Defense and Veterans Brain Injury Center "Clinical Updates in Brain Injury Science Today [CUBIST]" Podcast
"Sport-related Concussion Clinical Profiles: Clinical Characteristics, Targeted Treatments and Preliminary Evidence"
TRT: 11:15 min
Host: Dr. Don Marion, MD

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Defense and Veterans Brain Injury Center "Clinical Updates in Brain Injury Science Today [CUBIST]" Podcast

Episode 205: Clinical, profile-based, models for sport-related concussions

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Don Marion: The views, opinions, and findings contained in this podcast are those of the host and subject matter experts. They should not be construed as official Department of Defense positions, policies, or decisions unless designated by other official documentation.

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Marion: Hi. Welcome to Clinical Updates in Brain Injury Science Today, or "CUBIST," a podcast for health care providers about current research on traumatic brain injury, also known as TBI. This program is produced by the Defense and Veterans Brain Injury Center, otherwise known as DVBIC. I'm your host today, Don Marion. I am a neurosurgeon in the Research section here at DVBIC.

In today's episode, I'll be talking with Ms. Betsy Myhre. Ms. Myhre is a nurse practitioner and senior clinical consultant at DVBIC. Betsy and I will discuss a study titled, "Sport-related Concussion Clinical Profiles: Clinical Characteristics, Targeted Treatments, and Preliminary Evidence" This article was recently published in Current Sports Medicine Reports by Anthony P. Kontos and colleagues from the University of Pittsburgh.

Marion: Hi, Betsy

Myhre: Hi, Don. How are you?

Marion: Good. Thank you for being here. Can you tell us a little about this study-what are the key findings?

Myhre: Absolutely. The purpose of this article is to describe and update information on a clinical profile-based model for sport-related concussion and to examine preliminary evidence for the prevalence of each clinical profile and any association among different profiles. The study was specifically focused on sport-related concussions in athletes. This article builds off of a previous article published by Kontos and colleagues that was a conceptual model that proposed (6) different clinical trajectories or profiles for athletes with sport-related concussion.

Marion: I must admit, I am a little thrown off by the terms "trajectories" and "profiles" in this context. Can you briefly describe the 6 clinical trajectories or profiles from the original article before we discuss the study in this article?

Myhre: Yes, I think that is really important for the listener to understand. In sport-related concussion, frequently athletes do not present clinically in the same manner or exhibit the same symptoms. Researchers now recommend that assessment and treatment plans for sport-related concussion are modified based on the characteristics of the injury, symptoms and the athlete. Previous recommendations of standardized, rigid concussion protocols are changing based on our understanding that each athlete may exhibit different symptoms and the road to getting back to play, school, work or full recovery may vary based on these symptom trajectories or profiles. The six clinical trajectories or profiles in the model include cognitive/fatigue, vestibular, ocular, posttraumatic migraine, anxiety/mood and cervical. Since cervical is not a cerebral concussion, it is important to assess cervical function and symptoms, but it is now being considered a modifier to the clinical trajectories, so for this article, the authors focused on the remaining five (5) profiles. I think it is important to note that sleep issues are also identified as a modifier to the concussion related clinical trajectories or profiles. For each clinical profile, there are common symptoms, identified clinical examination/evaluation findings, risk factors and targeted treatment strategies.

Marion: Can you give us an example of one of the clinical profiles and those common findings and recommendations?

Myhre: Yes, one of the clinical profiles I have seen in clinic is the post-concussion athlete who presents with symptoms of anxiety. The athlete may discuss symptoms of excessive preoccupation with their concussion, worrying and rumination. Sometimes they exhibit school or work avoidance or other behaviors that may not be characteristic of this athlete. The athlete may have elevated scores on a mood/anxiety questionnaire and may have a personal or family history of depression or anxiety (which is one of the strongest predictors of prolonged recovery from a sport-related concussion). The model also identifies that the athlete may have comorbid migraine or sleep problems. The targeted treatment strategy for this patient would be a consult for behavioral therapy or mental health and perhaps, psychotropic medications. The article has a great chart which explains each of the clinical trajectories or profiles in detail.

Marion: In other words, if the provider fully understands the profile, they will better understand that the problem is more complex than just the headache or dizziness that the patient presents with, and will consider a treatment plan that addresses the sub-issues as well as the presenting complaint. Is that correct?

Myhre: Yes, Don, that is absolutely correct.

Marion: Thanks. So how was the study conducted?

Myhre: This study was a retrospective, blinded review of 340 patient clinical charts at two concussion clinics. The reviews were conducted by a 6-person team – 3 neuropsychologists and 3 physical therapists. They reviewed the charts for relevant medical history, injury information, relevant interview or examination information, symptoms, and for cognitive and vestibular/ocular tests, and then determined primary and secondary clinical profiles for the patients. There were some exclusion criteria such as moderate to severe traumatic brain injury, history of stroke or seizure disorder, major psych disorders, length of time from injury (seen greater than 90 days). Of the 340 charts, 236 met the study criteria. The patients ranged in age from 11 to 40 years, with an average age of 19. I also found it interesting that almost 60% were females and 45% were 8 to 21 days post-injury.

Marion: In the country as a whole, and especially in the Military, men account for the vast majority of TBIs. Why were women in the majority in this study, and how do you think gender may impact profiles?

Myhre: Great question. Yes, we do see more TBIs in men than women, for instance of the 10,175 TBIs patients seen in the Military Health System in the 4ᵗʰ quarter of 2018, only 1600 were in women. Of course, only 15% of all active duty in the U.S military are female, so that accounts for the smaller numbers.. This is why it interested me that 60% of the patients in the Kontos study were female. A few factors may contribute to that – since the average patient age was 19, young woman may either seek initial or follow up care more readily then young men post-concussion, have prolonged symptoms, research has shown sex-hormones, estrogen and progesterone levels at time of injury may have an impact on recovery etc.. I think gender may have an impact on profiles and more research will differentiate these profiles.

Marion: What was the frequency of primary profiles that were determined from the chart review?

Myhre: The most common single primary clinical trajectory/profile was migraine with just over a quarter of the participants exhibiting this profile. Interestingly, anxiety/mood was the second most common with just under one quarter of participants. Cognitive/fatigue, with only 11%, was the least common primary profile. Since vestibular and ocular clinical profiles combined represented 35% of the concussions, the authors recommend a comprehensive concussion assessment including multiple domains such as symptoms, cognitive, ocular, affective and vestibular.

Marion: Betsy, when I had an active clinical practice I would typically ask my patient what was bothering them most, and then focus my initial treatment on that problem. Practically speaking, how does "profile based care" change the amount of time and effort required to perform an initial evaluation, and prescribe a treatment program?

Myhre: Knowing the clinical profiles will help the clinician predict other symptoms the patient may be experiencing, lead to more focused assessment and treatment. For instance, if the patient informs you that they are having anxiety symptoms, you could assess them for migraines, which frequently are a secondary profile in patients with anxiety. The goal is to do a more focus, comprehensive assessment and targeted treatment.

Marion: What are the key findings that providers should take away from this study?

Myhre: This article provides valuable information on clinical trajectories or profiles after sport-related concussion and supports the recommendation to do a full, comprehensive assessment of post-concussion patients. Rest, both cognitive and physical, is still recommended in moderation, but this study helps identify clinical profiles, their prevalence (with migraine being the single most common clinical trajectory) and advocates for targeted and active treatment approaches to concussion based on clinical profile. Some types of active interventions that research has shown improves concussion symptoms and recovery are vision, vestibular and behavioral management therapies. Providers should understand the clinical profiles and develop plans to either provide care or refer patients to specialists (such as physical therapists or concussion clinics) which can provide these targeted therapies. One recommendation that the authors' state is the need for future research on type, timing, frequency and intensity of specific, targeted interventions.

Marion: Thank you so much Betsy for your insights. That's all we have time for today. We hope you enjoyed this quick literature update.

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"CUBIST" is produced and edited by Dr. Deborah Bailin and was hosted today by me, Don Marion. It is a product of the Defense and Veterans Brain Injury Center, led by Division Chief Captain Scott Pyne, Medical Corps, United States Navy.

Thank you for listening to this episode. Next time, we will discuss TBI research getting attention in the mainstream press.

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