



**DEFENSE CENTERS
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For Psychological Health
& Traumatic Brain Injury

**Understanding the Relationship Between Mild TBI
and
Post-deployment Health Concerns:
Evidence, Clinical Implications and Treatment**

March 27, 2014, 1-2:30 p.m. (EDT)

Moderator

**Capt. Robert L. Koffman, MC
U.S. Navy**

**Senior Consultant Behavioral Health and Integrative Medicine
National Intrepid Center of Excellence
Bethesda, Md.**





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San Antonio, Texas



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Today's webinar:

State of the Science: Clinical, Metabolic and Pathologic Effects of Multiple Concussions

January 16, 2014, 1-2:30 p.m. (EST)

Moderator: Donald Marion, M.D., M.Sc.
Clinical Affairs Senior Advisor
Defense and Veterans Brain Injury Center
Silver Spring, Md.

DVBIC DHCC

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Webinar Overview

Mild traumatic brain injury (mTBI) or concussion has been identified as an important injury of the Afghanistan and Iraq conflicts. Controversy exists regarding the relationship between mTBI and other health conditions resulting from service in a war zone. The goal of this webinar is to share current research and treatment practices related to post-deployment symptoms, including those attributed to mTBI. This pragmatic discussion will include the perspectives of one of the Defense Department's most cited mental health researchers as well as a specialty care provider on ways to manage service members and veterans with combat-related injuries.

After completion of this webinar, participants will learn to:

- **Identify** evidence regarding the etiology and management of post-concussion and post-deployment health problems
- **Examine** the complex relationship between mTBI and post-deployment health concerns
- **Evaluate** clinical approaches to the management of service members and veterans with post-deployment/post-concussion complaints

Presenter: Charles W. Hoge, M.D.

- Charles Hoge, Colonel (retired), works as a senior scientist and neuropsychiatry consultant at the Office of the Army Surgeon General and Walter Reed Army Institute of Research, and as an attending psychiatrist at Walter Reed National Military Medical Center.
- Graduated from the University of Maryland School of Medicine, completed specialty training and obtained board certification in internal medicine, infectious diseases, and psychiatry during his 20 years of active-duty service in the U.S. Army Medical Corps.
- Authored more than 100 peer-reviewed journal articles, 20 of which have been published in the New England Journal of Medicine, the Journal of the American Medical Association and the Lancet.
- Authored a self-help book for combat veterans and their families titled, *Once a Warrior-Always a Warrior: Navigating the Transition from Combat to Home*.



ARMY MEDICINE
Serving To Heal...Honored To Serve

Understanding Post-deployment Health Concerns: Posttraumatic Stress Disorder (PTSD) and Mild Traumatic Brain Injury (mTBI)

Disclosure

The views expressed in this presentation are my own and do not reflect official policy of the Defense Department or the U.S. Government.

I have no relevant financial relationships to disclose.

I do not intend to discuss the off-label/ investigative (unapproved) use of commercial products or devices.



Case Presentation

SSG Warrior, a 26 year-old Army infantry E6 with 8 years time in service (TIS) and three combat deployments is referred to primary care due to his responses on the post-deployment health reassessment (PDHRA).

SSG Warrior's physical and mental health symptoms include: headaches, low back pain, joint pain (shoulders and knees), fatigue, indigestion, concentration/memory difficulties, dizziness/balance problems, tinnitus, chronic sleep disturbance, depressed mood, anger, hypervigilance, nightmares, avoidance, and sometimes drinks alcohol to get to sleep.

He reports multiple direct combat exposures, including two close proximity blasts (one that hit the vehicle in front of him) that caused brief (few minutes) alteration in consciousness (disoriented, dazed). He also lost two close team members during the last deployment.

Patient Health Questionnaire (PHQ-9) score = 15 (scale of 1-27)

PTSD Checklist - Military (PCL-M) score = 60 (scale of 17-85)

Alcohol Use Disorders Identification Test (AUDIT-C) score = 6 (scale of 0-12)

Generalized Post-deployment Symptoms (OIF/OEF) (%)

Physical Symptoms (PHQ-15, NSI, PDHA)	Florida National Guard (2-3 years Post-deployment) (N=1443)	Non-deployed Florida National Guard Soldiers (N=1655)
Fair/Poor Health	13.4	4.0
Back/muscle pain	42.2	15.8
Fatigue	20.4	6.8
Sleep disturbance	25.6	9.5
Headaches	23.4	8.8
Irritability	18.7	6.5
Concentration problems	17.8	6.2
Memory problems	11.5	5.6
Indigestion	16.0	4.4
Ringing in the ears	31.7	9.7
Shortness of breath	12.3	4.5
Chest pain	8.5	3.0
Abdominal pain	8.6	3.1
Dizziness	9.6	2.7

(Vanderploeg, Belanger, Horner, Spehar, Powell-Cope, Luther, & Scott, 2012)



Polling Question #1

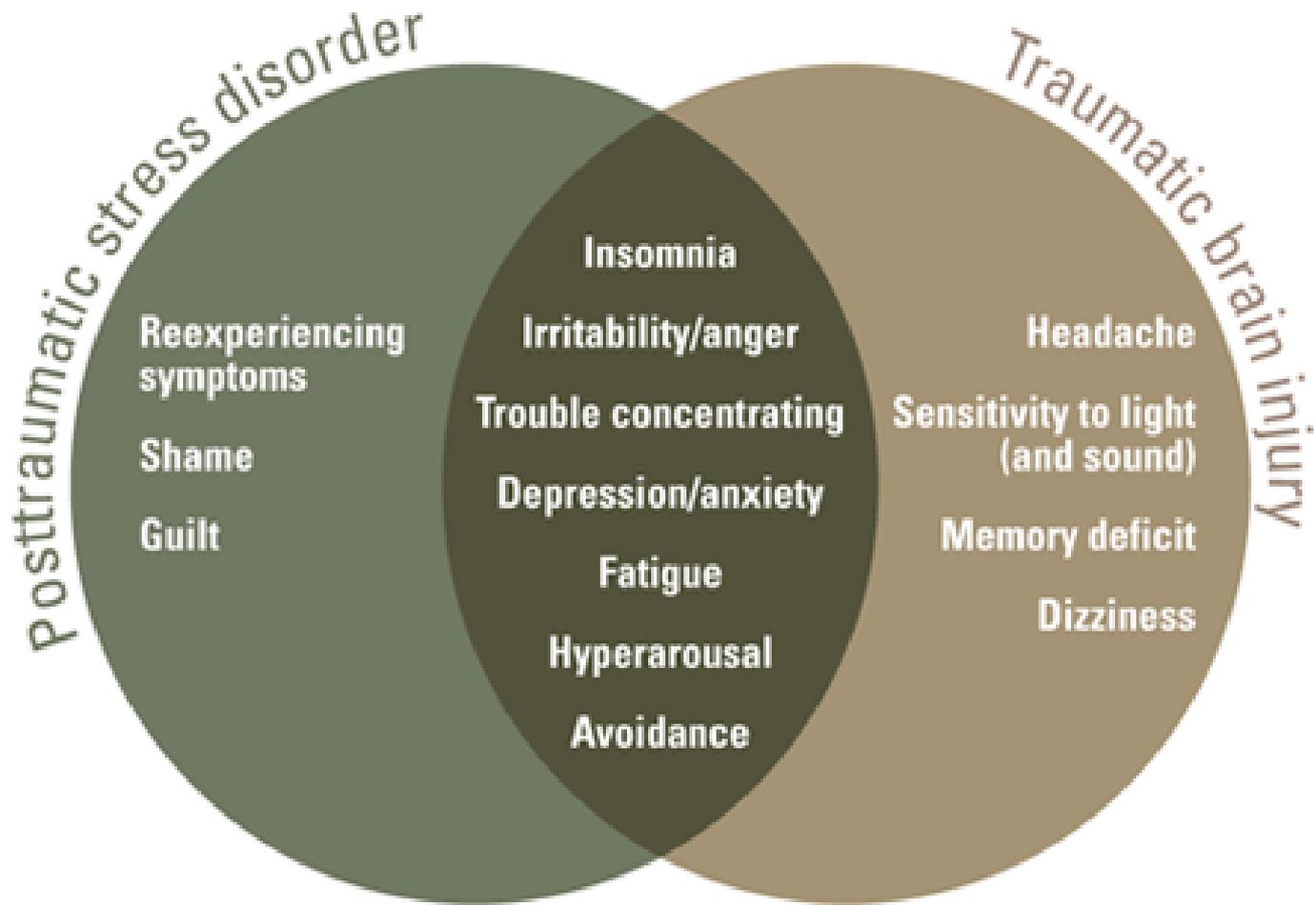


What is the most likely cause of SSG Warrior's cognitive and physical symptoms?

- A. Mild TBI**
- B. PTSD**
- C. Combination of A and B**
- D. Depression**
- E. Grief**
- F. Other physical injuries during deployment**
- G. Chronic sleep loss**
- H. All of the above**



mTBI/PTSD Symptom “Overlap”



Association of Generalized Symptoms with PTSD

PHQ-15 Physical Symptom Scale	Soldiers Post-Iraq PTSD (N=468) (%)	Soldiers Post-Iraq No PTSD (N=2347) (%)
PHQ-15 \geq 15 (severe)	34.4	5.2
Stomach pain	16.0	4.7
Back pain	40.2	22.4
Pain in arms, legs, joints	50.2	25.9
Headaches	31.9	9.9
Chest pain	15.1	3.5
Dizziness	14.4	2.0
Heart pounding/racing	23.6	3.7
Shortness of breath	22.9	4.5
Constipation/loose stools	20.8	7.1
Nausea/indigestion	25.1	8.9
Tired, low energy	74.9	28.3
Sleep Disturbance	71.1	26.1
Sexual pain/problems	10.5	1.5

• All differences significant.

(Hoge, Terhakipian, Castro, Messer, & Engel, 2007)



WRAIR LCS Infantry mTBI Replication Study (N=1502)

Unadjusted Associations of mTBI with Symptoms

Post-Deployment Symptoms	mTBI with LOC (N=86)	mTBI with AOC (N=174)	Other Injuries (N=396)
Headaches	46%*	26%*	16%
Memory problems	40%*	21%*	10%
Concentration problems	45%*	24%	21%
Dizziness	17%*	11%*	4%
Fatigue	59%*	47%*	38%
Sleep disturbance	59%*	49%	40%
Pain in arms, legs, joints	55%*	47%	41%
Nausea, gas, indigestion	23%*	15%	12%
Heart pounding/racing	13%*	14%*	6%
Sexual pain/problems	11%*	8%	5%

* Differences statistically significant compared with other injuries (unadjusted).

(Wilk, Herrell, Wynn, Riviere, & Hoge, 2012)



Final Adjusted Odds Ratios for Significant Outcomes Associated

Health Symptom	LOC	PTSD	Depression
Headaches	1.5 (1.1–2.3)	2.0 (1.0–3.8)	4.7 (2.2–9.9)
Memory problems	1.8 (1.2–2.8)	3.2 (1.6–6.5)	4.0 (1.8–8.9)
Balance problems	2.1 (1.1–3.9)	5.3 (1.5–18.0)	8.5 (2.9–24.8)
Pain in arms, legs, joints	1.5 (1.1–2.1)	1.4 (0.8–2.4)	2.2 (1.1–4.4)

- Adjusted for age, gender, injury mechanism (blast vs. non-blast), combat exposure, injury severity (air evacuation), PTSD, depression.



OIF/OEF: PTSD/Depression are Strongest Predictors of Post-Concussive/ Neuropsychiatric Symptoms

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OIF/OEF: PTSD/Depression are Strongest Predictors of Post-Concussive/ Neuropsychiatric Symptoms

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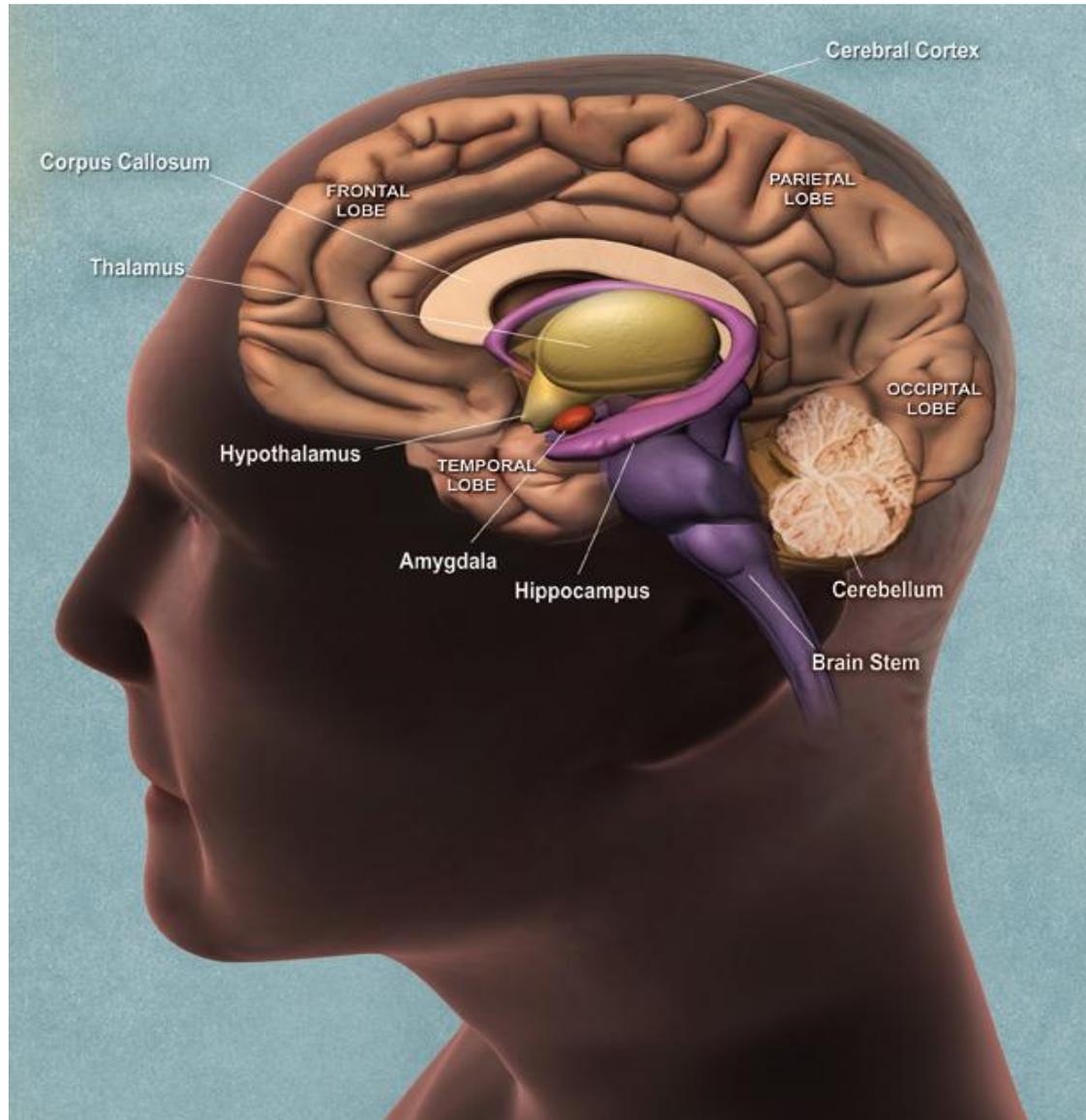
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Why is PTSD (and depression) so strongly associated with generalized physical and cognitive symptoms?

Limbic System





The PTSD Paradox: Symptoms are Physiologically Adaptive Combat Reflexes/Skills

Hyper alert, hypervigilant	Sharply tuned threat perception, situational awareness, “6 th sense”
Intolerance of mistakes, over-controlling, mistrust	Attention to detail, minimize mistakes in dangerous situations, need-to-know
Re-experiencing, guilt, should haves/would haves	Intense mission rehearsal and training, after action reviews (AARs)
Sleep problems	Ability to function on limited sleep
Anger	Adrenaline, focus, attention, control of fear, physical strength
Detachment, numbing	Emotional control (including grief)
Social withdrawal	Unit cohesion, bonds as strong as family



Polling Question #2

Other than PTSD and depression, which of the following is the next most likely contributor to generalized post-deployment symptoms in SSG Warrior?

- A. Somatoform / somatization disorder**
- B. Alcohol / substance use disorder**
- C. Negative illness expectations**
- D. Grief / bereavement**
- E. Chronic sleep loss**



Grief and Post-concussive Symptoms (PCS)

Infantry Brigade 6 month post-Iraq/Afghanistan (n=1522)

	In the past month how much have you experienced difficulty coping with grief over the death of someone close?				
	Not at all	A little bit	Moderately	Quite a bit	Extreme
High Physical Symptom Score (PHQ-15 \geq 15)	5%	21%	29%	34%	42%
Headaches	12%	24%	31%	37%	53%
Concentration problems	10%	24%	36%	54%	58%
Memory problems	8%	16%	21%	34%	39%
Balance problems	2%	10%	7%	15%	15%
Irritability	31%	49%	60%	78%	87%
Fatigue	25%	48%	57%	70%	75%
Ringling in ears	7%	12%	13%	32%	31%
Sleep disturbance	26%	45%	53%	63%	77%



Multivariate Predictors of Generalized Symptoms Infantry Brigade 6 month post-Iraq/Afghanistan (n=1522)

	High Generalized Physical Symptoms
PTSD	3.6 (2.0-6.7)
Depression	4.5 (2.3-8.7)
Grief	3.6 (2.1-6.2)
Combat Injury:	
No Injury	Referent
mTBI with loss of consciousness (LOC)	1.5 (0.6-3.7)
mTBI with alteration of consciousness (AOC)	1.9 (0.9-3.8)
Other Injury	0.6 (0.3-1.1)

* Logistic regression controlled for age, gender, education, marital status, rank, combat exposure, alcohol misuse, and adverse childhood experiences.



Summary: Multiple Factors Likely Contribute to Post-deployment Health Symptoms



Combat traumatic events / blasts

Concussions / mTBIs

Other physical injuries

War zone

Extreme physical stress

Sleep deprivation (5.6 hours average)

Separation from family

Environmental exposures

Poor leadership / cohesion

Negative expectations

Home zone

Persistent circadian dysregulation

Persistent autonomic arousal & neuroendocrine dysregulation

Risky behaviors

Lack of social / unit support

Transition Stressors

Pain medications

Disability processes

PTSD
Depression
Grief
Alcohol/substance use disorders

Persistent Post-deployment Symptoms including PCS



What do these findings tell us about treatment?

What are optimal treatment approaches for generalized post-deployment physical cognitive and psychological symptoms that have multiple causes?



Interdisciplinary Team Approach Shown to be Effective in Chronic Multi-Symptom Conditions

- Patient-centered treatment based in primary care
- Regularly scheduled primary care visits with brief physical exam at each visit
- Step-care approaches to symptom management
- Trusting clinical judgment and protecting patients from unnecessary diagnostic tests
- Judicious use of consultation that protects patients from unnecessary specialty referrals



Interdisciplinary Team Approach Shown to be Effective in Chronic Multi-symptom Conditions

- Cognitive behavioral therapy (CBT), behavioral activation, stress reduction techniques
- Motivational interviewing
- Care / case management
- Provide reassurance and expectation for full recovery
- Treat underlying mental disorders, but ***do not label*** (or insinuate) that symptoms are psychological in origin



Additional References



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Presenter: Amy O. Bowles, M.D.

- Dr. Bowles has been the brain injury rehabilitation service chief, San Antonio Military Medical Center, San Antonio, Texas for the past six years.
- Board certified in physical medicine and rehabilitation; served as a staff physiatrist at Audie L. Murphy Veterans Affairs Hospital, San Antonio, Texas.
- Current and past academic appointments include adjunct assistant professor, department of rehabilitation medicine, department of occupational therapy, University of Texas Health Science Center, San Antonio, Texas.
- Co-authored a number of peer-reviewed papers as well as the VA/DoD Clinical Practice Guidelines for the Management of Concussion; regularly participates in national forums where military TBI care is discussed.
- Twice received the Commander's Award for Civilian Service and is listed in the Top Doctors in America database.



Understanding the Relationship of mTBI and Post-deployment Health Concerns: Evidence, Clinical Implications and Treatment

Clinical Management Approach

Amy O. Bowles, M.D.

Chief, Brain Injury Rehabilitation Service,
San Antonio Military Medical Center
San Antonio, Texas



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SSG Warrior's Symptoms

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Symptom-based Management = Overwhelming



Headaches	Neurology
Low back pain	Physical Therapy (Ortho? Imaging?)
Joint pain	Physical Therapy (Ortho? Imaging?)
Fatigue	Sleep study
Indigestion	Gastroenterology
Concentration problems	Neuropsychology (Speech Pathology?)
Memory difficulties	Neuropsychology (Speech Pathology?)
Dizziness	Audiology/ENT/vestibular
Balance Problems	Physical therapy/vestibular
Tinnitus	Audiology
Sleep disturbance	Sleep study
Depressed mood	Psychology/psychiatry
Anger	Psychology/psychiatry
Alcohol use	ASAP
Grief	Chaplain/psychology



Too many consults

- Logistically difficult and exhausting
- Conflicting therapies
 - Medications
 - Instructions
 - Education
- Meta messages
 - “I must be really bad...”
 - “Does she really know how to help me?”



Interdisciplinary Rehabilitation Model

San Antonio Military Medical Center



Interdisciplinary Team



“Professionals in interdisciplinary teams meet regularly in order to discuss and collaboratively set treatment goals with patients and jointly carry out the treatment plans. There is a high degree of communication and cooperation among the team members. The outcome of this model is that the professionals have skills across different disciplines. The interdisciplinary team model is considered to have a higher quality of collaboration and team performance,” (Komer, 2010, p. 746).

- Composition of the interdisciplinary team may vary
 - Patient needs
 - Clinic resources/roles
- Communication is critical
- Common beliefs about what’s going on
- Works best when the group of professionals truly functions as a team
- Rehabilitation – the focus is on **FUNCTION**



Foundation



- Address function
 - “Regardless of the cause, you are having trouble getting to appointments on time; we can help.”
- Recognize that many things may contribute to symptoms; encourage service members to address those things
 - “If half your attention is focused on the footsteps in the hallway, you’re going to have trouble remembering what we’re talking about.”
- Understand that physical therapy (or speech therapy or occupational therapy...) is unlikely to “fix” depression (or PTSD or....)
 - Provide support but encourage follow-up with the right people/providers



Set up for Success



- All services are co-located in a single clinic
 - Administratively, we are a single clinical “service” in the Department of Orthopedics and Rehabilitation
- Interdisciplinary team philosophy:
 - many things – not just concussion – contribute to cognitive symptoms
 - we can help these patients
 - “we are experts”
- Good communication:
 - weekly meetings to discuss each patient
- The team is happy and works well together
 - little staff turn-over



Initial Visit



- Structured clinical interview; 60 minutes
 - Document concussion history
 - Explore current complaints
 - Somatic (headache, joint pain, dizziness....)
 - Psychological (depressed mood, anger, alcohol...)
 - Functional (forgets appointments, cannot find things....)
 - Ask about past and present management of symptoms
 - Education, education, and more education
- Follow-up visits with provider every two to four weeks until subjective improvement and discharged from other services/met goals



- Concussion
 - What it is (education); what it is not (reassurance)
 - Prognosis and expectations for recovery
 - Tread carefully: “...but I am not better in a few months”
 - Decoding prior education (“damage control?”)
- Additional contributors to cognitive symptoms
- Treatment/management
 - “There is no magic pill”
 - Education is a critical intervention
 - “Here is what we can offer to improve functioning...”



Stabilization Track



Programming is *individualized* and may include group therapy and/or individual therapy sessions such as:

- Speech therapy for cognitive remediation and compensatory strategies
- Physical therapy for headache and/or dizziness complaints
- Psychology services for sleep, anxiety, PTSD, etc., if not provided elsewhere
- Occupational therapy for assistive technology assessment and/or vision complaints (less often)

Interdisciplinary team meets to discuss each service member every week



How Much Therapy?



- Speech Therapy:
 - Typically one evaluation and four weekly sessions
- Physical Therapy:
 - Typically weekly for four to eight weeks
- Psychology:
 - Varies widely
- Total length of stay :
 - Mean 62 days
 - Median 43 days



Cognitive Behavioral Education Strategies (CBEST)



- *Manualized* psychoeducational group program that specifically addresses misattributions for cognitive dysfunction which tend to perpetuate symptoms
- Specifically designed for very chronic symptoms
- Groups also address:
 - memory/attention (speech therapy)
 - planning/organization (speech therapy)
 - sleep (occupational therapy/psychology)
 - behavioral health issues (psychology)
 - functional independence (physical therapy/occupational therapy/recreational therapy)
 - activity level (physical therapy/occupational therapy/recreational therapy)
 - community and social reintegration (occupational therapy/recreational therapy)



CBES_t – Patient Experience



- Initial brief interdisciplinary evaluation for appropriateness (OT, ST, Psychology)
- Four-week program; 0900 – 1000; Tuesday – Thursdays; designed specifically to support non-WTs

Tuesday	Wednesday	Thursday
Cognitive Dysfunction <i>Behavioral Health</i>	Goal Setting <i>Speech Therapy</i>	Headache & Fatigue <i>Occupational Therapy</i>
Asleep at the Wheel <i>Behavioral Health</i>	Memory <i>Speech Therapy</i>	Applied Memory <i>Occupational Therapy</i>
Behind the Wire <i>Behavioral Health</i>	Attention <i>Speech Therapy</i>	The Balancing Act (Work & Leisure) <i>Recreational Therapy</i>
Creating a Life Worth Living <i>Behavioral Health</i>	Planning <i>Speech Therapy</i>	Debriefing <i>Behavioral Health</i>



Outcomes

- Decreased symptom burden = patient satisfaction
 - “Everyone was thoughtful and *truly cared about me!*”
 - “The staff really *work well together* and they show that they care about the warriors that come through here.”
 - “Since being diagnosed with PTSD and TBI, I wanted to *ensure myself that I was going to be ok.*
 - “I felt like I was not myself..Just being able to talk to Ms. XXXX made a world of difference in my behavior and my way of thinking.”
 - “...provided an atmosphere that made it easy to be open to their help and they provided a fount of *tools for me to move forward* and continue to improve my ability to respond to things in my environment in a positive, healthy way.”



Traps to Avoid

- Inadvertently undermining yourself
 - She said, “most people get better in days to weeks...” and I didn’t.
 - Am I exceptionally broken/unusual/unfixable/etc.?
 - Does she know what she’s doing?
- Trying to prove to patients that they are “better”
 - Patients should tell YOU, not the other way around
- Sending mixed messages
 - “My psychologist said he can’t help me until my TBI is better.”



Key Components

- Consistency of message
 - “We expect you to improve!”
 - “We recognize that many things contribute to cognitive complaints; not just concussion.”
- Aura of competence
 - “We are experts, and we know how to help you.”
- Caring and empathy
 - “I believe you.”
 - “It is nice to see you today; how are you?”

These are risk communication strategies!



References

- Department of Veterans Affairs & U.S. Department of Defense. (2009). *VA/DoD Clinical Practice Guideline for Management of Concussion/Mild Traumatic Brain Injury (mTBI)*. Retrieved from [healthquality.va.gov: http://www.healthquality.va.gov/management_of_concussion_mtbi.asp](http://www.healthquality.va.gov/management_of_concussion_mtbi.asp)
- Haskins, E. (2012). *The Cognitive Rehabilitation Manual; Translating Evidence-Based Recommendations into Practice*. (L. E. Trexler, Ed.) Reston, Virginia: American Congress of Rehabilitation Medicine. Retrieved from <http://www.acrm.org/publications/cognitive-rehab-manual>
- Komer, M. (2010). Interprofessional teamwork in medical rehabilitation: a comparison of multidisciplinary and interdisciplinary team approach. *Clinical Rehabilitation*, 24, 745-755. doi:10.1177/0269215510367538

Questions?

- Submit questions via the Q&A Pod located on the screen.
- The Q&A Pod is monitored and questions will be forwarded to our presenter for response.
- We will respond to as many questions as time permits.



Continuing Education Details

- If you pre-registered for this webinar and want to obtain CE certificate or a certificate of attendance, you must complete the online CE evaluation and post-test.
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- The Duke Medicine website online CE evaluation and post-test will be open through **Thursday April 3, 2014**, until 11:59 p.m. (EDT).

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Save the Date

Next DCoE TBI Webinar topic: *Family Functioning and TBI*

Apr. 10, 2014

1-2:30 p.m. (EDT)



Next DCoE Psychological Health Webinar topic: *Military Children; Mild TBI and PTSD*

Apr. 24, 2014

1-2:30 p.m. (EDT)



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