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Increasing access of outpatient therapeutic services for adolescents with persistent symptoms after sport-related traumatic brain injury

Evergreen Family Health

Natalie J. Bales

R6 Family Medicine Rotation

January 2023

Mentors: Katrina Ducis M.D. & Paul Reiss M.D.



Problem Identification and Need

AHEC Focus Area: **Medical Practice Transformation**

- **Post-concussion syndrome (PCS)** is persistent symptoms such as headache, dizziness, insomnia, fatigue, irritability, inattention, or difficulty with word retrieval for at least 21 days after a diagnosed concussion, occurring in about 15-20% of individuals.
- Many assessment tools for use at initial evaluation (figure 1), however **there are clear gaps in instructions for follow-up care and issues with accessibility**

ATHLETE INFORMATION

Any athlete suspected of having a concussion should be removed from play, and then seek medical evaluation.

Signs to watch for

Problems could arise over the first 24–48 hours. The athlete should not be left alone and must go to a hospital at once if they

- Have a headache that gets worse
- Are very drowsy or can't be awakened
- Can't recognize people or places
- Have repeated vomiting
- Behave unusually or seem confused; are very irritable
- Have seizures (arms and legs jerk uncontrollably)
- Have weak or numb arms or legs
- Are unsteady on their feet; have slurred speech

Remember, it is better to be safe.

Consult your doctor after a suspected concussion.

Return to play

Athletes should not be returned to play the same day of injury. When returning athletes to play, they should be **medically cleared and then follow a stepwise supervised program**, with stages of progression.

For example:

Rehabilitation stage	Functional exercise at each stage	Objective of each stage
No activity	Physical and cognitive rest	Recovery
Light aerobic exercise	Walking, swimming or stationary cycling keeping intensity to % maximum predicted heart rate. No resistance training	Increase heart rate
Sport-specific exercise	Skating drills in ice hockey, running drills in soccer. No head impact activities	Add movement
Non-contact training drills	Progression to more complex training drills, eg passing drills in football and ice hockey. May start progressive resistance training	Exercise, coordination, and cognitive load
Full contact practice	Following medical clearance participate in normal training activities	Restore confidence and assess functional skills by coaching staff
Return to play	Normal game play	

There should be at least 24 hours (or longer) for each stage and if symptoms recur the athlete should rest until they resolve once again and then resume the program at the previous asymptomatic stage. Resistance training should only be added in the later stages.

If the athlete is symptomatic for more than 10 days, then consultation by a medical practitioner who is expert in the management of concussion, is recommended.

Scoring Summary:

Test Domain	Score		
	Date: _____	Date: _____	Date: _____
Number of Symptoms of 22			
Symptom Severity Score of 132			
Orientation of 5			
Immediate Memory of 15			
Concentration of 5			
Delayed Recall of 5			
	SAC Total		
BESS (total errors)			
Tandem Gait (seconds)			
Coordination of 1			

Notes:

Figure 1: Example of standardized tool for acute evaluation of athletes 13-years or older who suffered a concussion with vague instructions for the post-concussion period

Public Health Cost

- A retrospective study showing cost of care for initial evaluation of a concussed football player to be \$800.10 per concussion (Yengo-Khan, 2020)
- The rate of TBI-related Hospitalizations & ED Visits in Vermont Residents at Vermont Hospitals increased from 544.0 per 100,000 people in 2005 to 788.3 per 100,000 people in 2014 (Barnard, 2017)
- Not addressing post-concussion syndrome places higher burden on the overall workforce: a recent study found that most patients without PCS returned to work within 6 months (84.2%), while only half of patients (50.5%) with PCS were able to return to work within 6 months (van der Vlegel, 2021)

Community Perspective

- Kyle Peckham, MS, MBA, ATC - Head Athletic Trainer at Rice Memorial High School
 - About 15-25% of injuries are TBI-related, but “no concussion is the same”
 - Use SCAT5 initially at sideline for concussion concerns, but retest reliability is poor
 - Athletes will do light aerobic activity within 48 hours of injury, emerging literature shows that this is better than rest for mental health and shortens return to play time.
 - Athletes with persistent symptoms are typically referred to PT and/or their PCP
 - Biggest concern is issues with accessibility to therapeutic services and long wait times
 - They have an athletic trainer hotline already in place that similar to this intervention and is used for orthopedic injuries
 - He agrees that an intervention such as this one would be great to have

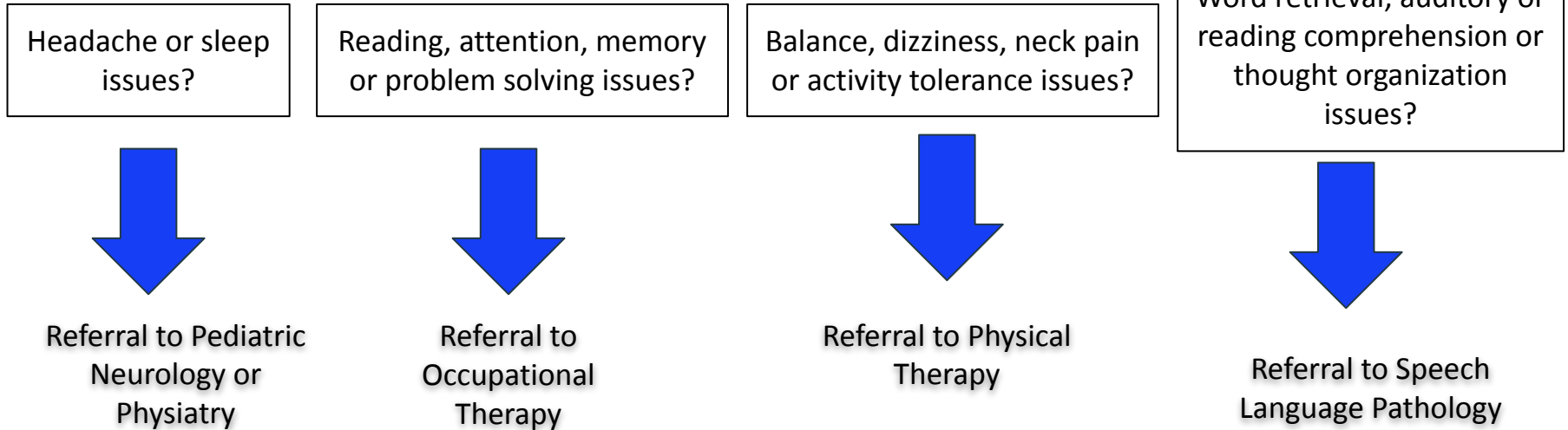
Clinic Perspective

- Presented this idea to Dr. Paul Reiss and the Evergreen Sports Medicine Team
 - Discussed recent push to move towards thinking of each persistent symptom after a concussion as a separate entity and referring patients to seek therapeutic services that will address those specific symptoms rather than globalizing all symptoms as “post-concussion syndrome”
 - This hotline would be helpful for Family Medicine Physicians without adjacent Sports Medicine departments or for practitioners who are unsure of who to refer to
 - They agree this would help with accessibility to therapeutic services
 - Shared hotline number with the group and they will keep it in mind as needed

Intervention & Methodology

Hotline staffed by nurse who uses this visual aid depicting user-friendly directions for referral suggestions based on post-concussion symptoms that appear after discharge:

802-847-4590: What symptoms are present?



Results/Response

- A feasible model to simplify follow-up care for adolescents with persistent concussion symptoms
- Addresses issue of accessibility and timeliness to referrals
- Since implementation by Dr. Katrina Ducis and RN Ruth Foerster, 44 patients have utilized this model
 - Quantitative data will be collected via retrospective review of these patient charts looking at total symptomatic days, improvement of return to normal times, number of providers/services referred to, duration of therapeutic services used

Evaluation of Effectiveness & Limitations

- Continue to track patients who utilize this model
- Could potentially interview patients/families who have used this model
- Limitations: patient's access to phone, insurance coverage if therapy is needed, symptoms underreported or misunderstood, potential long wait times at therapeutic service, transportation to services

Recommendations for Future Interventions/Projects

- Collaborate with PT360, a locally owned physical therapy group that offers a research-based program specifically designed for post-concussion syndrome in Chittenden County
- Add numbers of local PT/OT/SLP who would accept these referrals
- Relation of seasonality to number of concussions occurring in the population
 - Severity of concussion dependent on time they occur
- Add visual aid to “Concussion Toolkit” sponsored by Brain Injury Alliance:
<https://biavt.org/wp-content/uploads/2020/09/ConcussionToolkit09.26.2019.pdf>

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