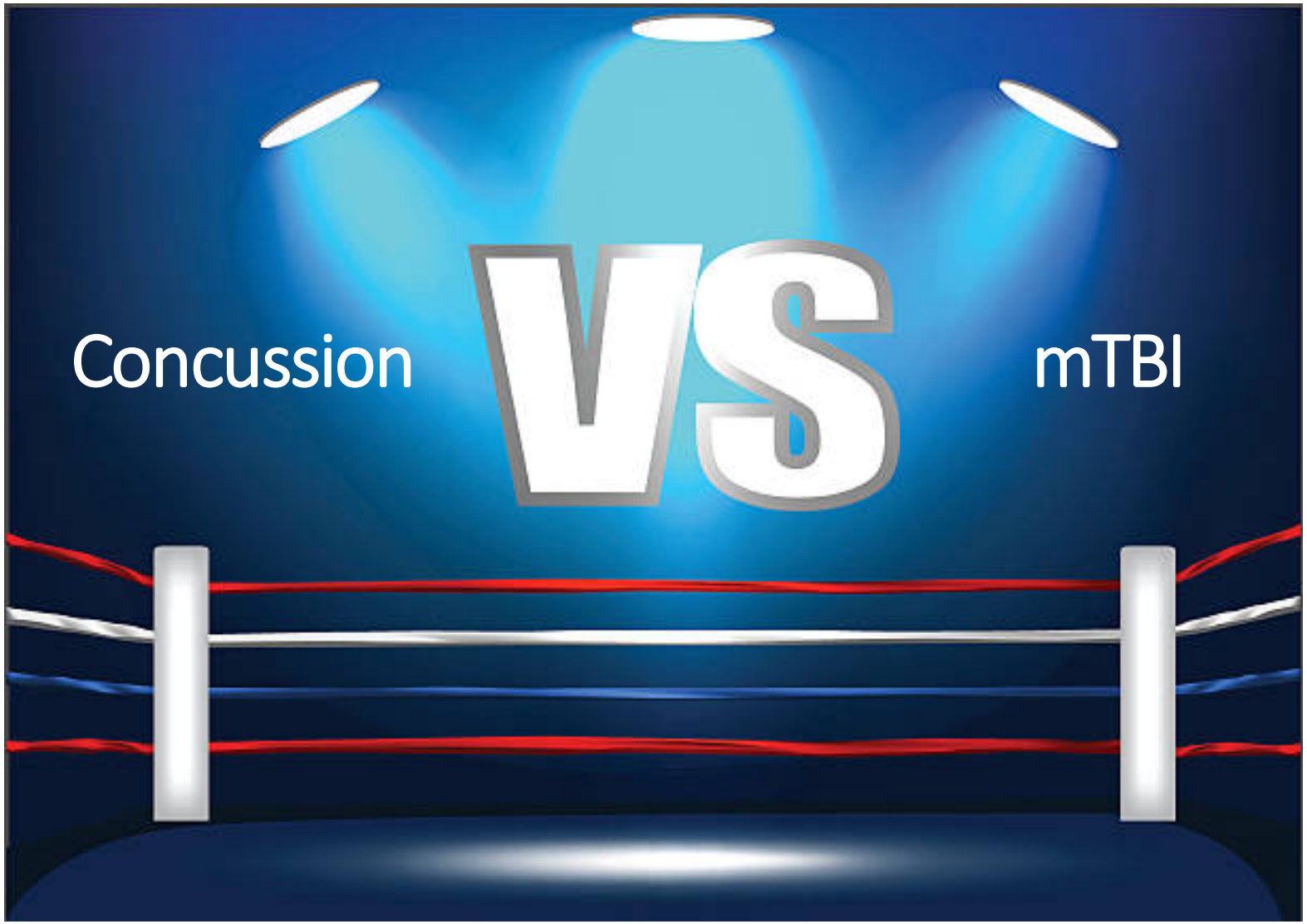
Learning Objectives

1. explain progression through return-to-activity protocols following mild traumatic brain injury
2. identify factors that place patients at risk for prolonged recovery following mild traumatic brain injury recovery
3. describe the role of the SLP in education, assessment, and treatment during typical and prolonged mild traumatic brain injury recovery

Review of concussion/mTBI

Does the term we use matter?

- Are they actually different?
- Communication across fields
- Impact on client and public perception



Mild injury =/= Mild effects

- Remember that the severity of injury is largely classified based on initial presentation, not on effect
- Similar presentation can have differential functional impact

Criteria	Mild	Moderate	Severe
Structural imaging	Normal	Normal or abnormal	Normal or abnormal
LOC	Up to 30 minutes	30 minutes up to 24 hours	24 hours or more
AOC	Up to 24 hours	> 24 hours	> 24 hours
PTA	0-1 day	Between 1-7 days	>7 days
GCS	13-15	9-12	3-8

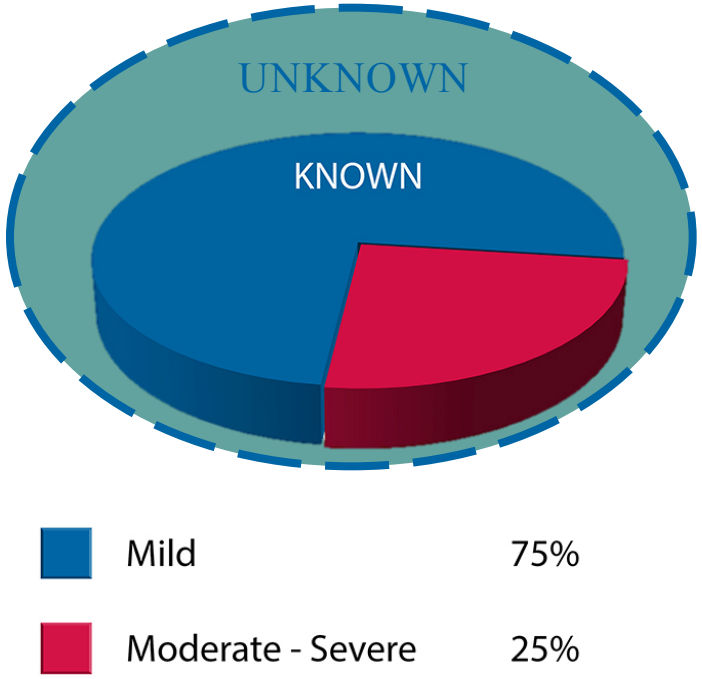
Recreated from the VA/DOD Clinical Practice Guideline for the Management of Concussion-Mild Traumatic Brain Injury; The Management of Concussion-mild Traumatic Brain Injury Working Group, 2016

Concussion/Mild TBI by the numbers…

CAUSES

- Falls
- MVA
- Sports-related accidents
- Blast injuries
- Assaults

INCIDENCE >1 MILLION PER YEAR



Recreated from BIAA, 2016

Identification of concussion/mTBI

Concussion indicators

SIGNS OBSERVED	SYMPTOMS REPORTED
• Can't recall events prior to or after a hit or fall • Appears dazed or stunned • Forgets an instruction, is confused about an assignment or position, or is unsure of the game, score, or opponent • Moves clumsily • Answers questions slowly • Loses consciousness (even briefly…NOT REQUIRED!) • Shows mood, behavior, or personality changes	• Headache or "pressure" in head • Nausea or vomiting • Balance problems or dizziness, or double or blurry vision • Bothered by light or noise • Feeling sluggish, hazy, foggy, or groggy • Confusion, or concentration or memory problems • Just not "feeling right," or "feeling down"

CDC Heads Up, 2019

Seek additional medical care if…

- GCS<15 at initial assessment
- post-traumatic seizure (generalized or focal)
- focal neurological signs of a skull fracture
- loss of consciousness
- severe and persistent headache
- repeated vomiting (two or more occasions)
- post-traumatic amnesia >5 minutes
- retrograde amnesia >30 minutes
- high risk mechanism of injury (road traffic accident, significant fall)
- coagulopathy, whether drug-induced or otherwise.

SIGN, 2009

Diagnosis

Concussion remains a CLINICAL diagnosis.

Generally, assessment will consider factors such as cognition (orientation, attention, memory), vestibulo-ocular function, and symptoms.

These can include sideline/bedside measures, or more extensive neurocognitive testing that compares to norms or to patient's own baseline.

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Patient details

Name: _____

DOB: _____

Address: _____

ID number: _____

Examiner: _____

Date of Injury: _____ Time: _____

Management of typical concussion/mTBI

General principles for early concussion management

- Brief period of cognitive and physical rest
- Advancing activity slowly and systematically
- Serial assessment of symptoms
  - With symptom monitoring before and during increase in activity (avoiding symptom exacerbation)

Physical and cognitive rest

To avoid catastrophic re-injury

To avoid placing increased demands on a system that needs to heal/restore metabolic balance

To avoid symptom exacerbation

To minimize symptom duration?

Current recommendation:

BRIEF physical and cognitive rest during acute time period (24-48 hours) post concussion.

Banks & Salvatore, 2019

Symptom Checklists

Several similar versions

Rate on a scale from 0-6 (none-severe)

Cover Physical, Cognitive, Sleep, and Psychological/Emotional components

Sum to make a Total Symptom Score

McCrory et al., 2016

STEP 2: SYMPTOM EVALUATION

The athlete should be given the symptom form and asked to read this instruction paragraph out loud then complete the symptom scale. For the baseline assessment, the athlete should rate his/her symptoms based on how he/she typically feels and for the post injury assessment the athlete should rate their symptoms at this point in time.

Please Check: ☐ **Baseline** ☐ **Post-Injury**

Please hand the form to the athlete

	none	mild		moderate		severe	
Headache	0	1	2	3	4	5	6
"Pressure in head"	0	1	2	3	4	5	6
Neck Pain	0	1	2	3	4	5	6
Nausea or vomiting	0	1	2	3	4	5	6
Dizziness	0	1	2	3	4	5	6
Blurred vision	0	1	2	3	4	5	6
Balance problems	0	1	2	3	4	5	6
Sensitivity to light	0	1	2	3	4	5	6
Sensitivity to noise	0	1	2	3	4	5	6
Feeling slowed down	0	1	2	3	4	5	6
Feeling like "in a fog"	0	1	2	3	4	5	6
"Don't feel right"	0	1	2	3	4	5	6
Difficulty concentrating	0	1	2	3	4	5	6
Difficulty remembering	0	1	2	3	4	5	6
Fatigue or low energy	0	1	2	3	4	5	6
Confusion	0	1	2	3	4	5	6
Drowsiness	0	1	2	3	4	5	6
More emotional	0	1	2	3	4	5	6
Irritability	0	1	2	3	4	5	6
Sadness	0	1	2	3	4	5	6
Nervous or Anxious	0	1	2	3	4	5	6
Trouble falling asleep (if applicable)	0	1	2	3	4	5	6
Total number of symptoms:							of 22
Symptom severity score:							of 132
Do your symptoms get worse with physical activity?						Y	N
Do your symptoms get worse with mental activity?						Y	N
If 100% is feeling perfectly normal, what percent of normal do you feel?							

If not 100%, why?

_____

_____

_____

Education and counseling

Education and counseling

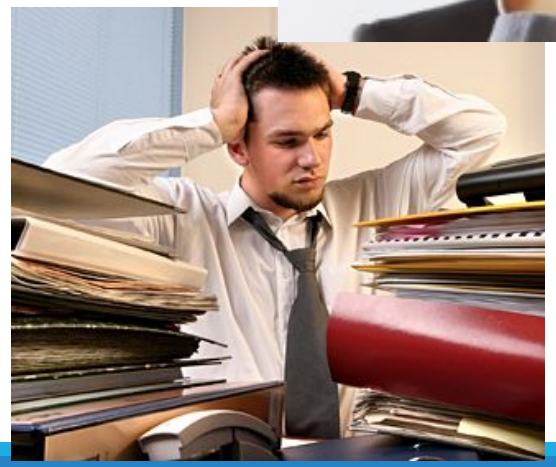
- Basics of a mild TBI
- Warning signs
- Expected symptoms and trajectory (including emphasizing likelihood of full recovery)
- Management of cognitive and physical activity/rest
- Return to activity plan
- Clinical management plan (and role of other team members)

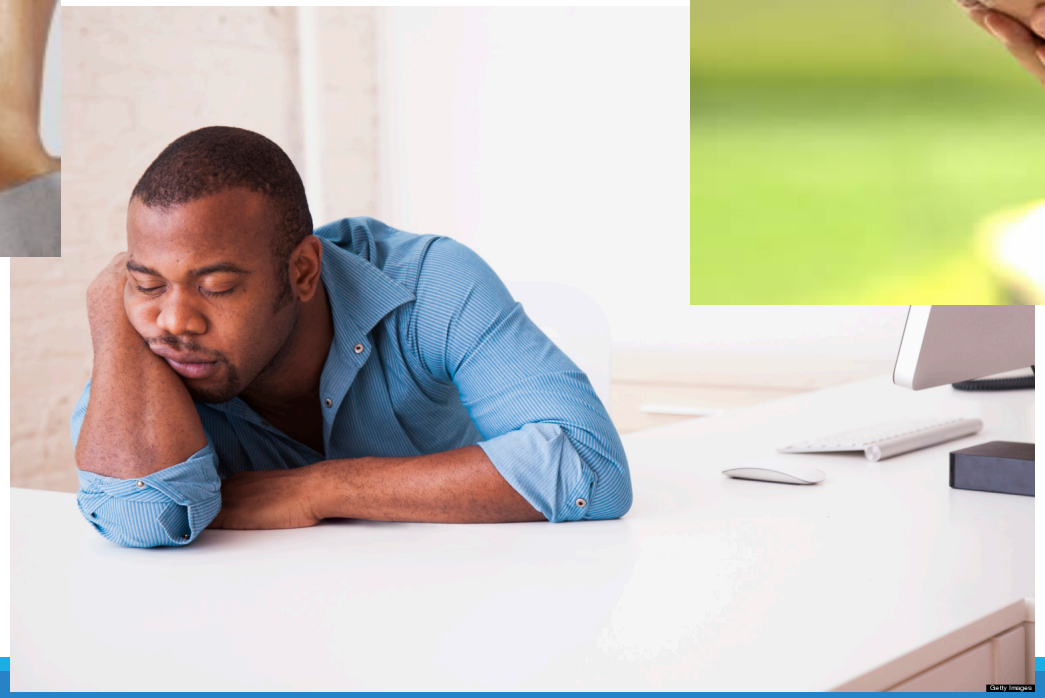
Even brief interventions can improve recovery (especially as measured by symptom duration)

- Informational booklet for kids; Ponsford, 2011
- Telephone counseling/education for adults; Bell et al., 2008
- Example resource from CDC

Brown et al., 2014

Graduated return to activity



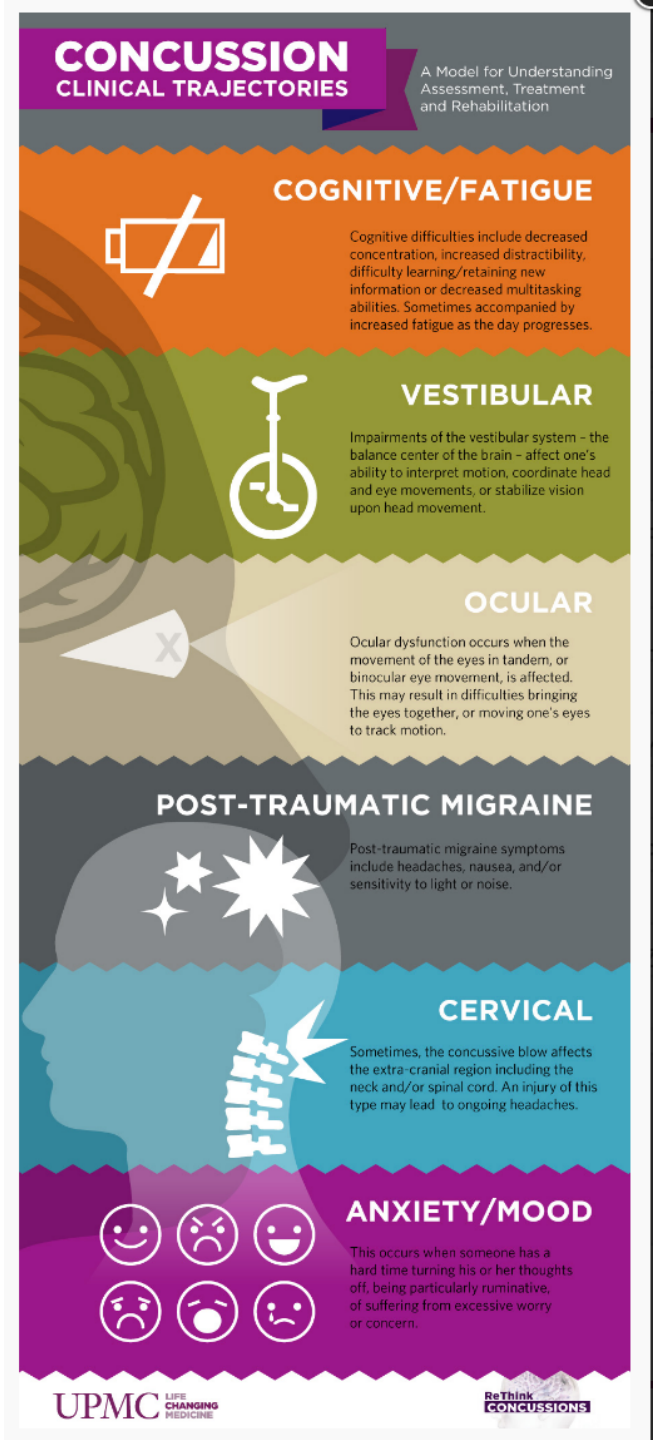


Importance of an interdisciplinary team

Concussion subtypes

UPMC

http://rethinkconcussions.upmc.com/2016/10/concussion-clinical-trajectories/



Overlap in symptoms

	Concussion	Stress	Anxiety	Depression	PTSD
Headaches	X	X	X	X	X
Drowsiness	X	X	X	X	X
Irritability	X	X	X	X	X
Depression	X	X	X	X	X
Poor memory	X	X	X	X	X
Attention/ Concentration	X	X	X	X	X
Fatigue	X	X	X	X	X
Poor sleep	X	X	X	X	X
Nausea	X	X	X	X	X
Worry	X	X	X		X
Dizziness/Loss of balance	X		X		
Impaired hearing	X				X
Blurred vision	X				

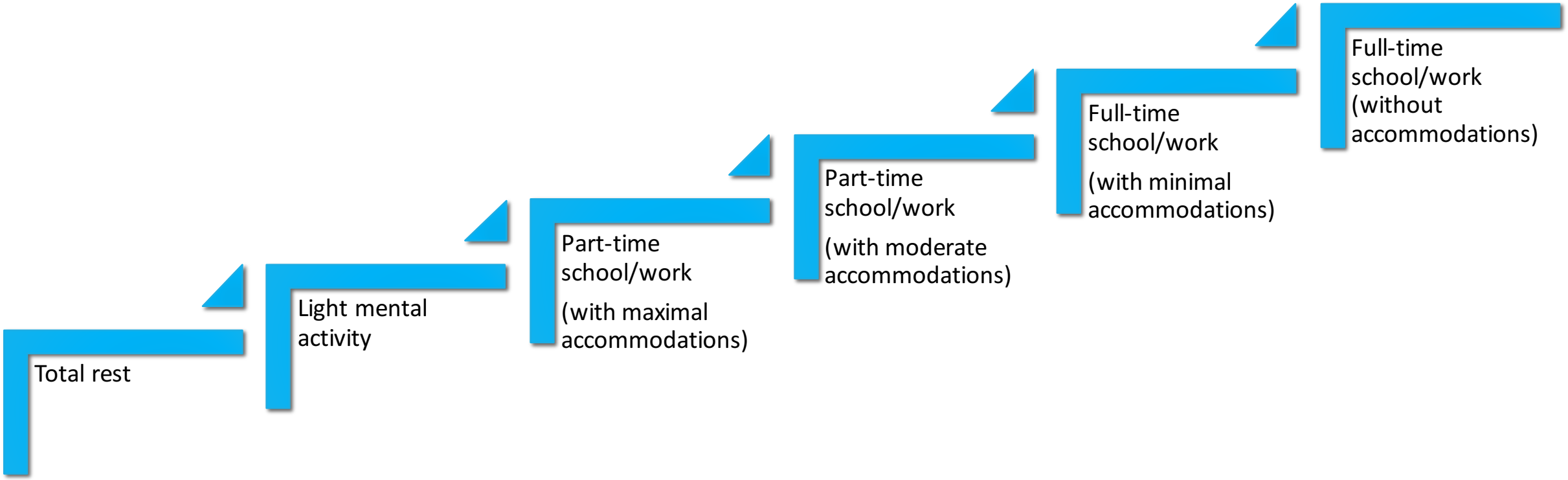
“What does an SLP have to do with concussion?”

Roles of the SLP

- Education and counseling
- Monitoring recovery and guiding return to activity
- Recommending environmental modifications/work and school-based adjustments
- Assessment and treatment for individuals with persistent concerns
- A model of increased involvement in early management, especially in collegiate environment

Brown et al., 2014

Return to school/work



Halstead, 2013

Symptom management

Avoiding symptom exacerbation

Reduce impairment/increase participation

Maximize functioning on patient-centered goals

Environmental modifications/ Work and school-based adjustments

Should be symptom-specific

Should be re-evaluated as recovery continues

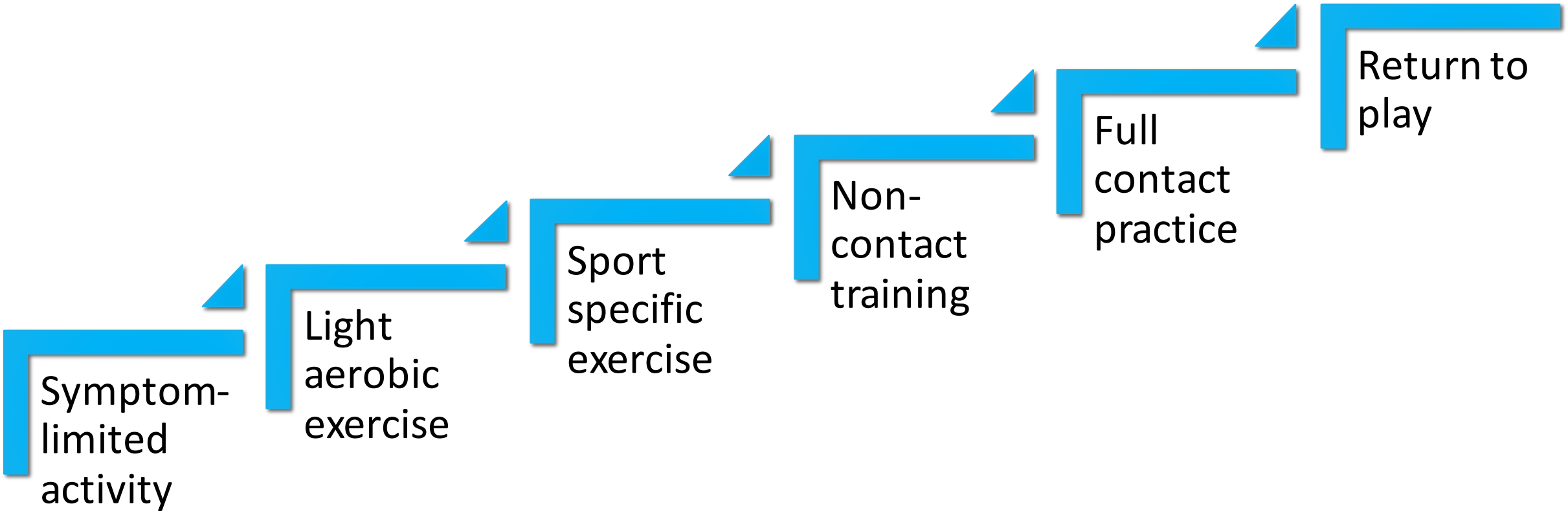
Note: These may require specific education regarding when/how to implement

School resource

Work resource

Symptom	Sample adjustment
Headache	Reduction of aggravating stimuli (e.g., working in quieter or darker space, reduced screen time)
Difficulty concentrating	Extra time for tasks Prioritization of activities
Difficulty remembering	Written notes from meetings
Fatigue	Frequent breaks, consider mental exertion

Return to play

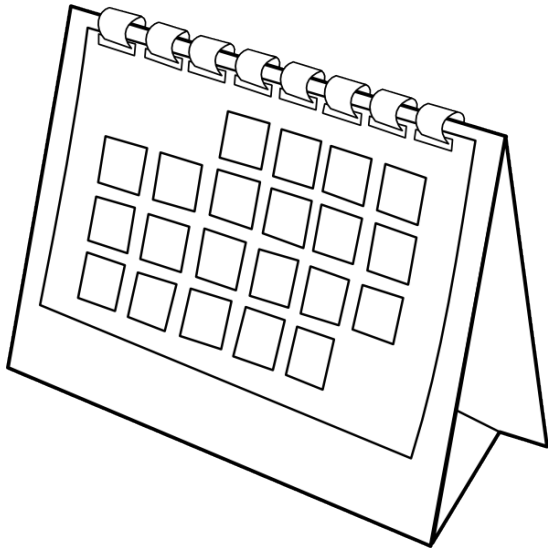


McCrory et al., 2016

Recovery in 7-10 days?

Majority with clinical recovery within 1 month

- Note that this does not necessarily correspond with return to physiological baseline (Kamins et al., 2017; Lim et al., 2019)



Factors to consider (Iverson et al., 2017)

- Age
- Sex/gender
- Early injury burden (i.e., symptoms and cognition)
- Premorbid mental health concerns (e.g., depression, substance abuse)
- Litigation (Karr et al., 2014)
- Previous concussions (?)
- ADHD/learning disabilities (?)
- Migraine history (?)

Persistent symptoms following concussion

Often considered persistent at 3 months

Some movement away from term “post-concussive syndrome”

May be related to brain changes?

Attention and memory issues most common cognitive symptoms, but can be accompanied by other somatic and psychological symptoms

”Good old days” bias?

Sohlberg & Ledbetter, 2016

SLP role: persistent cognitive symptoms

PRACTICE PATTERNS

SLP practice patterns

2002 study of SLPs in NC and IL working with individuals with mTBI (Duff, Proctor, & Haley, 2002)

- Surveyed those in non-school settings
- Found SLPs felt they lacked the skill needed for appropriate counseling
- Many were using in appropriate assessment tools (e.g., aphasia tests) and many were not addressing common cognitive deficits

2015 study of school SLPs (Duff and Stuck, 2015)

- Found SLPs had inaccurate knowledge about concussion, were unfamiliar with concussion-related terminology
- Only a minority of SLPs reported working with individuals with concussion
- Many were using in appropriate assessment tools and not addressing cognitive deficits

Current practice patterns

2019 study of SLPs working in out-patient clinics (Williams-Butler & Cantu, 2019)

- Identified from SIG 2
- All included patient education
- Problems persist with selection of diagnostic tools
  - Screeners (e.g., RBANS)
  - Language-focused assessment tools (e.g., BDAE)
- Most common focus of intervention
  - Attention building
  - Executive function building
  - Return-to-work accommodations

SLP role: persistent cognitive symptoms

ASSESSMENT

Assessment

Goal is to determine functional impact and set plan for rehabilitation (Hardin & Kelly, 2019)

Include both self-report and functional, performance-based measures

Consider effort testing

Two helpful articles to drive tool selection for SLPs:

- Hardin & Kelly, 2019
- Krug & Turkstra, 2015

Team members/referrals

Athletic Trainer

Audiology/Vestibular

Occupational Therapy

Optometry/Ophthalmology

Physical Therapy

Physicians

Psychology/Neuropsychology

Special Educators

Kane, Diaz, & Moore, 2019; Vidal et al., 2012; Ketcham et al., 2017; The Management of Concussion-mild Traumatic Brain Injury Working Group, 2016

SLP role: persistent cognitive symptoms

TREATMENT

General management

- Educating patients regarding breakdowns
- Identifying barriers and ways to compensate
- Promoting generalization of strategies and skills
- Considering other factors that might impact cognition
- Expecting short-term therapy

Cornis-Pop et al., 2012

Evidence-based interventions

Education

Environmental modifications

Metacognitive strategy training

Direct attention training

Compensatory strategies for memory (internal and external)

Assistive technology training

Building cognitive endurance

Cornis-Pop et al., 2012; Sohlberg & Ledbetter, 2016

Ending treatment

When patients have returned to baseline

When patients have generalized strategies to support successful participation

When patients need to prioritize other interventions

When a plan is established to re-engage if a change in situation occurs

Miami University Concussion Management Program: an expanded role for the SLP

Primary members of the team:

- AT
- SLP
- Team Physician
- Athlete

SLP involved in the following:

- Education (pre and post injury)
- Baseline neurocognitive and symptom assessment
  - COWAT, Grooved Pegboard, King-Devick, BESS, ImPACT, PCRS
- Postconcussion neurocognitive and symptom assessment (within ~2 days)
- Academic accommodations, recommendations, and strategies (including sharing information with faculty)
- Rehabilitation

Knollman Porter, Constantinidou, & Hutchinson Marrona, 2014; Knollman-Porter, Constantinidou, Beardslee, & Dailey, 2019

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