

Return to Learn Following Concussion: Across Settings

Justin Tatman, MA, LAT, ATC
Coordinator, Athletic Trainer
Sport Concussion Program
TRIA Orthopedic Center
Minneapolis, MN



Brian Vesci, DAT, ATC
Traumatic Brain Injury Specialist
Health Service
Northwestern University
Chicago, IL



Presenter Conflict:

- The views expressed in these slides and today's discussion are ours
- Our views may not be the same as the views of our companies', clients' or our colleagues'
- Participants must use discretion when using the information contained in this presentation



Learning Objectives:

- Identify current evidence for return to learn after concussion
- Recommend appropriate academic accommodations based on concussion clinical presentation
- Identify individuals involved in the implementation of a return to learn protocol
- Outline strategies to developing and implementing return to learn programs regardless of athletic training setting



Why are we here?

- Up to 90% of student athletes report trouble with school or had a decline in grades subsequent sport-related concussion (SRC), and
- 61% of student athletes reported academic dysfunction at 1 month post concussion (Wasseman, *Am J Pub Health*, 2016)
- As of 2016, only 12% of high schools had a formal RTL protocol (Lyons et al., *J School Health*, 2017)
- Survey of ATs in 2016 found only 44% had a RTL written policy (Kasamatsu, *J Athl Train*, 2016)
- In 2015, 63% of NCAA schools had a RTL, but 97% had a RTP protocol (Swanson, *Opt & Vision Sci*, 2017)



GLATA Laws by State:



- Illinois - Illinois Youth Sports Concussion Act (Public Act 099-0245)
 - “All public, private, or charter schools must convene a Concussion Oversight Teams (COT). The COT’s primary function will be to develop return-to-play and return-to-learn protocols for students believed to have experienced a concussion.”
- Indiana - Concussion Law (IC 20-34-7)
 - “As part of a school policy, schools should develop procedures regarding return to learn protocols for students diagnosed with a concussion”
- Michigan - Public Act 137 of 2017, Section 333.9155 and 333.9156
- Minnesota – 121A.37 and 121A.38
 - No mention of return to school or learn in statute
- Ohio - Ohio’s Return-to-Play law (ORC 3313.539 or ORC 3314.03) and Ohio Return to Learn- Concussion Team Model Handbook through ODH
- Wisconsin – Wisconsin Act 172, Statue 118.293



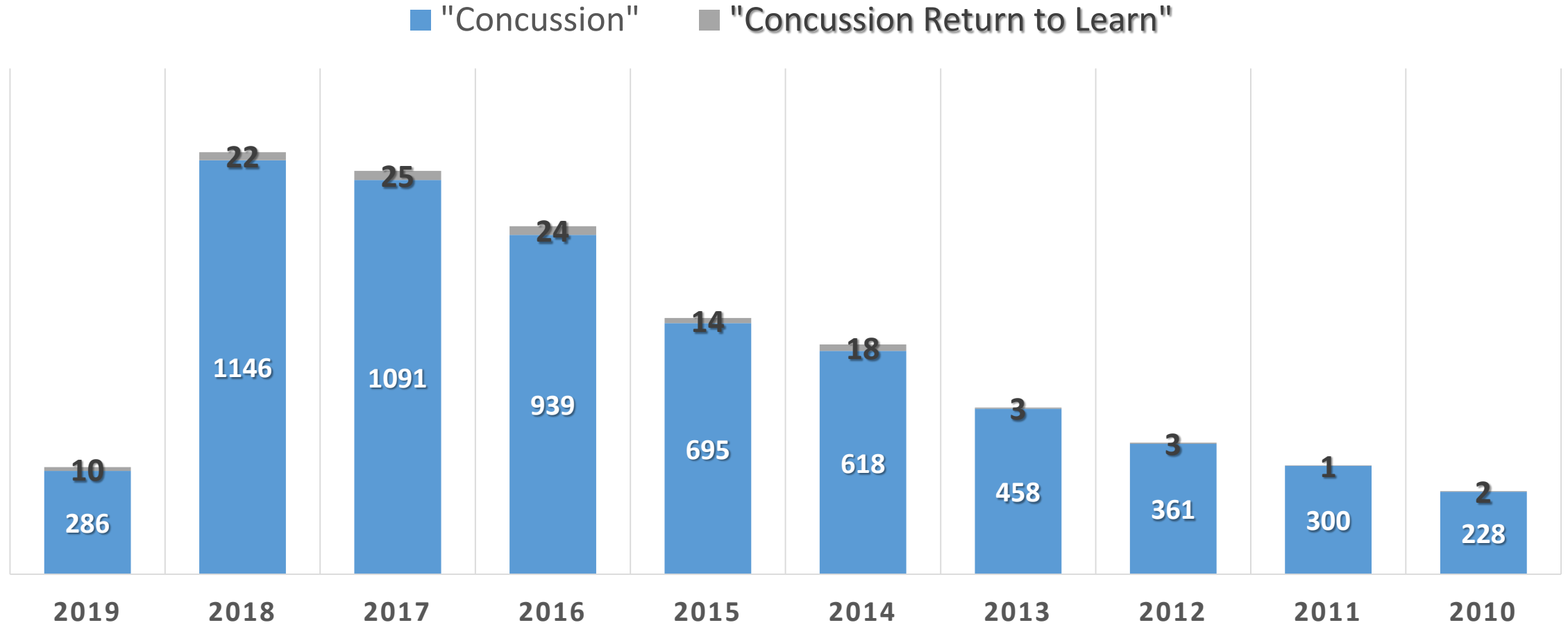
Considerations:

- Dysfunction and symptoms after concussion are treatable.
- Every patient experiences concussion differently.
- Research and clinical practice are rapidly evolving.
- Community knowledge about concussion is often incomplete and sensationalized.
- Education is treatment, you as an AT will be acting as an educator for:
 - Patient, parents/guardians, providers, administrators, and others.



Growing Body of Current Evidence

Pubmed search as on 3/10/19:



Gaps in Evidence

Journal of Athletic Training 2017;52(3):262-287
doi: 10.4085/1052-6050-51.6.06
© by the National Athletic Trainers' Association, Inc
www.natajournals.org

systematic review

Rest and Return to Activity After Sport-Related Concussion: A Systematic Review of the Literature

Tamara C. Valovich McLeod, PhD, ATC, FNATA*†; Joy H. Lewis, DO, PhD, MPH†; Kate Whelihan, MPH†; Cailee E. Welch Bacon, PhD, ATC*†

*Athletic Training Programs and †School of Osteopathic Medicine in Arizona, A.T. Still University, Mesa

- Consensus lacks on return to learn protocols
- Prescription and specifics of cognitive rest remain unclear
- Return to learn is not universally embedded in legislation
- Evidence based return to learn protocols are needed
- Impact of return to learn on academic outcomes in student athletes remains an area of need in the evidence



Quantitative Impact of Concussions on Academics

- Higher academic dysfunction at 1 week after DOI compared to orthopedic injuries (Wasseman, *Am J Pub Health*, 2016)
- Symptomatic students had increased concerns regarding academic performance and school related problems (Ransom, *Peds*, 2015)
- Vision, symptoms, headache, and concentrating difficulty significantly associated with academic difficulty (Swanson, *Opt & Vision Sci*, 2017)
- 79% of ATs managed students who experienced decrease in school and academic performance following concussions (Williams, *Sports Med*, 2015)



Current Evidence

What factors must be considered in 'return to school' following concussion and what strategies or accommodations should be followed?

A systematic review

Laura K Purcell,¹ Gavin A Davis,² Gerard A Gioia³

- Factors to be considered on return to school following concussion:
 1. Symptomology
 - Severity, type, duration
 2. Age/school level
 3. Course load
 4. Rest following injury



("Back to School", Billy Madison;
Source: Google Images; Rollingstone.com)



Returning too soon....

- Increase risk of psychosocial problems in those who return full time with no academic accommodations, compared to those with reduced cognitive exertion (Brown et al., *Pediatrics*, 2014)
- Approximately a third of students reported new symptoms once back in school (Baker et al., *Clinical Pediatrics*, 2015)
 - Decrease academic performance
 - Increase mental health concerns (stress, anxiety surrounding performance)
- Prolong Recovery?
 - Not allowing adequate rest in acute and sub acute phase could potentially prolong overall recovery; similar to playing through symptoms (Silverberg, *JAMA Peds*, 2016; Thomas, *Pediatrics*, 2015)



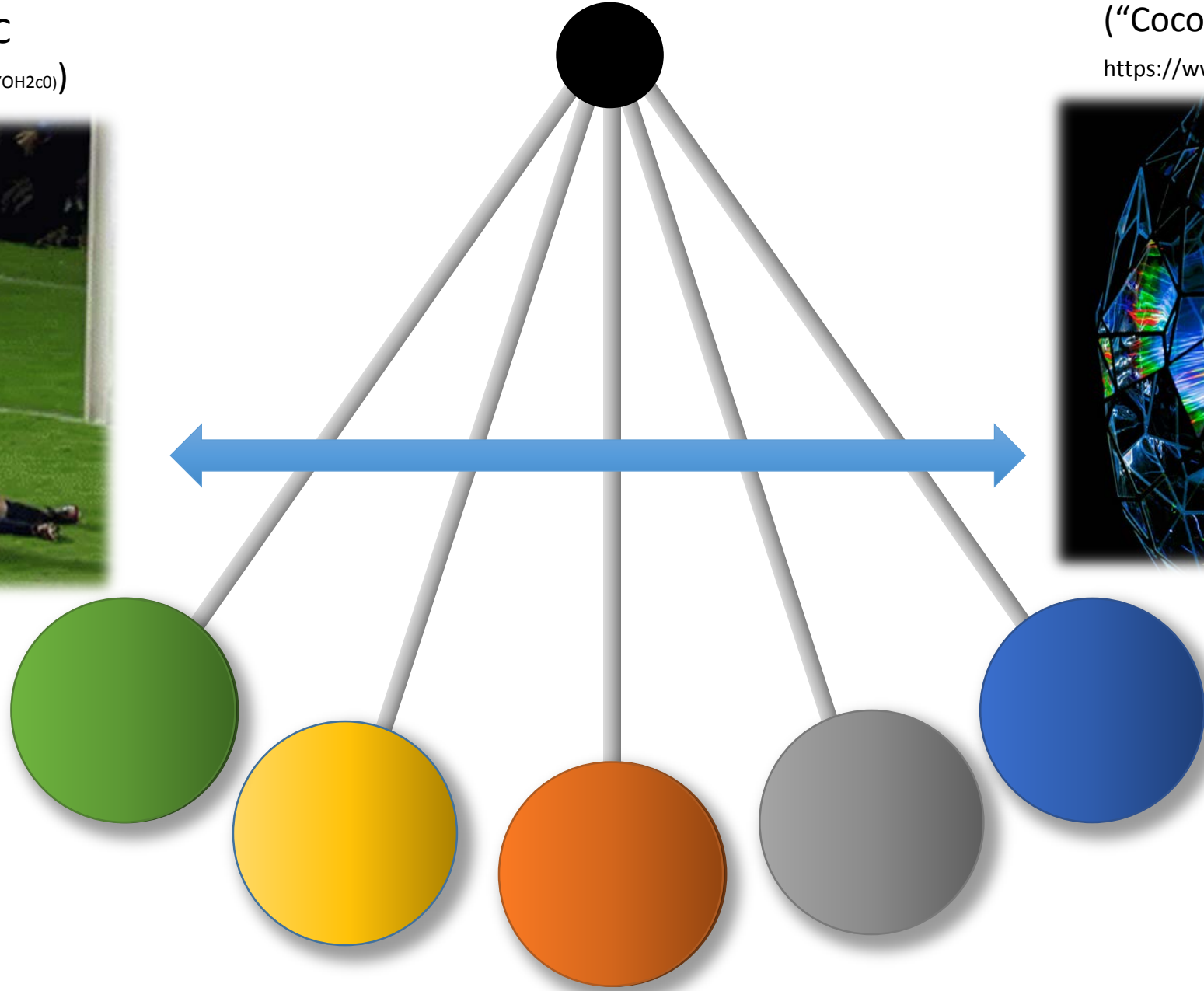
Returning too late....

- No evidence that complete rest = full and efficient recovery
(McCrory et al., *Br J Sp Med*, 2017)
- Longer restriction from activity, including being withheld from school, may prolong recovery and even increase symptoms (Thomas et al., *Pediatrics*, 2015)
- Minimizing school absence to avoid onset of secondary problems
(Purcell et al., *Br J Sp Med*, 2018; Collins et al., *Neurosurgery*. 2016)
 - Social isolation
 - Depression
 - Anxiety about make up work, social status, academic success
 - Deconditioning and tolerance



(Video Credit: Studio C
<https://www.youtube.com/watch?v=8F9jXYOH2c0>)

(“Cocoon” by Julian Melchiorri
<https://www.julianmelchiorri.com/cocoon>)



Optimal Rest with Early Activity



Rest: How much is appropriate?

- Initial rest is effective and necessary but too much rest can be detrimental to recovery; and even lead to protracted cases
- Specific statements:
 - ***CDC/JAMA Peds:*** Counsel patients to return gradually to non-sports activities after ***no more than 2-3 days of rest.***
 - ***CISG 2016 Berlin Consensus:*** After a brief period of rest during the acute phase (24–48 hours) after injury, patients can be encouraged to become gradually and progressively more active while staying below their cognitive and physical symptom-exacerbation thresholds



Return to School – When is the perfect time?

- Timeframes reflected in vary existing guidelines:
 - 24-48 hours rest (Purcell et al., *Br J Sp Med*, 2018)
 - Once student tolerates cognitive activities at home without worsening of symptoms (McCrory et al., *Br J Sp Med*, 2017)
 - Tolerate cognitive activates for 30- 45 minutes (Halstead et al., *Peds*, 2013)
 - Tolerate 2, 30 minute cognitive sessions (G.F Strong School Program)
 - No more than 5 days (Nebraska SCN, 2017)
- Age, type and severity of symptoms, and academic course load need to be considered



Return to School – When?

Rest and Return to Activity After Sport-Related Concussion: A Systematic Review of the Literature

Tamara C. Valovich McLeod, PhD, ATC, FNATA*†; Joy H. Lewis, DO, PhD, MPH†; Kate Whelihan, MPH†; Cailee E. Welch Bacon, PhD, ATC*†

*Athletic Training Programs and †School of Osteopathic Medicine in Arizona, A.T. Still University, Mesa

- **Critical message:** Rest is important in the first 1–2 days after concussion, then moderate amounts of physical and cognitive activity, under the direction of a health care provider, may be beneficial in the recovery process. (Valovich McLeod, *JAT*, 2017)
- *“The exact amount and duration of rest is not yet well defined in the literature and requires further study.”* (Broglia, et al., *Br J Sp Med*, 2017)
- Validation of the existing return-to-activity progressions is still needed



Current RTL Guidelines

Return to School; Recommendations 15 (A-F):

- Medical and school-based teams should counsel the student and family regarding the process of gradually increasing the duration and intensity of academic activities as tolerated
- Return-to-school protocols should be customized based on the severity of symptoms in children
- Educational supports should be monitored and adjusted on an ongoing basis
- For prolonged symptoms and academic difficulties despite an active treatment approach, refer the child for a formal evaluation by a specialist in pediatric mTBI



Current RTL Guidelines CISG

Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016

Paul McCrory,¹ Willem Meeuwisse,² Jiří Dvořák,^{3,4} Mark Aubry,⁵ Julian Bailes,⁶ Steven Broglio,⁷ Robert C. Cantu,⁸ David Cassidy,⁹ Ruben J. Echemendia,^{10,11}

- *“Schools are encouraged to have an SRC policy that includes education on SRC prevention and management for teachers, staff, students and parents, and should offer appropriate academic accommodation and support to students recovering from SRC.”*

Consensus statement

Table 2 Graduated return-to-school strategy

Stage	Aim	Activity	Goal of each step
1	Daily activities at home that do not give the child symptoms	Typical activities of the child during the day as long as they do not increase symptoms (eg, reading, texting, screen time). Start with 5–15 min at a time and gradually build up	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 increased breaks during the day	Increase academic activities
4	Return to school full time	Gradually progress school activities until a full day can be tolerated	Return to full academic activities and catch up on missed work



(McCrory et al., Br. J Sports Med, 2017)



American Medical Society for Sports Medicine position statement on concussion in sport

Kimberly G Harmon,¹ James R Clugston,² Katherine Dec,³ Brian Hainline,⁴
Stanley Herring,⁵ Shawn F Kane,⁶ Anthony P Kontos,⁷ John J Leddy,⁸ Michael McCrea,⁹
Sourav K Poddar,¹⁰ Margot Putukian,^{11,12} Julie C Wilson,¹³ William O Roberts¹⁴

Current RTL Guidelines

• AMSSM – Position Statement

(Harmon KG, *et al.*, *Br J Sports Med*, 2019)

Table 4 Return to learn

Facilitate communication and transition back to school.

- ▶ Notify school personnel after injury to prepare for return to school.
 - Obtain consent for communication between medical and school teams.
- ▶ Designate point person to monitor the student's status related to academics, recovery and coping with injury, and communicate with medical team.
 - School health professional, guidance counsellor, administrator, athletic trainer.
- ▶ Develop plan for missed assignments and exams.
- ▶ Adjust schedule to accommodate reduced or modified attendance if needed.

Classroom adjustments

- ▶ Breaks as needed during school day.
- ▶ Reduce inclass assignments and homework.
- ▶ Allow increased time for completion of assignments and testing.
- ▶ Delay exams until student is adequately prepared and symptoms do not interfere with testing.
- ▶ Allow testing in a separate, distraction-free environment.
- ▶ Modify due dates or requirements for major projects.
- ▶ Provide preprinted notes or allow peer notetaker.
- ▶ Avoid high-risk or strenuous physical activity.

School environment adjustments

- ▶ Allow use of headphones/ear plugs to reduce noise sensitivity.
- ▶ Allow use of sunglasses/hat to reduce light sensitivity.
- ▶ Limit use of electronic screens or adjust screen settings, including font size, as needed.
- ▶ Allow student to leave class early to avoid crowded hallways.
- ▶ Avoid busy, crowded or noisy environments—music room, hallways, lunch room, vocational classes, assemblies.

Clinicians should individualise adjustments based on patient-specific symptoms, symptom severity, academic demands, as well as pre-existing conditions, such as mood disorder, learning disability or attention deficit/hyperactivity disorder.^{87 88}

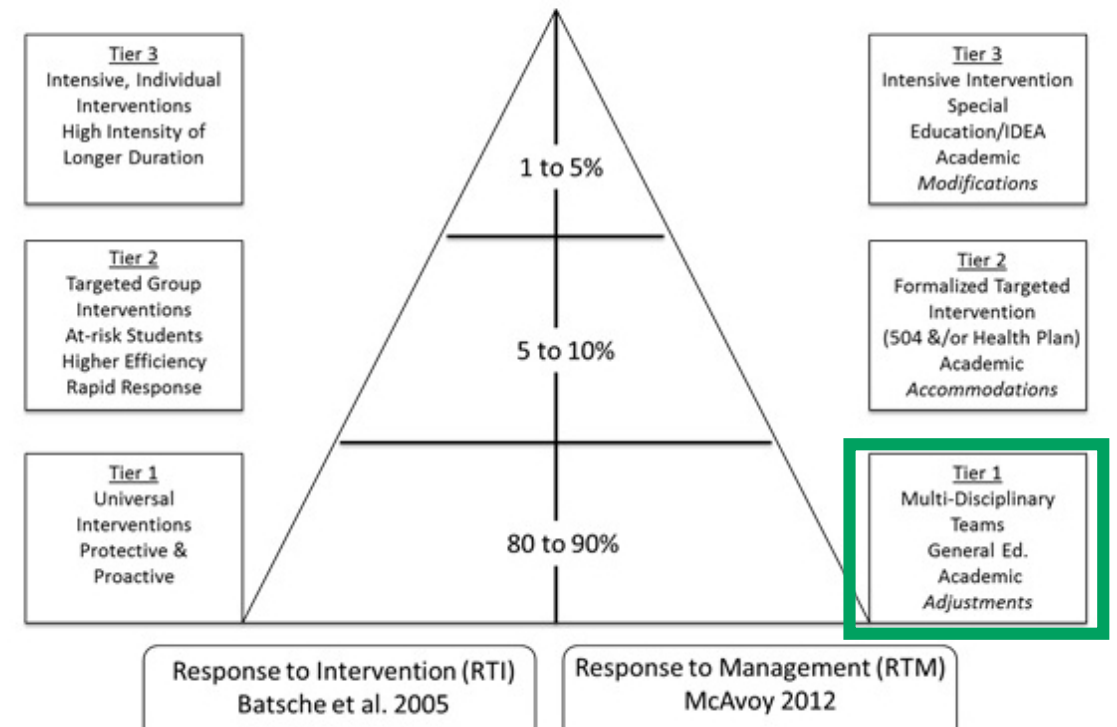
Athletes with complicated or prolonged recovery may require a multidisciplinary team with specific expertise across the scope of concussion management.



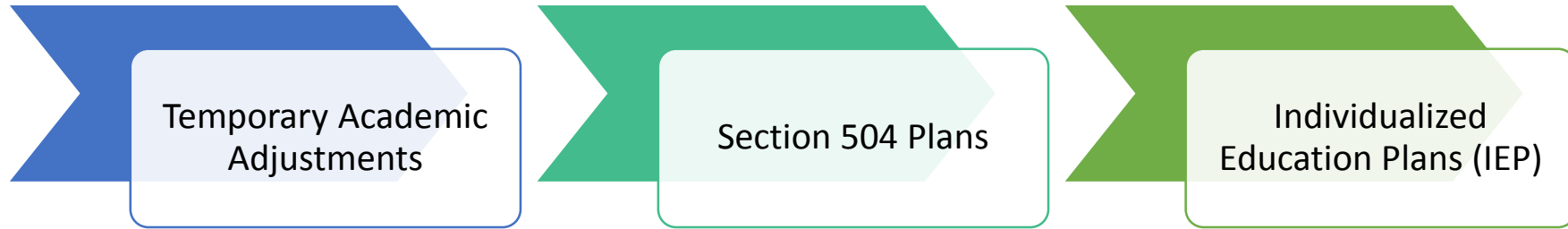
Who will need accommodations?

- After concussion, most students benefit from temporary academic adjustments that are proactive and preventative (Batsche et al., 2005)
- Consistent with current recovery trends in concussion
 - Most (80-90%) of student-athletes recover in 3-4 weeks (Collins et al., *Neurosurgery*, 2016)

RTI/RTM Concussion Pyramid, (McAvoy, 2012)



Policies



Type of Accommodation	Definition	Time Frame	Implementation Mechanism
Academic Adjustment	Non-formalized changes in environment	3-5 weeks	Informal negotiation (form or documentation dependent on setting and policies) with teachers and academic administrations
Academic Accommodation	Longer academic accommodations needs (i.e. alternative arrangements for standardized testing)	5 weeks – 4 months	504 Plan
Academic Modification	More prolonged changes necessary (special education)	> 4-6 months	Individualized Education Plan (IEP)



IEP vs 504 –

What the AT needs to know

- While the procedures are different, the goal is the same:
 - Ensure that students with disabilities have access to a free and appropriate education that is comparable to the education available to their non-disabled peers

IEP vs 504

	Individualized Education Plan (IEP)	Section 504 Plan
Type of law	Special Education - Individuals with Disabilities Act (IDEA)	Civil Rights - Rehabilitation Act of 1973
Department	Department of Education	Office of Civil Rights
Requirements for eligibility	Has a disability that: a) meets criteria under IDEA, b) significantly impacts educational performance, and c) requires specialized services	Has a disability that significantly impacts a major life function.
What is included?	Specialized education services, accommodations, related services.	Accommodations, modifications.
Age limits	IEP offered through 12th grade.	No age limits with a 504 plan.
Where is the plan used?	Educationally, through the 12th grade. Does not transfer to college.	School, work, and college. 504 Plans will transfer to college.
Discipline	A Manifestation Determination meeting must be held to determine if the offense is a manifestation of the disability by the 10th day of suspension. Services are required during long-term suspension.	A Manifestation Determination meeting must be held to determine if the offense is a manifestation of the disability by the 10th day of suspension. May require reevaluation.

www.schoolpsychologistfiles.com



Diagnosis that qualify for IEP distinction

1. Specific learning disability (SLD)
 - Dyslexia, Dysgraphia, Dyscalculia, Auditory processing disorder, Nonverbal learning disability
2. Other health impairment (Includes ADHD)
3. Autism spectrum disorder (ASD)
4. Emotional disturbance
 - Anxiety disorder, schizophrenia, bipolar disorder, obsessive-compulsive disorder and depression.
5. Speech or language impairment
6. Visual impairment, including blindness
7. Deafness
8. Hearing impairment
9. Deaf-blindness
10. Orthopedic impairment
11. Intellectual disability
 - Down syndrome is one example of an intellectual disability.
- 12. Traumatic brain injury**
13. Multiple disabilities
 - More than one condition; creates educational needs that can't be met in a program for any one condition



Standardized Testing -



- Review requirements for accommodations
 - <http://www.act.org/content/act/en/products-and-services/the-act/registration/accommodations.html>
 - <https://accommodations.collegeboard.org/>
- Timeline
 - Minimum 6 weeks for ACT
 - SAT website: “It can take up to 7 weeks for accommodations to be approved”
- Realistic role of AT in this process: facilitator (not recognized as diagnostician)
- What is acceptable as a diagnosis?
- Teacher feedback forms



ACT – Traumatic Brain Injuries



6. Evidence of continued educational impairment and its relationship to the requested accommodations, as supported by objective data. Examples include:

- A complete evaluation of intellectual, neurocognitive, and academic skills, using acceptable batteries of assessment
- **(ImPACT results cannot be used in isolation..)**
- *“Each request for accommodation is evaluated on a case-by-case basis using the information described above. If a particular element of documentation is not provided, the diagnostician must explain why it is not included in the submission”*



SAT – Head Injuries



- Documentation should state the specific head injury as diagnosed
- “Because concussions have a normal course of recovery, documentation should include symptom progression during and after the recovery phase, per best practice.”
- List of common diagnostic tests span cognitive ability, academic achievement, symptoms validity, times tests and brief tests
 - **NOT** including ImPACT in isolation



Tailoring academic accommodations

- Individualized accommodations after concussion are needed:
 - Who was this patient before their injury?
 - What are best practices for the AT?
 - How can this be translated to patient care?
 - How can this be communicated with the stakeholders?

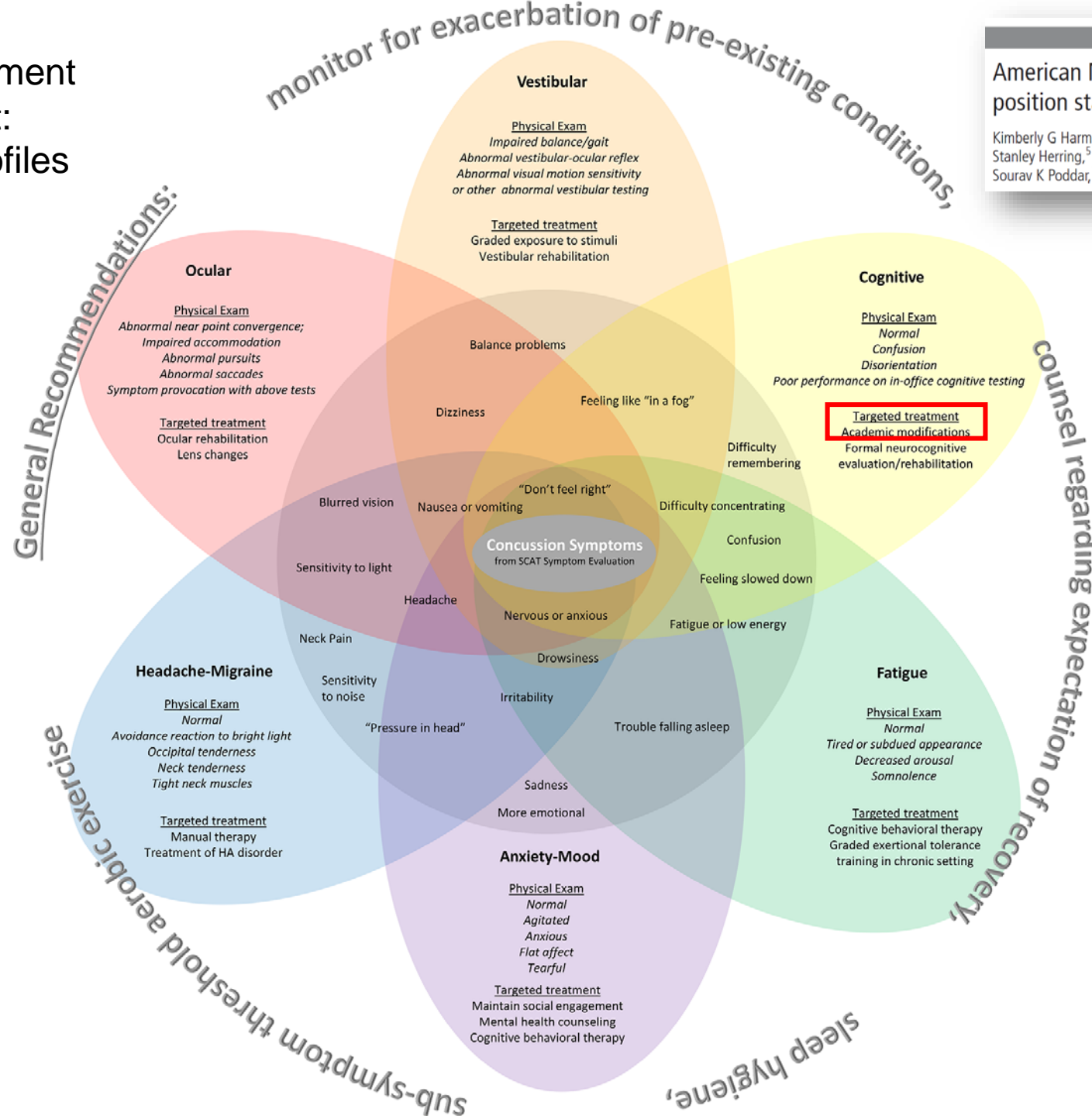


AMSSM Position Statement on Concussion in Sport: Overlapping clinical profiles

Consensus statement

American Medical Society for Sports Medicine
position statement on concussion in sport

Kimberly G Harmon,¹ James R Clugston,² Katherine Dec,³ Brian Hainline,⁴ Stanley Herring,⁵ Shawn F Kane,⁶ Anthony P Kontos,⁷ John J Leddy,⁸ Michael McCrea,⁹ Sourav K Poddar,¹⁰ Margot Putukian,^{11,12} Julie C Wilson,¹³ William O Roberts¹⁴



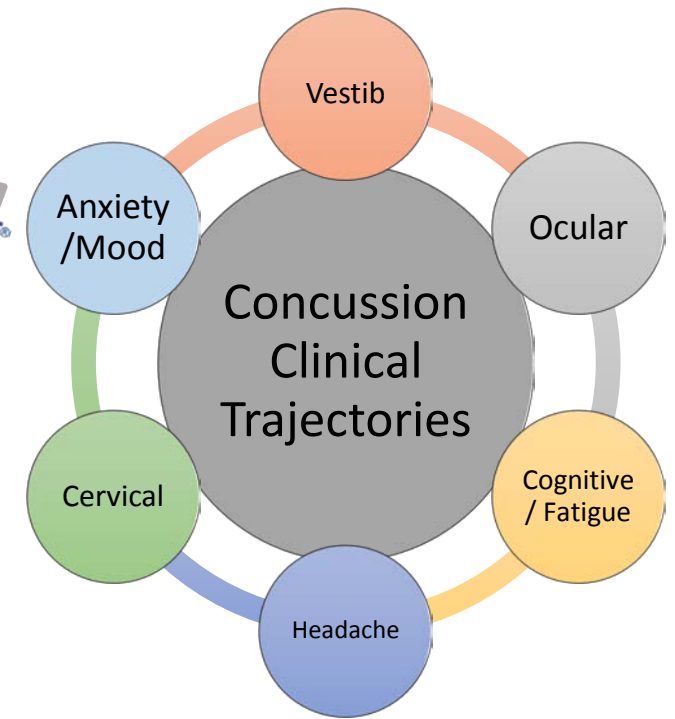
(Harmon KG, et al.,
Br J Sports Med, 2019)



Clinical Trajectories



- **Clinical Interview**
 - Constitutional risk factors
 - Symptom clusters
 - What questions to ask?
- **Vestibular-Ocular Screening**
 - Provocative or not?
 - Specific findings help determine type of exertional activity
- **Computerized Neurocognitive Testing**
 - Specific cognitive profiles for clinical trajectories
- **Treatment Management**
 - Behavioral Management
 - Therapy and/or medication considerations
 - School considerations



Findings lead to individually determined treatment and rehabilitation plan, including academic accommodations.

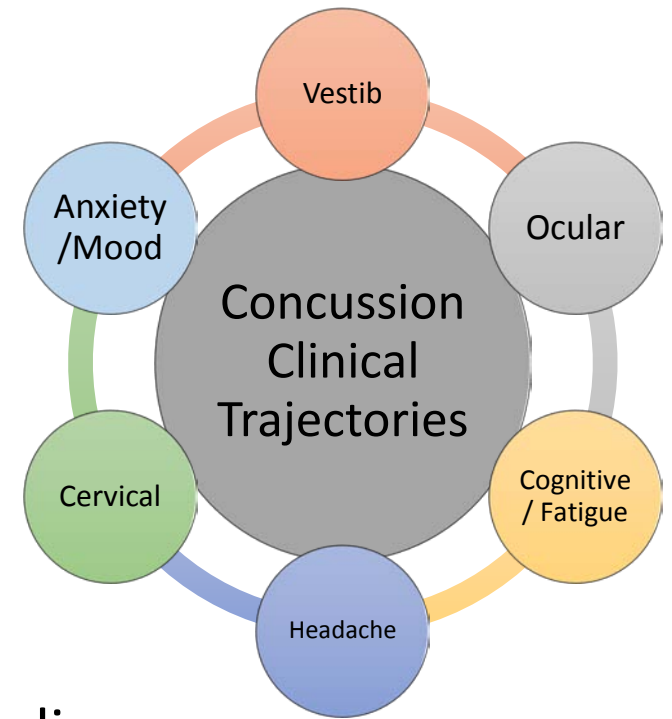


(Broglia et al., *Clin Sports Med*, 2015; Collins, et al., *KSSTA*, 2014; Kutcher, *Continuum*, 2014)



Modifying Accommodations Based on Clinical Trajectories

- Vestibular
 - Problem: Dizziness/balance in busy environments
 - Problem: Avoid cafeteria and assemblies, provide breaks
- Ocular
 - Problem: Headache, blurred vision with screen use or reading
 - Solution: Visual breaks, print out work, minimize screen brightness, preferential seating
- Cognitive/Fatigue
 - Problem: mental fatigue, difficulty concentrating, mental foggy
 - Solution: scheduled breaks, core assignments only, extra time, test in morning, behavioral management



(Broglia et al., *Clin Sports Med*, 2015; Collins, et al., *KSSTA*, 2014; Kutcher, *Continuum*, 2014)



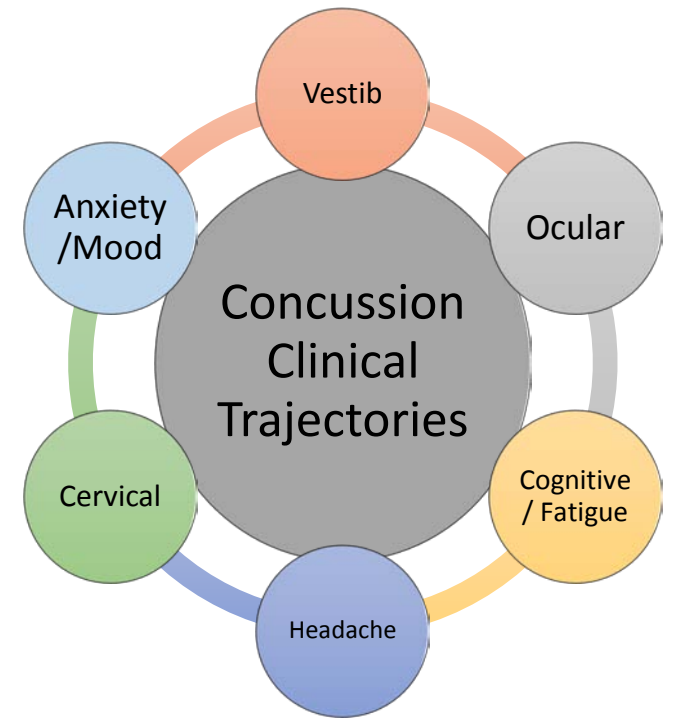
Modifying Accommodations Based on Clinical Trajectories

- Headache

- Problem: Headache, environmental sensitivities
- Solution: Minimize triggers, routine, extra time, breaks

- Anxiety/Mood

- Problem: concern over grades, falling behind, worry about memory
- Solution: Limit time OUT of school, routine and behavioral management, limit overall accommodations to remain engaged
 - Sport participation in safe non-risk steps of stepwise RTP protocol



(Broglia et al., *Clin Sports Med*, 2015; Collins, et al., *KSSTA*, 2014; Kutcher, *Continuum*, 2014)



PHYSICAL:

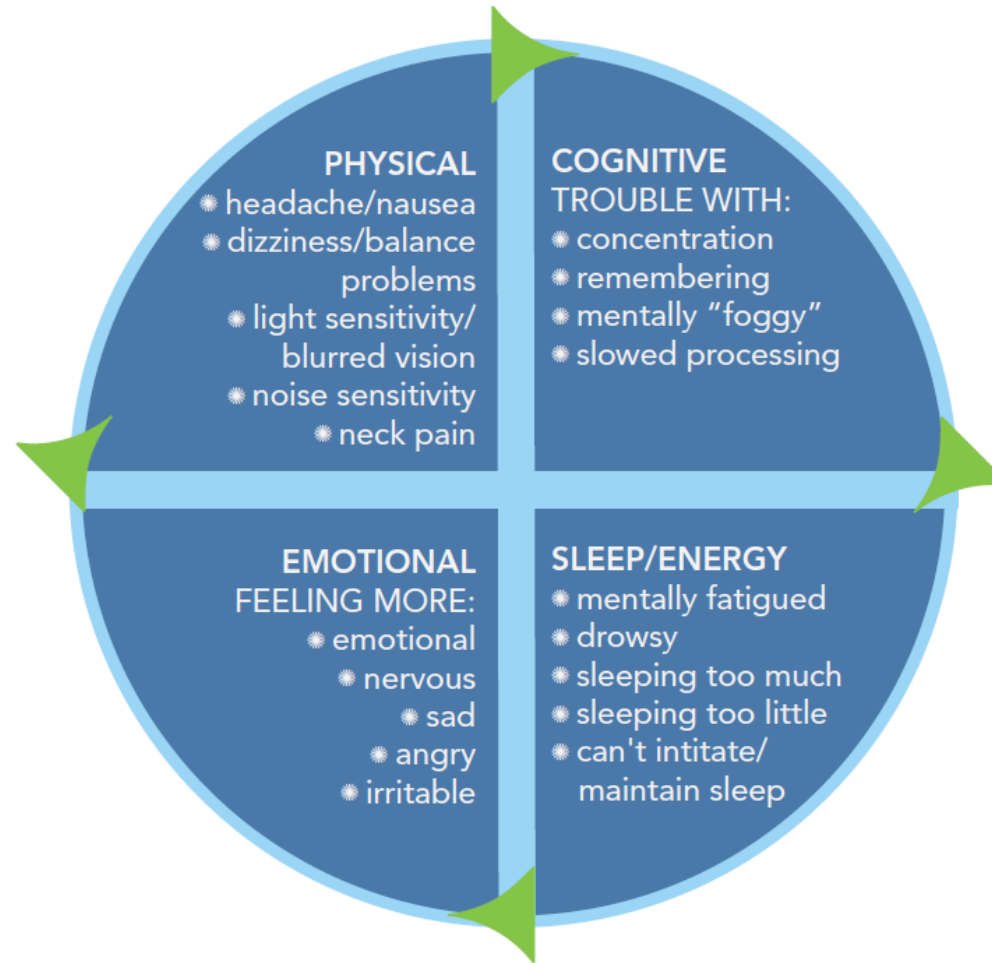
- "Strategic Rest" scheduled 15 to 20 minute breaks in clinic/quiet space (mid-morning; mid-afternoon and/or as needed)
- Sunglasses (inside and outside)
- Quiet room/environment, quiet lunch, quiet recess
- More frequent breaks in classroom and/or in clinic
- Allow quiet passing in halls
- REMOVE from PE, physical recess, & dance classes without penalty
- Sit out of music, orchestra and computer classes if symptoms are provoked

EMOTIONAL:

- Allow student to have "signal" to leave room
- Help staff understand that mental fatigue can manifest in "emotional meltdowns"
- Allow student to remove him/herself to de-escalate
- Allow student to visit with supportive adult (counselor, nurse, advisor)
- Watch for secondary symptoms of depression and anxiety usually due to social isolation and concern over "make-up work" and slipping grades. These extra emotional factors can delay recovery

Symptom Wheel

Suggested Academic Adjustments



COGNITIVE:

- REDUCE workload in the classroom/homework
- REMOVE non-essential work
- REDUCE repetition of work (ie. only do even problems, go for quality not quantity)
- Adjust "due" dates; allow for extra time
- Allow student to "audit" classwork
- Exempt/postpone large test/projects; alternative testing (quiet testing, one-on-one testing, oral testing)
- Allow demonstration of learning in alternative fashion
- Provide written instructions
- Allow for "buddy notes" or teacher notes, study guides, word banks
- Allow for technology (tape recorder, smart pen) if tolerated

SLEEP/ENERGY:

- Allow for rest breaks –in classroom or clinic (ie. "brain rest breaks = head on desk; eyes closed for 5 to 10 minutes)
- Allow student to start school later in the day
- Allow student to leave school early
- Alternate "mental challenge" with "mental rest"

Read "Return to Learning: Going Back to School Following a Concussion" at nasponline.org/publications/cq/40/6/return-to-learning.aspx



Symptom Based Accommodations

Symptom	Accommodation
Headache	Frequent Breaks, Reduce exposure to agitators, Rest as needed
Dizziness	Allow to put head down, reduce exposure to busy hallways or environments
Visual Disturbances	Computer exposure accommodations, audio tapes, reduce brightness, visual breaks
Trouble Concentrating	Avoid major projects, break up testing and classwork, consider note taking assistance
Mental Fogginess	Breaks (planned and prn), reduce work to include only core subjects/assignments
Trouble with Attention	Preferential seating, quiet work space, study hall instead of gym/choir, band
Sleep Disturbances	Schedule changes (late start, early dismissal), rest breaks prn in nurses office
Fatigue	Break and rest (strategic), adjust overall schedule to include more breaks, end early
Anxiety	Verbal and written reassurance, workload reduction, make up plan, test format changes
Depression	Encourage normal social activities, sub symptoms threshold physical activity
Labile Mood	Breaks prn, clear communication with teachers/admin, snacks/hydration



Accommodation Forms Examples

- No reason to re-invent the wheel
- Multiple resources exist as examples or free domain to adopt as documents for use in return to learn protocol

- CDC – mTBI 2018 material
 - https://www.cdc.gov/headsup/basics/return_to_school.html
- REAP Project
 - http://www.concussiontreatment.com/images/REAP_Program.pdf
- GF Strong School Program
 - <https://gfsschoolprogram.weebly.com/concussion.html>
- BRAIN 101
 - <http://brain101.orcasinc.com/>
- cbirt – Univ. of Oregon
 - <https://cbirt.org/back-school/return-school-plan>
- Brain STEPS
 - <https://www.brainsteps.net/>
- Sport Concussion Institute
 - <http://www.concussiontreatment.com/forteachers.html>
- Nebraska Sports Concussion Network
 - <http://www.nebsportsconcussion.org/>



Returning to School After a Concussion



DEAR SCHOOL STAFF:

This letter offers input from a healthcare provider with experience in treating concussion, a type of traumatic brain injury. This letter was created to help school professionals and parents support students returning to school after a concussion. You can use these recommendations to make decisions about support for your student based on his or her specific needs. This letter is not intended to create a 504 Plan or an IEP unless school professionals determine that one is needed. Most students will only need short-term support as they recover from a concussion. A strong relationship between the healthcare provider, the school, and the parents will help your student recover and return to school.

_____ was seen for a concussion on _____
 Student Name Date
 in _____ office or clinic.
 Healthcare Provider's Name

The student is currently reporting the following symptoms:



PHYSICAL

- ☐ Bothered by light or noise
- ☐ Dizziness or balance problems
- ☐ Feeling tired, no energy
- ☐ Headaches
- ☐ Nausea or vomiting
- ☐ Vision problems



THINKING OR REMEMBERING

- ☐ Attention or concentration problems
- ☐ Feeling slowed down
- ☐ Foggy or groggy
- ☐ Problems with short- or long-term memory
- ☐ Trouble thinking clearly



SOCIAL OR EMOTIONAL

- ☐ Anxiety or nervousness
- ☐ Irritability or easily angered
- ☐ Feeling more emotional
- ☐ Sadness



SLEEP

- ☐ Sleeping less than usual
- ☐ Sleeping more than usual
- ☐ Trouble falling asleep

The student also reported these symptoms:

RETURNING TO SCHOOL

Based on the student's current symptoms, I recommend that the student:

- ☐ Be permitted to return to school and activities while school professionals closely monitor the student. School professionals should observe and check in with the student for the first two weeks, and note if symptoms worsen. If symptoms do not worsen during an activity, then this activity is OK for the student. If symptoms worsen, the student should cut back on time spent engaging in that activity, and may need some short-term support at school. Tell the student to update his or her teachers and school counselor if symptoms worsen.
- ☐ Is excused from school for _____ days.
- ☐ Return to school with the following changes until his or her symptoms improve.

(NOTE: Making short-term changes to a student's daily school activities can help him or her return to a regular routine more quickly. As the student begins to feel better, you can slowly remove these changes.)

Based on the student's symptoms, please make the short-term changes checked below:

- ☐ No physical activity during recess
- ☐ No physical education (PE) class
- ☐ No after school sports
- ☐ Shorten school day
- ☐ Later school start time
- ☐ Reduce the amount of homework
- ☐ Postpone classroom tests or standardized testing
- ☐ Provide extended time to complete school work, homework, or take tests
- ☐ Provide written notes for school lessons and assignments (when possible)
- ☐ Allow for a quiet place to take rest breaks throughout the day
- ☐ Lessen the amount of screen time for the student, such as on computers, tablets, etc.
- ☐ Give ibuprofen or acetaminophen to help with headaches (as needed)
- ☐ Allow the student to wear sunglasses, earplugs, or headphones if bothered by light or noise
- ☐ Other: _____

Most children with a concussion feel better within a couple of weeks. However, for some, symptoms can last for a month or longer. **If there are any symptoms that concern you, or are getting worse, notify the student's parents that the student should be seen by a healthcare provider as soon as possible.**

► For information on helping students return to school safely after a concussion, visit www.cdc.gov/HEADSUP.

Healthcare Provider's Name (printed)

Healthcare Provider's Signature

Date

For additional questions, you may reach me at: _____



AT HOME			AT SCHOOL			
STAGE 1:	STAGE 2:		STAGE 3:	STAGE 4:	STAGE 5:	STAGE 6:
Physical & cognitive rest <ul style="list-style-type: none"> Basic board games, crafts, talk on phone, photography Physical activities that do not increase heart rate or break a sweat Avoid: <ul style="list-style-type: none"> Computer, TV, texting, video games, reading No: <ul style="list-style-type: none"> School work Sports Work Driving until cleared by a health care professional 	Start with light cognitive activity: Gradually increase cognitive activity up to 30 min. Prior activities plus: <ul style="list-style-type: none"> Reading, TV, drawing, Lego Limited peer contact and social networking Take frequent breaks Contact school to create return to learn plan.	When light cognitive activity is tolerated: Introduce school work. Prior activities plus: <ul style="list-style-type: none"> School work as per return to learn plan Communicate with school on student's progression.	Back to school part-time Part-time school with maximum accommodations. Prior activities plus: <ul style="list-style-type: none"> School work at school as per return to learn plan No: <ul style="list-style-type: none"> P.E. physical activity at lunch/recess homework testing sports assemblies field trips Communicate with school on student's progression.	Part-time school Increase school time with moderate accommodations. Prior activities plus: <ul style="list-style-type: none"> Increase time at school Decrease accommodations Homework – up to 30 min./day Classroom testing with adaptations No: <ul style="list-style-type: none"> P.E. physical activity at lunch/recess sports standardized testing Communicate with school on student's progression.	Full-time school Full days at school, minimal accommodations. Prior activities plus: <ul style="list-style-type: none"> Start to eliminate accommodations Increase homework to 60 min./day Limit routine testing to one test per day with adaptations No: <ul style="list-style-type: none"> P.E. physical activity at lunch/recess sports standardized testing 	Full-time school Full days at school, no learning accommodations. <ul style="list-style-type: none"> Attend all classes All homework Full extracurricular involvement All testing No: <ul style="list-style-type: none"> full participation in P.E. or sports until <i>Return to Play</i> protocol completed and written medical clearance provided
	No: <ul style="list-style-type: none"> School attendance Sports Work 			Increase school work, introduce homework, decrease learning accommodations	Work up to full days at school, minimal learning accommodations	Full academic load
Rest	Gradually add cognitive activity including school work at home		School work only at school			
When symptom-free for 24 hours, BEGIN STAGE 2	Tolerates 30 min. of cognitive activity, introduce school work at home	Tolerates 60 min. of school work in two 30 min. intervals, BEGIN STAGE 3	Tolerates 120 min. of cognitive activity in 30-45 min. intervals, BEGIN STAGE 4	Tolerates 240 min. of cognitive activity in 45-60 min. intervals, BEGIN STAGE 5	Tolerates school full-time with no learning accommodations BEGIN STAGE 6	Return to Learn protocol completed, focus on RETURN TO PLAY

Tolerate = no exacerbation of symptoms; symptoms may be present, but not getting worse

Adapted from the Return to Learn protocol by G.F. Strong School Program



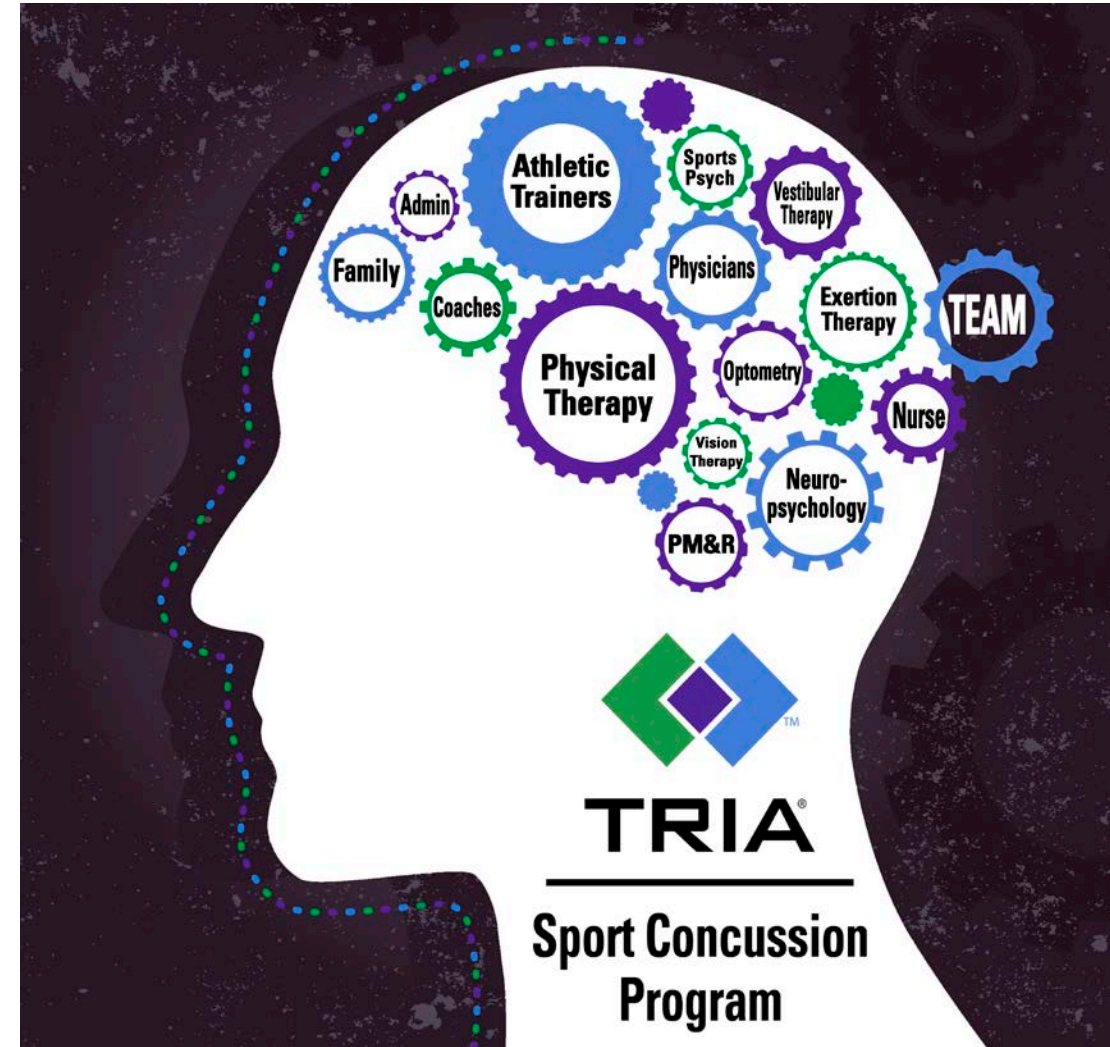
Barriers to Implementing RTL Protocols

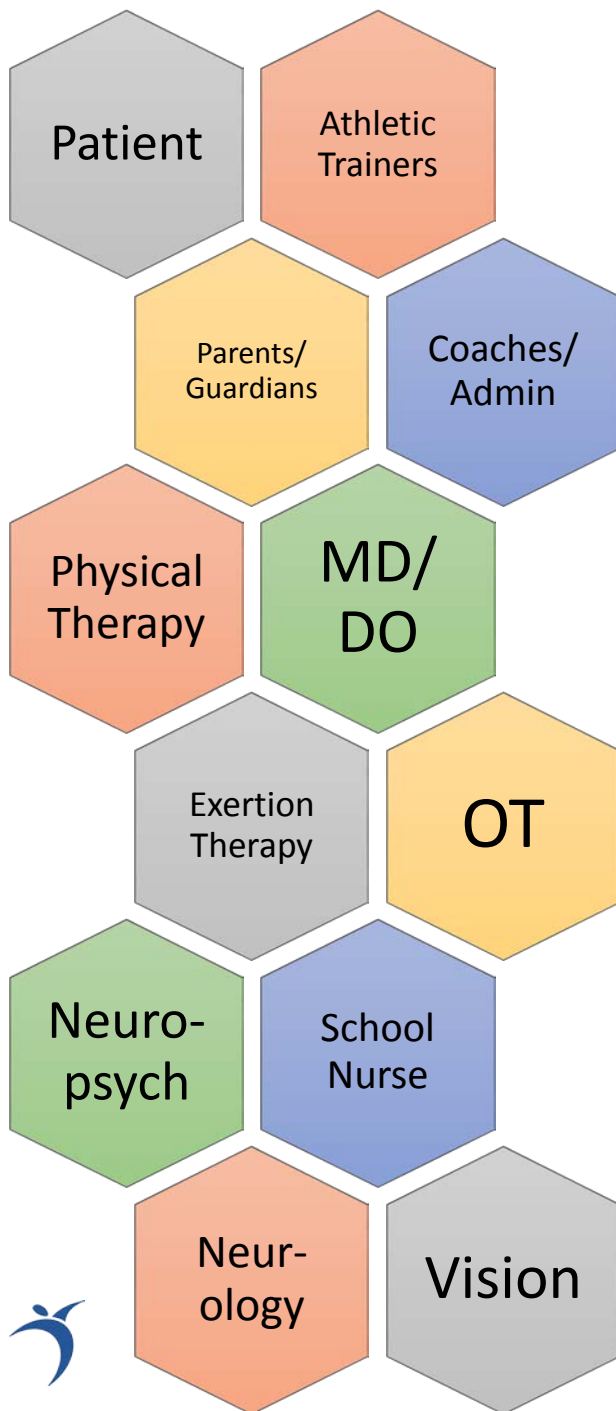
- Lack of time for 1-on-1 instruction needed for some accommodations; and
- Lack of awareness, education, and support for nurses, educators and counselors
 - School administration: “we don’t know what to do” (Lyons et al., *J School Health*, 2016)
- Lack of collaboration – only 50% of HS with an AT had a professional relationship with their nurse (Valovich McLeod, *JAT*, 2017)
- As of 2017, only 13 states have specifics within their concussion law/legislation regarding return to school or learn (Thompson, 2016; The Policy Surveillance Program A Lawatlas Project <http://lawatlas.5.org/datasets/sc-reboot>)
 - Most place responsibility on the school
 - Lack of required education of school personnel
 - No guidance of managing of students with prolong/persistent symptoms



A Team Approach: Who is Involved?

- “No one profession owns concussion!”
 - Dr. Stan Herring
- Personnel will vary depending on setting
 - Elementary and Middle Schools
 - High Schools
 - College/Universities
 - Athlete vs non-athlete

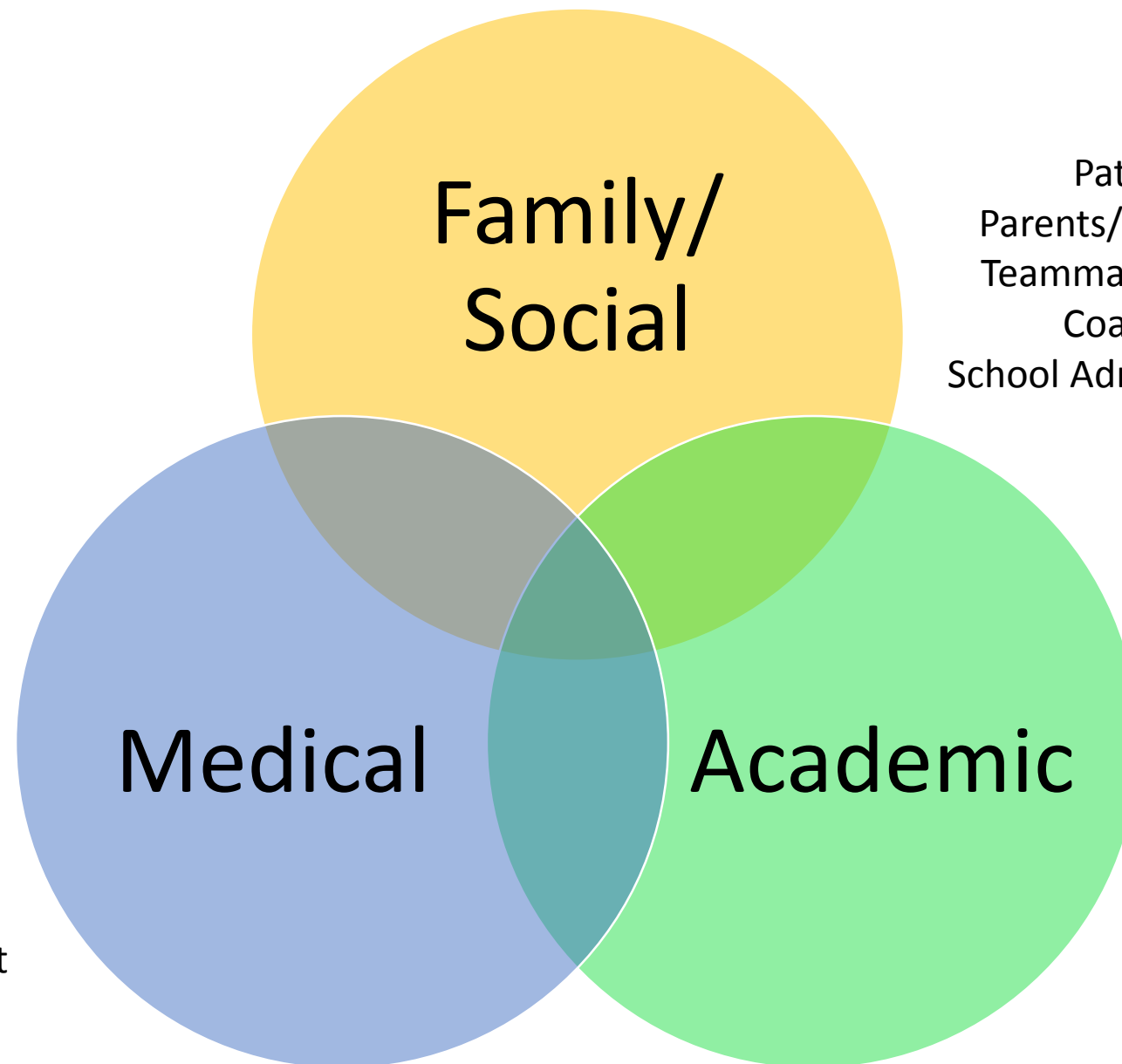




Framework for
collaborative
practice ensuring
that health care is...

Safe
Timely
Effective
Efficient
Equitable
Patient-centered





Patient
Parents/guardians
Teammates/peers
Coaches
School Administrators

Athletic Trainer
Physician
Neuropsychologist
Behavioral Optometrist
Physical Therapists
Occupational Therapist
RN/NP
Psychologist/Psychiatrist
Speech Language Pathologist

Athletic Trainer
School Nurse
Teachers / Professors
School Administrators
School Counselors
Social Workers
Disability Services
Academic Dean



Opportunities to Impact Return to Learn

Preseason/
before school
year



Role of the AT in Return to Learn Team

Examining Academic Support After Concussion for the Adolescent Student-Athlete: Perspectives of the Athletic Trainer

Tricia Kasamatsu, PhD, ATC*; Michelle Cleary, PhD, ATC†; Jason Bennett, DA, ATC†; Keith Howard, PhD†; Tamara Valovich McLeod, PhD, ATC, FNATA‡

*California State University, Fullerton; †Chapman University, Orange, CA; ‡A.T. Still University, Mesa, AZ

Remarkable Findings:

- ***< 50% reported RTL policy***
- ***Most recommend adjustments***
- ***73.7% of ATs identify as “point person”***
- ***Organizational structure matters***



Role of the AT in Return to Learn Team

Return to Learn After Sport-Related Concussion: A Survey of Secondary School and Collegiate Athletic Trainers

Chelsea L. Williamson, MEd, ATC*; Grant E. Norte, PhD, ATC, CSCST†;
Donna K. Broshek, PhD‡; Joseph M. Hart, PhD, ATC, FNATA, FACSM*;
Jacob E. Resch, PhD, ATC*

Remarkable Findings:


- ***76.8% agreed that managing RTL was AT responsibility***
- ***84.6% addressed academic adjustments after concussion***



Role of the AT in Return to Learn Team

School Nurses' Management and Collaborative Practices for Student-Athletes Following Sport-Related Concussion

**Michelle L. Weber, MS, ATC¹, Cailee E. Welch Bacon, PhD, ATC²,
and Tamara Valovich McLeod, PhD, ATC, FNATA²**

The Journal of School Nursing
1-10
© The Author(s) 2018
Reprints and permission:
sagepub.com/journalsPermissions.nav
DOI: 10.1177/1059840518774391
journals.sagepub.com/home/jsn


Remarkable Findings:

- ***Secondary schools with nurses and ATs more frequently conducted baseline and post-injury concussion assessment***
- ***Most frequently reports collaborative relationship was with ATs***



Role of the AT in Return to Learn Team

School nurses' perceptions and experiences with an interprofessional concussion management team in the secondary school setting

Cailee E. Welch Bacon, Casey D. Erickson, Melissa C. Kay, Michelle L. Weber & Tamara C. Valovich McLeod

Remarkable Findings:

- ***ATs primarily communicate with nurse***
- ***Scheduling is a barrier to communication with other school professionals***



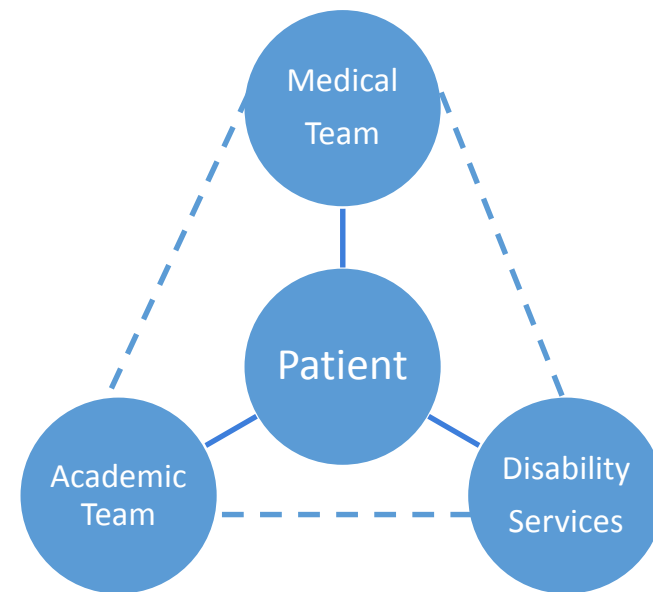
Where to Begin in the Collegiate Setting

- NCAA Policy:

- Point person to navigate RTL
- Compliance with ADAAA
- No classroom activity on same day
- Individualized plan
- Modified schedule for up to two weeks, as indicated
- Engage campus resources
- Re-evaluation by physician as needed

- Individual School policies:

- Consider contextual factors of college/university
- Communication/Collaboration



Academic Integrity

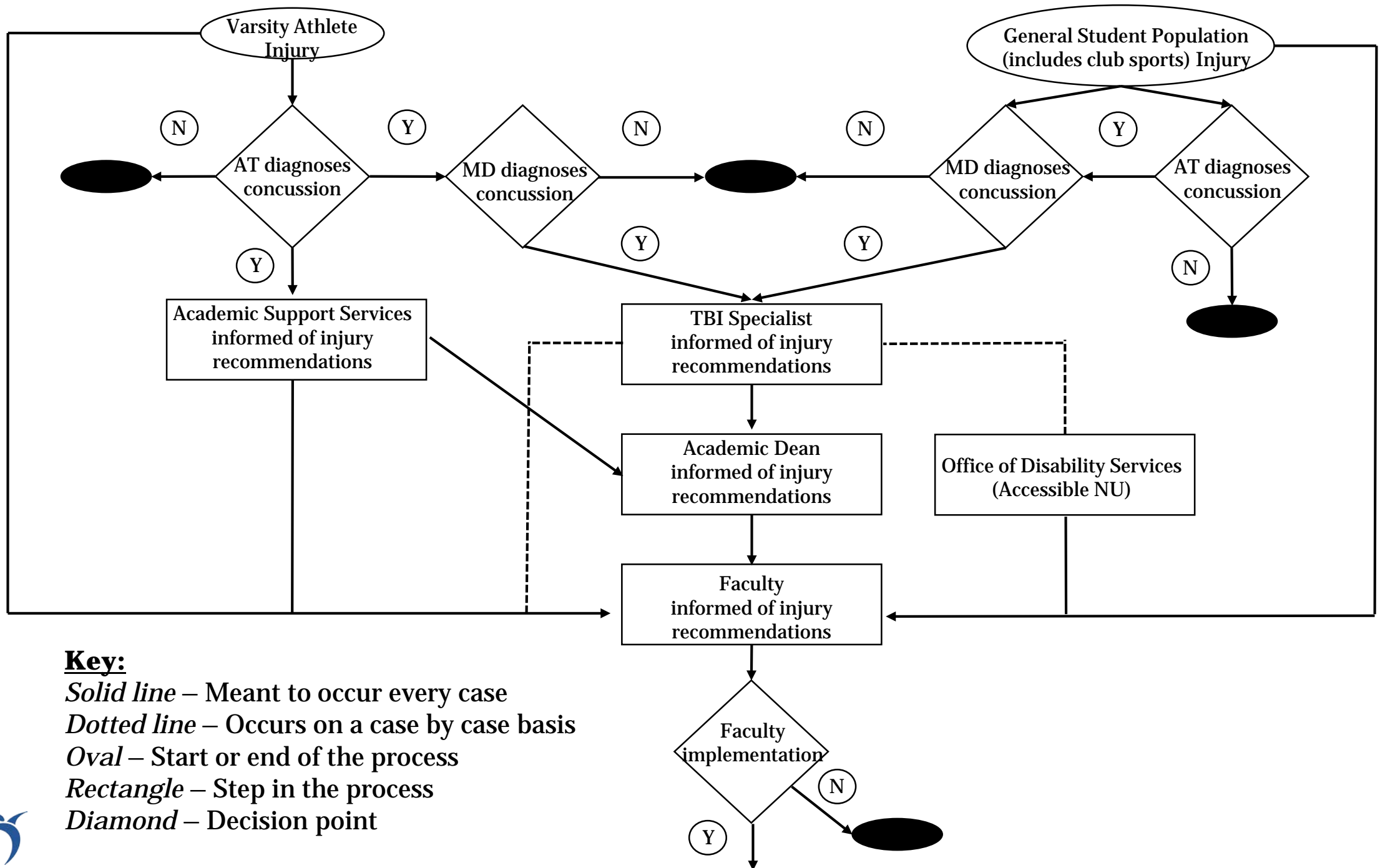


<https://humanservices.arkansas.gov/resources/dhs-integrity>

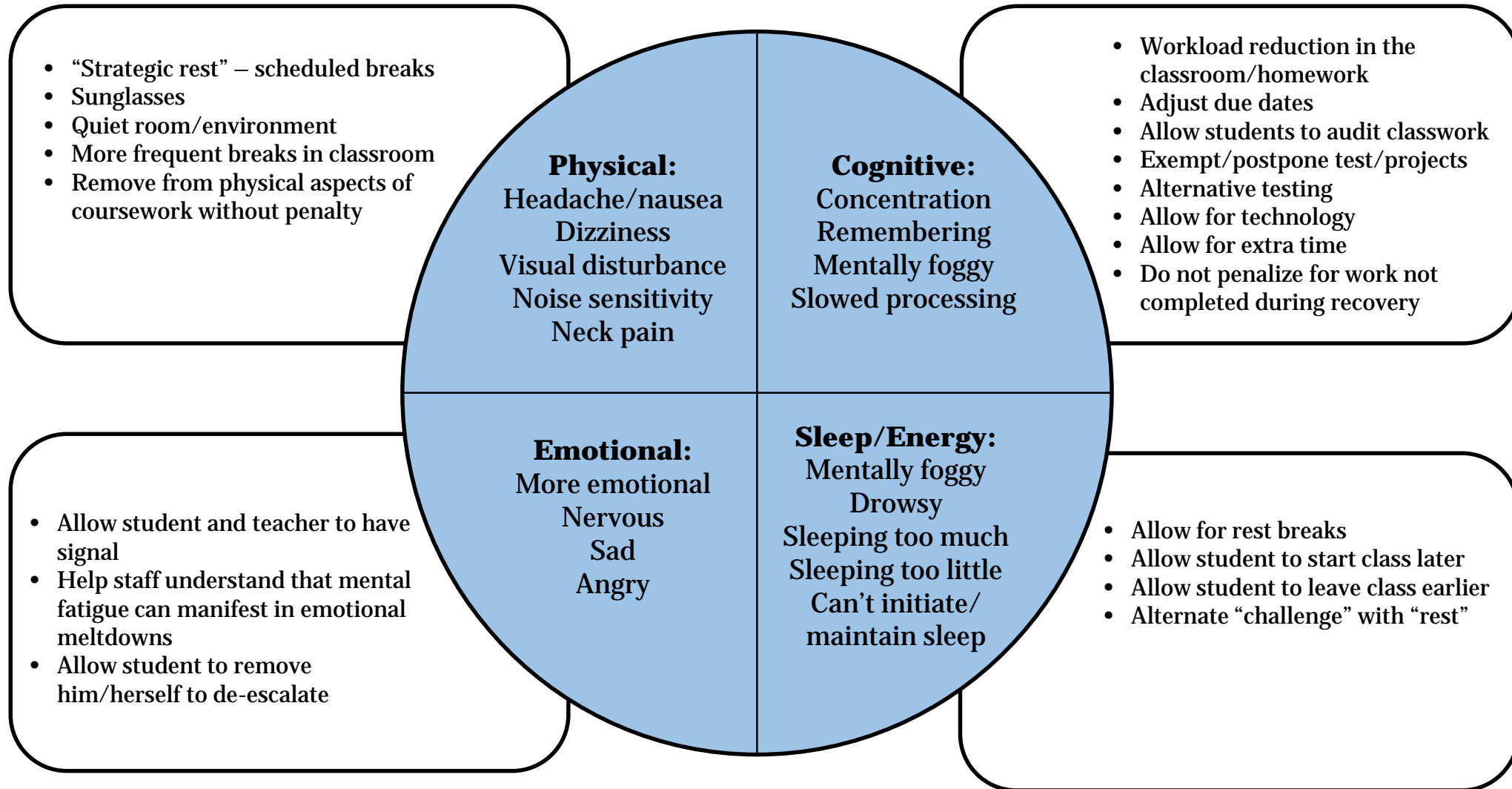
- Moral code or ethical policy of academia
 - Avoidance of cheating or plagiarism
 - Maintenance of academic standards
 - Honesty or rigor in research
 - Academic publishing

https://en.wikipedia.org/wiki/Academic_integrity

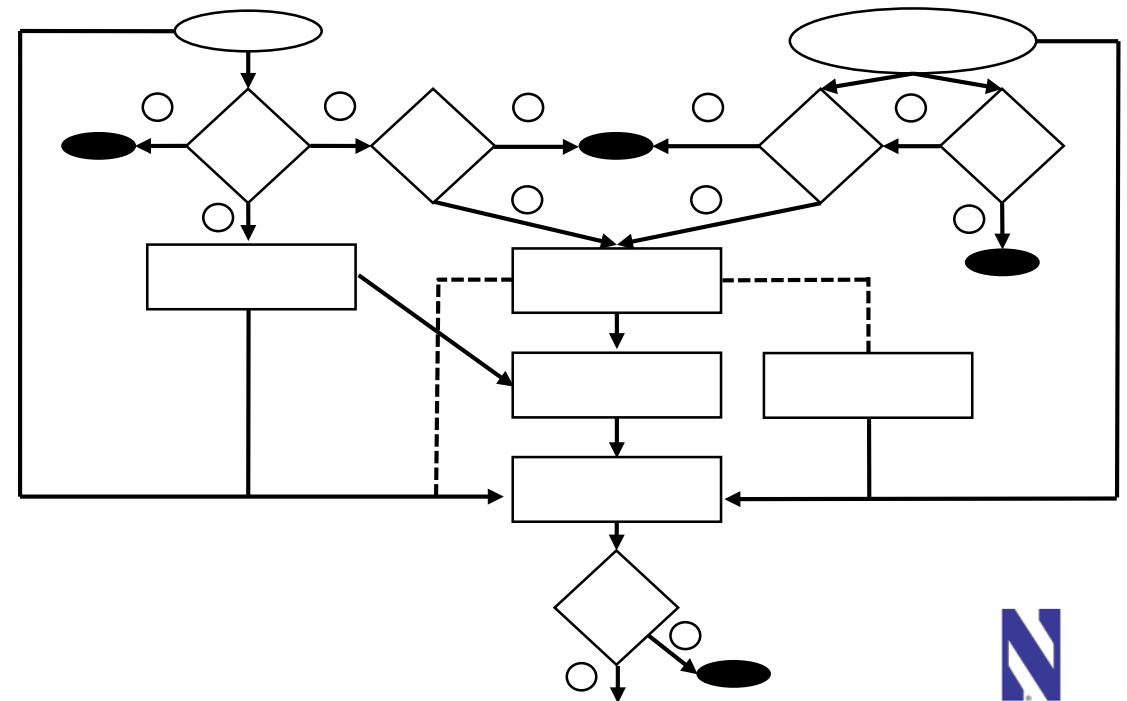




Symptom Wheel



- 



Sleep Hygiene

Sleep and Concussion

- Concussion disrupts sleep patterns acutely
 - Raikes and Schaefer 2016
- Self reported sleep disturbance affects concussion recovery
 - Kostyun et al. 2014
- 3-4 fold increase in recovery time
 - Bramley et al. 2017

Recommendations - CDC

- Be consistent
- Be mindful of the environment
- Limit screen time before bed
- Nutritional considerations
- Physical activity
- Total sleep time
 - Person and age dependent recommendations

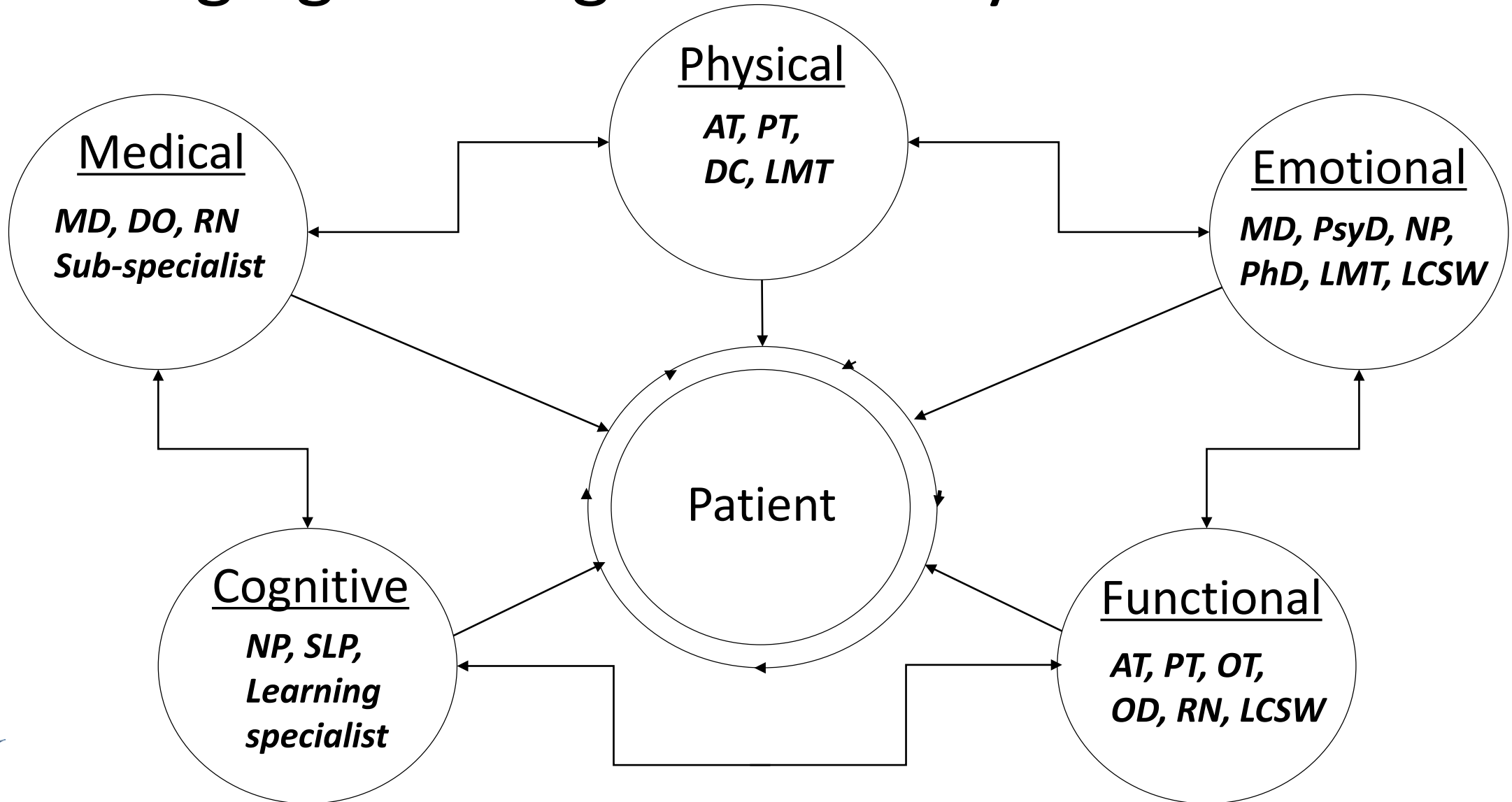


Other Considerations

- Behavioral health
 - Prior history vs new concerns
 - Keep consistent schedule
 - Communication
- Nutrition
 - Fueling needs – do not restrict
 - Increase Omega-3s (EPA and DHA)
 - Hydration
 - If nauseous – BRAT diet
- Physical activity
 - Symptom limited



Managing Prolonged Recovery



Case Example

- 18 y/o female college student
- Mechanism: Hit forehead on pipe
- Relevant history
 - 3 prior concussions (4-6 week recovery)
 - Migraine headache – 1/month
- Initial exam – remarkable findings
 - Primary symptoms – somatic and cognitive
 - Near point convergence 19.7cm (increase headache)
 - Normal cervical spine exam
- Plan – symptom limited physical and cognitive rest
 - Release of information signed (academic communication)



Case Example

- Rehabilitation evaluation – 12 days following injury
- Same symptom profile, but decreased
- Dizziness handicap inventory score = 20

	Headache	Dizziness	Nausea	Fogginess	Objective
Baseline	3	4	2	5	
Smooth Pursuit	4	4	2	5	
Saccades (Horizontal)	3	5	2	5	
Saccades (Vertical)	3	5	2	6	
Convergence (Near Point)	3	5	3	5	14.7 cm
VOR (Horizontal)	4	6	2	5	
VOR (Vertical)	3	6	2	5	
Visual Motion Sensitivity	4	7	2	6	



Case Example

- Follow 1 month of rehab – 5 total visits plus home exercise program
- Still has headache and cognitive symptoms, no dizziness
- Dizziness handicap inventory score = 0

	Headache	Dizziness	Nausea	Fogginess	Objective
Baseline	4	0	0	4	
Smooth Pursuit	4	0	0	4	
Saccades (Horizontal)	4	0	0	4	
Saccades (Vertical)	4	0	0	4	
Convergence (Near Point)	4	0	0	4	< 6 cm
VOR (Horizontal)	4	0	0	4	
VOR (Vertical)	4	0	0	4	
Visual Motion Sensitivity	4	0	0	4	



Case Example

- Referral to Neurology and Speech Language Pathology
- Neurology referral
 - Migraine versus cervicogenic headache
 - Cognitive symptoms likely due to pain and sleep dysregulation
 - NSAIDs and muscle relaxer
 - Neck exercises
- Speech Language Pathology
 - No records shared
 - Patient saw SLP weekly for rest of quarter
- Patient lost to follow-up



Where to Begin in the Elementary, Middle, and Secondary Schools

Medical Team

- Look into current policies
 - District, state, conference
- Identify recourses are available in your school & establish relationships
- Find community referral resources
 - Multidisciplinary concussion team
- Establish acute academic accommodations forms
- Work with academic team to create RTL protocol
 - Point person
 - Chain of communication

Academic Team

- Educate teachers and support staff on concussions and their effects on academics
- Set up classroom strategies for different academic accommodations
- Work with medical team to create RTL protocol
- Administration to help reinforce protocol
- Provide feedback to medical team
- Review cases and adjust as needed



Case Example 2

- 15 y/o high school (9th grade) male hockey student athlete
- DOI 4/26/18 – Checked into boards by unexpected hit, forcing head to hit glass; no LOC, amnesia or disorientation
 - Immediately removed by AT on site; SCAT5 performed, diagnosed concussion
- Relevant biopsychosocial history:
 - 1 previously diagnosed concussion 2 years ago (MOI hockey); full recovery in approximately 3-4 weeks; so residual symptoms
 - History of motion sickness
 - Diagnosed ADHD (13 y/o); Takes adderall XR 10 mg daily; may take 10 mg instant release in afternoon prn (often does on days of hockey games)
 - IEP on file with school for extended time on testing



Case Example 2

- Injury occurred on a Thursday night:
 - Patient and parent provided concussion education and recommendations for treatment
- School excuse for Friday given by AT and email to nurse/counselor – No school
- Letter to school (CDC checklist) given to provide universal adjustments upon return to school, prior to f/u evaluation and recommendations at school Monday
- AT evaluation after school (4/30/18):
 - High symptom burden (PCSS 43/132 severity)
 - Dizziness, sensitivity to busy environments/noises, photosensitive, mild nausea, low grade HA, and mental foginess; Prolonged exposure leads to increased HA, nausea, and foginess
 - VOMS – Provocative pursuits, VOR, and VMST, NPC < 6 cm
 - Was unable to complete school day, spent final two periods in nurses office



Case Example 3

- Academic Accommodations:

- Attendance – Full days as tolerated; using a schedule that emphasizes core classes only, while taking breaks in study hall or nurses office for electives; Screen Use – Minimize computer use to tolerance; print notes, allow preferential seating for viewing smartboards
- Tests – No computer testing, extend time for testing (consistent with IEP), test across multiple sessions, provide cue cards or notes as indicated, no more than 2 tests in 1 day
- Breaks – 10-15 minutes as needed throughout day; allow student to leave class 5 minutes early to avoid busy hallways; may eat lunch in quiet room with 1-2 friends; take scheduled breaks early in day even if symptoms are not elevated; may put head down if dizzy in class
- Others: No gym participation at this time, no band class, may take ADHD medication as prescribed, behavioral management emphasis; complete social activities as tolerated

- Enrolled in aerobic activity progression with AT and vestibular therapy with PT to r/o of peripheral and cervicogenic dizziness and being treatment of specific central vestibular dysfunction



Case Example 3

- 18 days s/p DOI
 - Patient making typical recovery; symptoms resolved, completing stepwise RTP
- Academic Accommodations:
 - Attendance – Full days; allow for scheduled make up work in each course, excuse all non-essential projects
 - Tests – Extend time; allow scheduled make up exams to be completed over 2-3 week period as arranged with teachers
 - Breaks – 10-15 minutes as needed throughout day
 - Others – PE - may participate in non-risk/non-contact activity congruent with step 4 of the stepwise RTP provided as guided by AT including cardiovascular fitness, strength and conditioning, and individual sports (swimming, tennis, badminton ok), no high risk team sports in gym until cleared for full return to sport; Band – Full band practice, may take breaks as needed



Conclusion – Take Home Points

- Dysfunction and symptoms after concussion are treatable.
- Every patient experiences concussion differently.
- Education is treatment.
- Return to school with proactive individualized adjustments/accommodations will result in best prognosis for patient
- Factors to be considered on return to school following concussion:
 1. Symptomology
 - Severity, type, duration
 2. Age/school level
 3. Course load
 4. Rest following injury



Thank you!

Questions...?

Justin Tatman, MA, LAT, ATC

Coordinator, Athletic Trainer
Sport Concussion Program
TRIA Orthopedic Center
Minneapolis, MN



Brian Vesci, DAT, ATC

Traumatic Brain Injury Specialist
Health Service
Northwestern University
Chicago, IL



Works Cited:

- Baker JG, Leddy JJ, Darling SR, et al. Factors Associated With Problems for Adolescents Returning to the Classroom After Sport-Related Concussion. *Clinical Pediatrics*. 2015;54(10):961-968. doi:10.1177/0009922815588820.
- Brown NJ, Mannix RC, O'Brein MJ, Gostine D, Collins MW, Meehan WP. Effect of Cognitive Activity Level on Duration of Post-Concussion Symptoms. *Pediatrics*. 2014;133(2). doi:10.1542/peds.2013-2125d.
- Collins MW, Kontos AP, Reynolds E, Murawski CD, Fu FH. A comprehensive, targeted approach to the clinical care of athletes following sport-related concussion. *Knee Surgery, Sports Traumatology, Arthroscopy*. 2013;22(2):235-246. doi:10.1007/s00167-013-2791-6.
- Collins MW, Kontos AP, Okonkwo DO, et al. Statements of Agreement From the Targeted Evaluation and Active Management (TEAM) Approaches to Treating Concussion Meeting Held in Pittsburgh, October 15-16, 2015. *Neurosurgery*. 2016;79(6):912-929.
- Ellis MJ, Cordingley D, Vis S, Reimer K, Leiter J, Russell K. Vestibulo-ocular dysfunction in pediatric sports-related concussion. *Journal of Neurosurgery: Pediatrics*. 2015;16(3):248-255. doi:10.3171/2015.1.peds14524.
- Halstead ME, Mcavoy K, Devore CD, Carl R, Lee M, Logan K. Returning to Learning Following a Concussion. *Pediatrics*. 2013;132(5):948-957. doi:10.1542/peds.2013-2867.
- ImPACT Applications, Inc., September 2013. [Webinar]
- Kasamatsu T, Cleary M, Bennett J, Howard K, McLeod TV. Examining Academic Support After Concussion for the Adolescent Student-Athlete: Perspectives of the Athletic Trainer. *J Athl Train*. 2016 Feb;51(2):153-61. doi: 10.4085/1062-6050-51.4.02. Epub 2016 Mar 4.



Works Cited:

- Lyons VH, Moore M, Guiney R, et al. Strategies to Address Unmet Needs and Facilitate Return to Learn Guideline Adoption Following Concussion. *Journal of School Health*. 2017;87(6):416-426. doi:10.1111/josh.12510.
- Master CL, Scheiman M, Gallaway M, et al. Vision Diagnoses Are Common After Concussion in Adolescents. *Clinical Pediatrics*. 2015;55(3):260-267. doi:10.1177/0009922815594367.
- McAvoy K. The REAP Project. REAP The Benefits of Good Concussion Management. http://concussiontreatment.com/images/REAP_Program.pdf. Published 2011. Accessed October 1, 2018.
- McCrory P, Meeuwisse W, Dvorak J, et al. Consensus statement on concussion in sport—the 5th international conference on concussion in sport held in Berlin, October 2016 *British Journal of Sports Medicine*. Published Online First: 26 April 2017. doi: 10.1136/bjsports-2017-097699
- Moser RS, Schatz P, Jordan BD. Prolonged effects of concussion in high school athletes. *Neurosurgery*. 2005 Aug;57(2):300-6; discussion 300-6.
- Moser RS, Glatts C, Schatz P. Efficacy of immediate and delayed cognitive and physical rest for treatment of sports-related concussion. *J Pediatr*. 2012; 161 5: 922– 926.
- Mucha A, Collins Moser RS, Glatts C, Schatz P. Efficacy of immediate and delayed cognitive and physical rest for treatment of sports-related concussion. *J Pediatr*. 2012; 161 5: 922– 926. MW, Elbin R, et al. A Brief Vestibular/Ocular Motor Screening (VOMS) Assessment to Evaluate Concussions. *The American Journal of Sports Medicine*. 2014;42(10):2479-2486. doi:10.1177/0363546514543775.



Works Cited:

- Nebraska Sports Concussion Network. Accessed on 10/1/2018. <http://www.nebsportsconcussion.org/resources.html>; <http://www.nebsportsconcussion.org/images/pdfs/return%20to%20learn.pdf>
- Nelson LD, Guskiewicz KM, Marshall SW, et al. Multiple Self-Reported Concussions Are More Prevalent in Athletes With ADHD and Learning Disability. *Clin J Sport Med*. 2015
- Pearce KL, Sufrinko A, Lau BC, Henry L, Collins MW, Kontos AP. Near Point of Convergence After a Sport-Related Concussion. *The American Journal of Sports Medicine*. 2015;43(12):3055-3061. doi:10.1177/0363546515606430.
- Purcell LK, Davis GA, Gioia GA. What factors must be considered in 'return to school' following concussion and what strategies or accommodations should be followed? A systematic review. *British Journal of Sports Medicine*. February 2018. doi:10.1136/bjsports-2017-097853.
- Ransom DM, Vaughan CG, Pratson L, Sady MD, McGill CA, Gioia GA. Academic effects of concussion in children and adolescents. *Pediatrics*. 2015;135:1043–1050
- Return to Learn protocol by G.F Strong School Program (Vancouver School Board), Adolescent and Young Adult Program, G.F. Strong Rehabilitation Center. Found in Concussion Management: A Toolkit for Physiotherapists; https://www.physiotherapyalberta.ca/files/concussion_toolkit.pdf
- Russell K, Hutchison MG, Selci E, Leiter J, Chateau D, Ellis MJ. Academic Outcomes in High-School Students after a Concussion: A Retrospective Population-Based Analysis. *PLoS One*. 2016;11(10):e0165116. Published 2016 Oct 20.
- Silverberg ND, Iverson GL, McCrea M, et al. Activity-related symptom exacerbations after pediatric concussion. *JAMA Pediatr* 2016;170:946–53.



Works Cited:

- Silverberg ND, Iverson GL, McCrea M, et al. Activity-related symptom exacerbations after pediatric concussion. *JAMA Pediatr* 2016;170:946–53.
- Swanson MW, Weise KK, Dreer LE, et al. Academic Difficulty and Vision Symptoms in Children with Concussion. *Optometry and Vision Science*. 2017;94(1):60-67. doi:10.1097/OPX.0000000000000977.
- Thomas DA, Apps JN, Hoffmann RG, et al. Benefits of Strict Rest After Acute Concussion: A Randomized Controlled Trial. *Pediatrics*. 2015;135(2). doi:10.1542/peds.2014-0966d.
- Thompson LL, Lyons VH, McCart M, Herring SA, Rivara FP, Vavilala MS. Variations in State Laws Governing School Reintegration Following Concussion. *Pediatrics*. 2016;138(6). doi:10.1542/peds.2016-2151.
- Valovich McLeod TC, Lewis JH, Whelihan K, Bacon CEW. Rest and Return to Activity After Sport-Related Concussion: A Systematic Review of the Literature. *Journal of Athletic Training*. 2017;52(3):262-287. doi:10.4085/1052-6050-51.6.06.
- Williams RM, Puetz TW, Giza CC, Broglio SP. Concussion recovery time among high school and collegiate athletes: a systematic review and meta-analysis. *Sports Med*. 2015;45(6):893-903.
- Wasseman EB, Bazarian JJ, Mapstone M, Block R, van Wijngaarden E. Academic Dysfunction After a Concussion Among US High School and College Students. *American Journal of Public Health*. 2016;106(7):1247-1253. doi:10.2105/AJPH.2016.303154.

