Moving Beyond Return to Play: 
*Emerging Science for Return to Learn following Concussion*

*Katy H. O’Brien, PhD CCC-SLP*

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- Katy O’Brien is a paid employee of the University of Georgia and as part of that work, conducts the research presented here.
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Concussion and mTBI

What is concussion?

“Trauma–induced alteration in mental status that may or may not involve loss of consciousness.”

2016 Berlin Definition Sport-Related Concussion  (McCrory et al 2017)

• Sport related concussion is a traumatic brain injury induced by biomechanical forces.

• May be caused either by a direct blow to the head, face, neck or elsewhere on the body with an impulsive force transmitted to the head.
• Typically results in the rapid onset of short-lived impairment of neurological function that resolves spontaneously. However, in some cases, signs and symptoms evolve over a number of minutes to hours.
• May result in neuropathological changes, but the acute clinical signs and symptoms largely reflect a functional disturbance rather than a structural injury and, as such, no abnormality is seen on standard structural neuroimaging studies.
• Results in a range of clinical signs and symptoms that may or may not involve loss of consciousness. Resolution of the clinical and cognitive features typically follows a sequential course. However, in some cases symptoms may be prolonged.
• Cannot be accounted for by other circumstances.

What is concussion?

- Rarely loss of consciousness (~10%)
- Rarely identifiable on neuroimagining
- Impaired function rather than structural changes
Structural versus Functional

Ylvisaker, Szekeres, & Feeney, 2001

Neurometabolic Cascade

Physical and Cognitive Effects Over Time


Academic Recovery

“Cocooning”

Downsides to Cocooning

• Physical deconditioning (Silverberg & Iverson, 2013)
• Mood dysregulation (Wells et al., 2015)
• Increased Depression and Anxiety/Nocebo Effect (DiFazio et al., 2015)
• Conflicts with standard of care for more severe TBIs


**Progressive Return to Activity**
Rest Recommendations (McCrory et al., 2017)

- 24–48 hours of rest
- Return to moderate activity
- Reassess symptoms

Variations in State Laws Governing School Reintegration Following Concussion

Leah I. Thompson, Ph.D.*, Adrian H. Lyons, MPH,††, Melissa McCarl, D.O.,§ Stanley A. Herring, MD,† †‡
Frederick P. Rivara, MD, MPH,§§, Monica S. Van F ield, MD ‡∥

Entities Responsible for RTL
- Required RTL Education of School Personnel
- Required RTL Policy
- Specified Standards for RTL Protocol
- Other Actions Related to RTL Mandated by Law
- Does the Statute Apply to All Students?
Concussion, Learning, Academics, and Student Success

Preliminary Results of a Survey Study of High School Return to Learn Experiences
Concussion Prevalence

- 13% of all injuries (Marar et al., 2012)
- Approximately 1.1 to 3.8 million (Bryan et al., 2016; Langlois et al., 2006)
  - Young athletes are more susceptible (Patel et al., 2005)

Current Concussion Management

Academic Implications of Concussion

Students report...
• Leaving school early
• Decrease in grades
• Desiring to return to school
• Using academic adjustments
  (ladevaia et al., 2015; McGrath, 2010; Baker et al., 2015)

Research Aim
To describe student experiences of RTL following concussion
Demographics

- N = 58 (37 female, 21 male)
- 253 total responses, 195 removed
- Mean age 17.7 (SD 2.5)
- Mean TPO 2.5 years
- 24/58 (40%) sustained multiple concussions

Injury Information
Recovery Timeline

Next day, 2-3 days, < 1 week, 1 week, 2-3 weeks, 1 month, > 1 month

Academic Effects
“We are trying to the best of our abilities, yet nothing is there.”

Academic Effects

“Sensory overload is very hard to overcome, people need time in order to adjust.”

Persistence of Academic Effects
Return to Learn

Academic Adjustments

- Extended Time
- Extended deadine
- Reduced workload
- Reduced screen time
- None
- Leave class early
- Leave school early
- Break-down assignments
- Access to notes
- Wear sunglasses
- Quieter area
- Preferred seating
- Allotted breaks during class
- Alternative test format
- Audio books
- Audio record lectures

Bar chart showing the frequency of different academic adjustments.
RTL Involvement

Student Perspectives
Preliminary Conclusions

Medical care postinjury
Extended recovery time
Academic effects
Return to school while recovering
Many students report using AA

Concussions in College
Returning to Learn Post-Concussion: Invisible Struggles of an Invisible Injury
A Phenomenological Investigation of College Student Experiences

The Issue: Academic Challenges

- Symptoms
- Initial steps
- **Self-advocacy**
- Resource awareness
- Symptom management – no protocol
  - ADA Constraints

*(A) An individual meets the requirement of 'being regarded as having such an impairment' if the individual establishes that he or she has been subjected to an action prohibited under this Act because of an actual or perceived physical or mental impairment whether or not the impairment limits or is perceived to limit a major life activity.

*(B) Paragraph (1)(C) shall not apply to impairments that are transitory and minor. A transitory impairment is an impairment with an actual or expected duration of 6 months or less.
The Current Study

Research Aims

• Student experiences
• Student care pathways
• Possible avenues of improvement

Qualitative Design

• Phenomenology
  • Emergent hypothesis
  • Holistic description of phenomena
  • Commonalities among participants

Data Collection and Sample

Participants

• Purposefully selected
• 1 male, 11 females
  • Colvin et al., 2009
  • Harmon et al., 2016
• Various academic levels
• Recruitment

Data Collection

• Academic dysfunction survey (Wasserman et al., 2017)
• Learning and Study Strategies Inventory (LASSI; Weinstein et al., 2016)
• Semi-structured interviews
• Audio recorded
Aim 1: To Describe College Student Experiences of Concussion

Concussion Consequences

- Physical effects
- Cognitive effects
- Sleep effects
- Social effects
Academic Effects

- Primarily cognitive effects
  - 11 students
  - 49 statements
- Physical effects
  - 7 students
  - 38 statements
Aim 2: To Describe Student Care
Pathways Following Concussion

Pathways of Care

• 10 sought care
• 4 sought immediate care on recommendation of someone else
• 4 delayed care (+48 hours post)
• 8 received imaging
• 3 to urgent cares
• Others to ER or MD
• 2 thought they could manage on their own
Interaction Effect

- *Interaction* of factors & impact on RTL
- Contributions to experience + student reaction

Aim 3: To Identify Avenues to Improvement of Care for Students with Concussion on Campus
Recommendations

- Improved concussion & resource knowledge
- Improved communication among resources
- Short term accommodations
- Improved academic outcomes and long-term effects
Conclusions and Implications

- Significant impact of effects on academics
- Limited knowledge impaired pathway of care
- Complex interaction of factors impaired academic, social, and functional outcomes

Return to Learn: What Now?
CDC HEADS UP

https://www.cdc.gov/headsup/youthsports/index.html

CDC Pediatric mTBI Guidelines

https://www.cdc.gov/traumaticbraininjury/PediatricmTBIGuideline.html
System Approaches and Advocacy
Building Statewide Infrastructure for the Academic Support of Students With Mild Traumatic Brain Injury

Gerard A. Gioia, PhD; Ann E. Glion, PhD; Stephen R. Hooper, PhD;
Brenda Eugene Brown, MEd, CRIN

Interdisciplinary Team
• Medical member
• Academic member
• Student/Family member

Professional Development
• School community
• Medical community

Identification, assessment, progress monitoring protocols
• Medical evaluation of mTBI symptoms
• School-based assessment and monitoring of symptom status

Academic, physical, and emotional interventions/accommodations

Coordinated medical-to-school communication

Brain 101

The Effectiveness of a Web-Based Resource in Improving Post-Concussion Management in High Schools
Ann E. Glion, PhD; Michael C. Koester, MD, ATC; James C. Chesnutt, MD; Gerard A. Gioia, PhD; Karen McAway, PsyD; Sondra Marshall, PhD; and Jeff M. Gau, MS

1Children’s National Medical Center, Rockville, MD
2Rocky Mountain Hospital for Children, Centennial, CO
3St. Charles Health Systems, Bend, OR
4Oregon Health & Science University, Portland, OR
5Oregon Research Institute, Eugene, OR

Access: cbirt.org
http://brain101.orcasinc.com/5000/
Return to Learn Documents

https://cbirt.org/back-school

Mapping Accommodations to Needs
Monitoring Over Time

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Questions?

cogcomlab.uga.edu

khobrien@uga.edu

Welcome to the Cog-Com Rehab Lab at the University of Georgia

The Cognitive-Communication Rehabilitation Lab serves adults and adolescents with traumatic brain injury (TBI) or concussion. Our work examines functional rehabilitation to support people with brain injury returning to productivity at work and school.