

Promotion of Recovery Following
Concussion and Psychosocial
Treatment of Post-Concussive
Syndrome in Children

Amery Treble-Barna, PhD
Postdoctoral Fellow at Cincinnati Children's Hospital Medical Center
Thomas Sullivan, PhD, ABPP-CN
Neuropsychologist & Founder of the Bengals' Concussion
Management Program

Objectives

1. Define concussion and the post-concussive syndrome
2. Discuss the promotion of recovery following concussion in adults and children
3. Provide an overview of the psychosocial treatment of post-concussive syndrome in children

Concussion Definition

- Concussion (also called mild traumatic brain injury): **disrupted brain functioning** from any force to the head as evidenced by altered or lost consciousness that is short in duration
- The majority of individuals who sustain a mild TBI appear normal on clinical neuroimaging (i.e., CT and structural MRI)

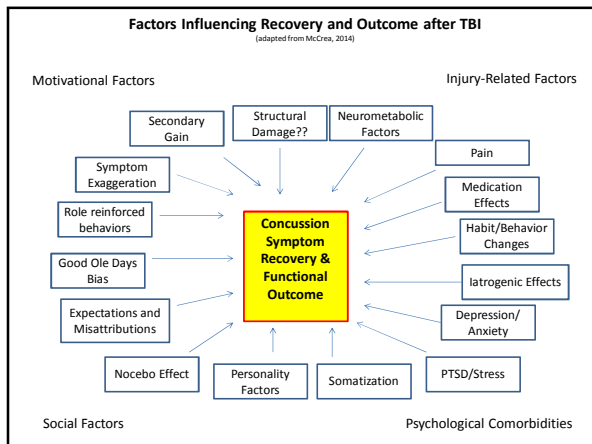
Post-Concussive Symptoms

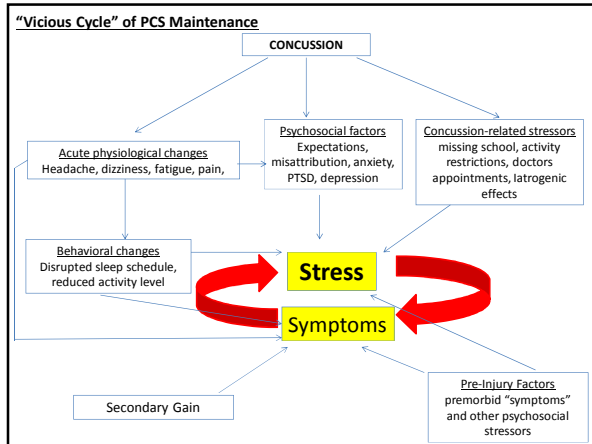
- Cognitive symptoms
 - Inattention, memory problems, difficulties thinking
- Somatic symptoms
 - Sleep problems, headache, dizziness, photophobia, phonophobia, vision changes
- Emotional symptoms
 - Irritability, sadness, anhedonia, anxiety, personality changes

Most individuals exhibit a resolution of symptoms within a matter of weeks following the injury

Post-Concussive Syndrome (PCS)

- Constellation of physical, cognitive, and emotional symptoms that persist in a small percentage of individuals
- Research suggests that PCS symptoms are not unique to concussion and are frequently reported in other medical conditions, such as chronic pain, depression, and anxiety
- The cause of PCS is a topic of debate
- “Psychogenesis”: PCS reflect premonitory differences, psychological factors, or malingering
- “Physiogenesis”: cite evidence from animal models and human studies showing acute neuropathology related to mild TBI





Post-concussive symptoms are generally:
 More likely after concussions caused by assault
 More likely after motor vehicle accident

Correlated with Posttraumatic stress disorder
 Correlated with general level of anxiety
 Correlated with level of depression
 More depression and anxiety = more PCS
 Correlated with poor social support

Question:

What is the most efficient way of fostering depression, anxiety, and a decline in social support among teenagers?

Being locked in a dark room for 30 days with no friend, no electronics and no school work!

“The best available evidence suggests that complete rest exceeding 3 days is probably not helpful, gradual resumption of preinjury activities should begin as soon as tolerated (with the exception of activities that have a high MTBI exposure risk), and supervised exercise may benefit patients with persistent symptoms.”

Silverberg, N. D., & Iverson, G. L. (2013). Is rest after concussion" the best medicine?": recommendations for activity resumption following concussion in athletes, civilians, and military service members. *The Journal of head trauma rehabilitation*, 28(4), 250-259.

Prospective Study

- British Journal of Medicine
- Subjects assigned at random
 - ½ no bed rest
 - ½ six day full bed rest
- Difference at 2 weeks
 - People with rest report fewer symptoms
- No difference at 6 months
- Methodological problems
 - No non-TBI control group
 - Over-focus on ubiquitous symptoms

Key points:

“The best available evidence suggests that complete rest exceeding 3 days is probably not helpful, gradual resumption of preinjury activities ...

Gradual

Evidence suggests that recommendations of prolonged cognitive or physical rest after concussions, although well-intentioned, are harmful.

Bengals Program

- Third concussion management program in NFL
- 1998 – present
- All players evaluated when joining team
- Serial post-injury evaluations
- Players have a personal relationship with Dr.
- Concussion symptoms are normalized
- Graduated RTP after symptom-free

Bengals Evaluations

- 30-minute evaluation
- Dual components: somatic and cognitive
- Both must be cleared before return to activity
- Somatic and cognitive generally clear together
- Similar program used in NHL
- Highlights difficulties with computerized system.
- Independent neurologists involved last 5 years+/-

Nationwide Children’s Hospital Concussion Symptom Treatment

- Developed by Kelly McNally, PhD
- An example of a psychosocial treatment for children with PCS
- Initial data suggests that treatment is effective for reducing symptoms and increasing daily functioning

Nationwide Children’s Hospital
Concussion Symptom Treatment

- Limited evidence-based guidelines for treatment of children with prolonged PCS
- Although few randomized controlled studies, can look to general psychotherapy literature and adult literature (e.g. Mittenberg et al. 2001)

NCH Concussion Symptom Treatment

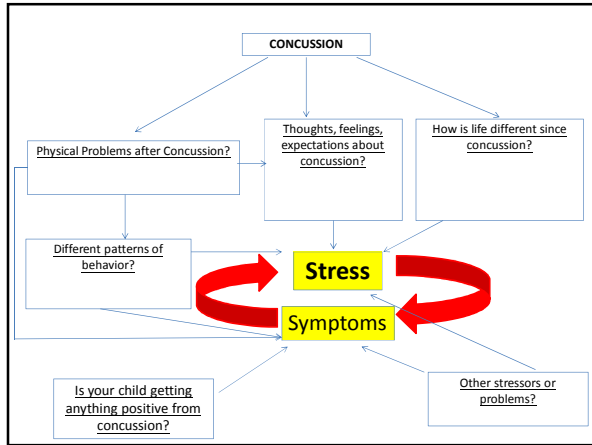
- Target population is children/teens with prolonged symptoms
 - 2-3 months post injury up to 12 months post-injury
 - Beyond 12 months, general behavioral health likely more appropriate for more comprehensive treatment
- 4-6 Sessions of brief, symptom focused treatment
 - Psychoeducation
 - Activity Scheduling
 - Relaxation/Biofeedback
 - Cognitive Behavioral Therapy

Psychoeducation

- Educational information regarding concussion, expected symptom course and potential relationship with stress
 - Children who received education reported fewer symptoms at 3 month time period (Ponsford et al., 2003)
- Goal is to set positive expectations for recovery
 - Combating expectation as etiology
 - NORMALIZE
 - “It’s not a question of *IF* you are going to get better it is a question of *WHEN*”

Psychoeducation

- Do not engage in debate regarding “reality” of symptoms
- Rather, help patients and families understand other potentially malleable factors that are contributing to symptoms
- Example Activities
 - Review “vicious cycle” model and have them fill in blanks
 - Review “Stress” handout and compare to concussion symptom ratings

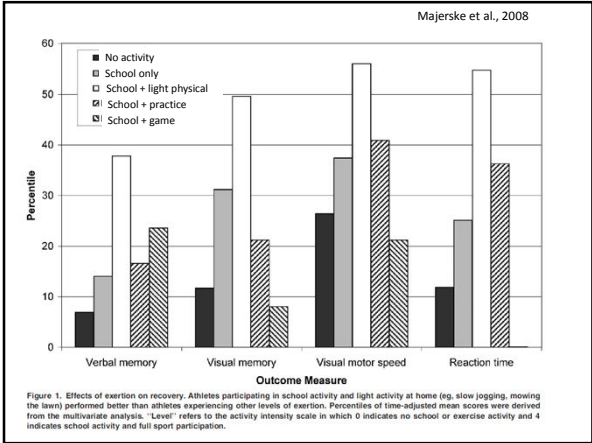


Activity Scheduling

- Review typical activity levels
 - Activity logs
- “Not too little, not too much” (Gioia, 2014)
- Overscheduled kids- build in times for rest/relaxation
- Underactive kids- Develop plan to gradually increase engagement in both pleasurable and mastery activities
 - Within bounds of physician recommendations for physical activity
 - Goal is to increase behavioral activation
 - Avoidance of activities can reinforce anxiety related to symptoms

Activity Scheduling

- Develop School plan (If still missing school)
 - In general, recommendation is to miss a few days to a week at the very most
 - Goal is to get back to full days of school ASAP
 - Stress of missed school/getting behind on work can exacerbate symptoms
 - Pain behaviors become reinforced, particularly when parents are more protective/catastrophizing (Logan et al., 2012)
 - Missed school can lead to development of anxiety and related school avoidance
 - May require gradual return
 - Avoid leaving school due to symptoms (can reinforce escape mechanism)
 - Provide relaxation/coping tools to use when symptoms are present at school



Activity Scheduling- Sleep

- Significant relationship between sleep disturbance and headache (Reviewed in Bellini et al. 2013)
 - Likely bidirectional relationship
- 2 factors contribute to poor sleep hygiene
 - Poor sleep organization: irregular sleep-wake cycle, napping, low daytime activity level, inappropriate sleep-wake schedule
 - Increased arousal at night: lack of bedtime routine, use of caffeine, use of technology at bedtime
- Frequency of migraines has been shown to decline following sleep hygiene intervention (Bruni et al, 1999)

Relaxation Training

- Relaxation training
- Empirically supported treatments for stress/anxiety/pain
 - Diaphragmatic breathing
 - Guided Imagery
 - Progressive Muscle Relaxation
 - Biofeedback

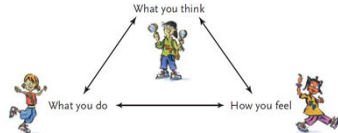
Biofeedback

- Increases ability to control physiological arousal by providing feedback
 - Skin conductance, heart rate variability, muscle tension, temperature, respiration
- View stress-response physiological profile
 - Fight or flight response
- Engage in relaxation exercises with feedback information
 - Graphic format or games



Cognitive Behavioral Therapy

- Most widely supported psychotherapeutic technique
- Focus on identifying and modifying thought errors that influence emotional responses
 - Misattributions, generalizations, black and white thinking, etc.



Potter & Brown, 2012

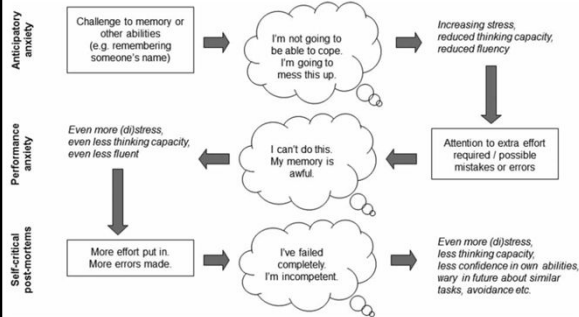


Figure 3. Outline of CBT model for conceptualising subjective cognitive difficulties.

Conclusions

- Most concussion symptoms resolve completely within a few weeks post-injury
- Prolonged symptoms are often related to stress and psychosocial factors
- A gradual return to pre-injury activities is the best medicine
- Prolonged symptoms can effectively be treated with brief psychosocial interventions

Thank you for listening!

Questions or comments?
