Recognizing and Treating Mild TBI and PTSD in Returning Post 9/11 Service Members and Veterans

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Simply Put: Where we can help

Life stress (broadly defined)
Chronic pain
Sleep problems
Psychological distress
Cognitive problems
Difficulty fulfilling major life/role responsibilities
Operations Iraqi Freedom and Enduring Freedom

- More than 2.6 million service members have been deployed in support of OEF/OIF since September 11, 2001 (IOM, 2012).

- The average age of those deployed was 33.4 years.

- Nearly 60 percent of those deployed were married, and nearly half had dependent children, 1.97 on average (IOM, 2013a).
Deployments

- By the end of 2010, deployed service members had been deployed an average of 1.7 times: 57% once, 27% twice, 10% three times, and 6% four or more times.

- The average length of deployments was 7.7 months
  - On average 4.5 months in the Air Force to 9.4 months in the Army
Compared to Previous Conflicts:

- More deployments of individual service members
- Increased deployments of women, parents of young children, and reserve and National Guard troops
- In some cases longer deployments and shorter times at home between deployments
Return from Deployment

- 96% of veterans felt proud of their service
- 93% felt they became more mature as a result of their service
- 90% felt they built self-confidence while serving

Pew Research Center, 2011
Return from Deployment – Emotional Impact

- 44% reported readjustment difficulties
- 48% reported strains on family life
- 47% reported outbursts of anger
- 49% reported posttraumatic stress
- 32% reported an occasional loss of interest in daily activities

Pew Research Center, 2011
Posttraumatic Stress Disorder (PTSD)

- One of the disorders most commonly diagnosed in U.S. combat troops
- Prevalence estimates range from 5% to 30% among service members deployed in OEF or OIF (IOM 2013a)
- 16% to 44% of service members with injuries reported PTSD
- 9% of service members who saw combat but were not injured reported PTSD (Hoge et al., 2008)
Posttraumatic Stress Disorder (PTSD)

Anxiety disorder
Deep psychological trauma and distress

Core Features
Re-Experiencing
Avoidance
Hyperarousal
Re-Experiencing

(1) Recurrent distressing recollections of the event, including images, thoughts, or perceptions.
(2) Dreams/nightmares
(3) Acting or feeling as if the traumatic event were recurring (including flashbacks)
(4) Intense psychological distress when exposed to reminders
(5) Physiological reactivity when exposed to reminders
Avoidance

(1) efforts to avoid thoughts, feelings, or conversations
(2) efforts to avoid activities, places, or people
(3) inability to recall an important aspect of the trauma
(4) markedly diminished interest or participation in significant activities
(5) feeling of detachment or estrangement from others
(6) restricted range of affect
(7) sense of a foreshortened future
Hyperarousal

(1) difficulty falling or staying asleep
(2) irritability or outbursts of anger
(3) difficulty concentrating
(4) hypervigilance
(5) exaggerated startle response
IOM (2013a) – Risk Factors for PTSD

- Deployment-related stressors
- Combat exposure
- Prior traumatic exposure
- Military sexual trauma
- History of psychological health conditions
- Severe physical injury
Deployment-Related Stressors – Increased Risk of PTSD

- Concerns back home
- Issues with leadership
- Lack of privacy
Combat Experiences Associated to PTSD

- Killing someone
- Threat of personal harm
- Witnessing someone being seriously wounded or killed
- Experiencing “friendly” fire
Prior Traumatic Experiences & PTSD

- More likely to develop PTSD than those with no such history
- 2 or more exposures to violence before entering military increases likelihood of PTSD
- Adverse childhood experiences
Previous Psychological Health Condition

Military personnel with previously diagnosed psychological health conditions, particularly PTSD, are at a greater risk for a repeat diagnosis in theater.
National Guard Soldiers

- Some suffer disproportionately from deployment
- Deployment-related factors include:
  - Financial hardship
  - Job loss
  - Lack of employer support
RAND - Depression

- Review of 12 studies: prevalence of depression in service members who served in OEF or OIF
- 5% to 37% of active-duty service members experience depression

(Tanielian and Jaycox, 2008)
Major Depression
Gadermann et al. (2012)

- Meta-analysis of 25 epidemiological studies looking at depression among U.S. military personnel – DSM-IV definition for Major Depression
- 12% currently deployed service members
- 13.1% of previously deployed
- 5.7% never deployed
Heavy Alcohol Use

- 19.7% of service members versus 13.6% of civilians
- Older service members less likely
- Military personnel aged 18 – 25 – higher rate
How might a veteran with PTSD feel?

- Anxious
- Super alert, hypervigilant in every day settings (fight or flight)
- Difficulty concentrating
- Anger, depression, guilt, fear, concern for your safety or for others etc.
How might a veteran with PTSD feel?

• No longer in control of your feelings
• Becoming distant, numb in your relationships
• Reduced range and intensity of the emotions
Evidence Based Treatments for Post-Traumatic Stress (PTS)

- Prolonged Exposure Therapy
- Cognitive Processing Therapy (CPT)
- Cognitive Behavioral Therapy (CBT)
- Couples Therapy for PTS
- Pharmacological Treatments
Prolonged Exposure Therapy (PE)

Two parts to PE Therapy:

• Imaginal exposure - Guided by a trusted clinician you re-imagine the situation that caused your trauma to decrease its power.

• In-vivo exposure - Confront situations that you avoid and feel anxious about. In-vivo allows you to feel safe again.
  – Thinking about a traumatic experience is not dangerous;
  – Result: You become less fearful of situations that remind you of your trauma.
Cognitive Processing Therapy (CPT)

- Consists of two integrated components:
  - Cognitive therapy and exposure. Writing and reading about the events
  - Rethinking negative thoughts (5 core themes: safety, esteem, trust, power, intimacy)
- Connecting trauma-related thoughts with feelings and behaviors
- Understanding unhelpful thinking patterns
- Learning new and healthier ways of thinking
Mild Traumatic Brain Injury
Traumatic brain injuries occur on a broad continuum of severity, from very mild transient injuries to catastrophic injuries resulting in death or severe disability.
Continuum of TBI Severity

Very mild/transient  Uncomplicated mild  Complicated mild  Moderate  Severe  Catastrophic

Approximately 90% of all injuries
## DoD Numbers for TBI Worldwide- 2000-2014

<table>
<thead>
<tr>
<th>Type of TBI</th>
<th>Worldwide Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Penetrating</td>
<td>4,538</td>
</tr>
<tr>
<td>Severe</td>
<td>3,088</td>
</tr>
<tr>
<td>Moderate</td>
<td>25,370</td>
</tr>
<tr>
<td>Mild</td>
<td>253,350</td>
</tr>
<tr>
<td>Not Classifiable</td>
<td>20,937</td>
</tr>
<tr>
<td>All Severities Total</td>
<td>307,283</td>
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</tbody>
</table>

Source: Defense Medical Surveillance System (DMSS), Theater Medical Data Store (TMDS) provided by the Armed forces Health Surveillance Center (AFHSC). Prepared by the Defense and Veterans Brain Injury Center (DVBIC).
DoD Numbers for TBI Worldwide
(source: DVBIC)

- 6.8% Penetrating TBI
- 1.0% Severe TBI
- 1.5% Moderate TBI
- 8.3% Mild TBI
- 82.4% Not Classifiable
Pathoanatomy & Pathophysiology
Most parts of the brain are vulnerable to traumatic injury.

The anterior portion of the brain is most likely to be affected (i.e., frontal and temporal regions).
Vulnerability of the Vascular System
Vulnerability of the Vascular System
(multi echo SWI venogram)
Why is White Matter Vulnerable?

1. Anatomy
2. Physics & Forces
Neurological & Neuropsychiatric Problems
Moderate and severe traumatic brain injuries can result in temporary, prolonged, or permanent neurological or neuropsychiatric problems.
Balance Problems & Dizziness

Cranial Nerve Impairments

Fatigue & Sleep Disturbance

Headaches

Movement Disorders (e.g., bradykinesia, tremor, dystonias)

Motor Impairments (e.g., hemiparesis, ataxia, apraxia)

Sexual Dysfunction

Visual Impairments (blurred vision, double vision)
Depression & Anxiety Disorders
Psychotic Disorders
Diminished Awareness (e.g., anosognosia)
Personality Changes, apathy, and decreased motivation
Cognitive Impairment
Mild Traumatic Brain Injuries are Not Created Equally
Spectrum of MTBI

Extremely Mild (Transient)  Structural Damage (Permanent)
Continuum of Pathophysiology

Minor Neurometabolic

Major Neurometabolic & Pathoanatomical (e.g., Contusion)
Continuum of Biological & Psychological Vulnerability

Extremely Hardy Vulnerable  Extremely

Their Mission Is Complete. Ours Has Just Begun.
How Do Service Members Sustain MTBIs?

- Sports (before, during, or after military service)
- Daily life (MVAs, falls, struck by object, fights)
- On the job (during military training or through an accident)
- During a military deployment (e.g., combat or through an accident on base)
Recovery from Concussion in Sports
By definition, a sport-related concussion is a mild traumatic brain injury.
Post-Concussion Scale: Symptoms Endorsed Acutely

- 260 acutely concussed high school and college athletes
- All assessed within 5 days
- Mean = 2.0 days; SD = 1.2 days
- 88% assessed within 3 days

(Lovell et al., 2006)
Most Common Symptoms

- Headaches (78.5%)
- Fatigue (69.2%)
- Feeling slowed down (66.9%)
- Drowsiness (64.2%)
- Difficulty concentrating (65.8%)
- Feeling mentally foggy (62.3%)
- Dizziness (61.2%)

(Lovell et al., 2006)
Least Common Symptoms

- Nervousness (21.2%)
- Feeling more emotional (17.7%)
- Sadness (15.0%)
- Numbness or tingling (14.6%)
- Vomiting (8.8%)

(Lovell et al., 2006)
Recovery Time
NCAA Football Cohort

- 1,631 players
- 94 concussions
- Balance problems resolved in 3-5 days
- Symptoms gradually resolved by 7 days
- Cognition resolved by 5-7 days
- 91% appeared recovered by 7 days

McCrea et al. (2003)
Pennsylvania High School Football Cohort

- 2,141 players
- 3-year prospective cohort study
- 134 concussions
- Players followed until recovered

Recovery Curves (N = 134)

Days Post Injury

- No Previous Concussions
- 1 or More Previous Concussions

- 94% at Day 28
- 84% at Day 31
Recovery from Mild Traumatic Brain Injury in Civilians
Most people recover functionally within 3 months following injury.
Most people return to work within 3 months.

Return to work rates are highly variable across studies and are likely influenced by many factors separate from the injury to the brain.
Civilians who sustain an MTBI are at substantially increased risk for experiencing depression in the first year following injury.

The etiology of depression is likely individualized and multifactorial.
Post-concussion-like symptoms can be mimicked or magnified by traumatic stress, anxiety, pain, depression, sleep disturbance, and social psychological factors at any point in the recovery trajectory.
Individuals who are symptomatic at 3-6 months are at considerable risk for being symptomatic at 1-2 years post injury.
Factors Affecting Recovery Time

- General health
- Previous concussions / neurological problems
- Pre-injury mental health problems
- Mechanism of Injury: MVA vs. Sports
- Acute Psychological Distress in the first few days
- Severity of concussion symptoms in the first week
- Post-Acute co-occurring conditions (depression, PTSD, chronic pain)
- Personality Characteristics
  - Motivation
  - Litigation
Education and Reassurance
There is some evidence that early education and reassurance can help patients manage symptoms better and can facilitate positive expectations for recovery.
Introduction to the Post-Concussion Syndrome
Introduction to the Post-Concussion Syndrome

- What is it?
- How long does it last?
- Can it be misdiagnosed?
ICD-10 Criteria for Postconcussional Syndrome

- Must endorse symptoms in at least 3 domains
  - Physical
  - Emotional
  - Cognitive
  - Insomnia
  - Excessive worry over symptoms
  - Intolerance for alcohol
• Physical Symptoms (headache, dizziness, balance problem, noise sensitive, light sensitive, and/or fatigue)

• Emotional Symptoms (irritability, sadness, nervousness, and/or feeling more emotional),

• Cognitive Symptoms (poor concentration, poor memory); and

• Insomnia (trouble falling asleep and/or sleeping less than usual).
Post-Concussion Syndrome

• More common in women than men.
• Pre-injury mental health problems are a major risk factor.
• It is associated with or influenced by traumatic stress in service members, veterans, and civilians.
• Persistent symptoms at 1 or 3 months are a risk factor for persistent symptoms at 1 year.
• Easy to misdiagnose in people with depression, anxiety, PTSD, and chronic pain.
The Nonspecificity Conundrum

Symptoms of the post-concussion syndrome are common in people with other health problems
“Postconcussion-Like” Symptoms are Common in:

University students
Mental health outpatients
General medical patients
Chronic pain patients
Personal injury litigants
‘Postconcussive’ symptoms in persons with chronic pain

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[Received 2nd April 1997; accepted 27 April 1997]
“Post-Concussion-Like” Complaints in Pain Patients

- 170 patients seen for a psychological evaluation
- None had brain injuries or diseases
- Cognitive complaints were common

Iverson & McCracken (1997)
DSM-IV Self-Report Criteria for Post-Concussional Disorder

- 39% met self-report criteria for Post-Concussional Disorder
Examination of “Postconcussion-Like” Symptoms in a Healthy Sample

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PCS-Like Symptoms in Community Volunteers

- 104 community control subjects from the greater Vancouver area
- Exclusion criteria: (a) previous mental health problem, (b) brain injury, (c) neurological disorder, (d) substance abuse.
- All completed a PCS checklist patterned after the ICD-10 Criteria.

Iverson & Lange (2003)
PCS-Like Symptoms in Community Controls (Blue = Mild; Red = Mod-Severe)

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Mild</th>
<th>Moderate-Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Headaches</td>
<td>52</td>
<td>3</td>
</tr>
<tr>
<td>Fatigue</td>
<td>76</td>
<td>14</td>
</tr>
<tr>
<td>Noise Sensitivity</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>Concentration</td>
<td>61</td>
<td>16</td>
</tr>
<tr>
<td>Memory</td>
<td>51</td>
<td>14</td>
</tr>
</tbody>
</table>
ICD 10 Diagnostic Criteria

72.1%

Moderate – Severe Symptom Endorsement

12.5%
Misdiagnosis of the persistent postconcussion syndrome in patients with depression

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Accepted 14 December 2005
Misdiagnosis of PCS in Depression

- 64 patients with depression
- Diagnosed and referred by family physician or psychiatrist
- Independently confirmed diagnosis with SCID-I

Iverson (2006)
PCS-Like Symptoms in Patients with Depression (Blue = Mild; Red = Mod-Severe)
ICD 10 Diagnostic Criteria

89.1%

Moderate – Severe Symptom Endorsement

57.8%
Treatment and Rehabilitation
Mild Traumatic Brain Injury

Treatment and rehabilitation that is symptom focused is recommended in the initial weeks and months following injury.
Basic Principles: Initial Months Following Injury

• Focused, Evidence-Based Treatment for Specific Symptoms and Problems
  – Medications
  – Physical Therapy
  – Vestibular Rehabilitation
  – Visual Rehabilitation
  – Exercise
  – Psychological Treatment
Careful and Comprehensive Assessment = Targets for Treatment and Rehabilitation
Reduce Symptoms; Improve Function

- Sleep Disturbance
- Stress & Anxiety
- Depression
- Deconditioning
- Headaches
- Bodily Pain
Resources:
Defense and Veterans Brain Injury Center
http://dvbic.dcoe.mil/resources/browse
Progressive Return to Activity Following Acute Concussion/
Mild Traumatic Brain Injury: Guidance for the Primary Care
Manager in Deployed and Non-deployed Settings

Assessment and Management of
Dizziness Associated with Mild TBI
Guidelines for Concussion/Mild Traumatic Brain Injury & Persistent Symptoms

Second Edition

For adults (18+ years of age)

Complete Version

Ontario Neurotrauma Foundation
Fondation ontarienne de neurotraumatologie
Treat what you can treat

- Many of the treatment and rehabilitation approaches that are effective for traumatic stress, depression, and chronic pain can be adapted for use with individuals who have symptoms and problems that are believed to be partially or largely related to an MTBI.
Conclusions
Success begets success.

Treat what you can treat.

Reduce symptoms.

Cognitive Difficulty & PCS Symptoms

- Depression
- Post-Traumatic Stress
- Anxiety/Cognitive Hypochondriasis
- Life Stress
- Insomnia/Sleep Disturbance
- Chronic Bodily Pain
- Chronic Headaches
- Brain Injury
- Vestibular Injury