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Treating Clients With Traumatic Brain Injury

Traumatic brain injury (TBI) is a frequent but under-recognized condition co-occurring with substance use disorder (SUD). TBI can cause a wide range of cognitive and behavioral consequences that interfere with a client's ability to adhere to substance abuse treatment.

Some clients with TBI enter substance abuse treatment with their injury diagnosed, while others may enter with an undiagnosed TBI that has lingering effects. Treatment counselors also may not recognize clients who have been affected by TBI because its effects overlap with those of SUD and other co-occurring conditions such as depression, generalized anxiety disorder, and posttraumatic stress disorder (PTSD).

Substance abuse treatment counselors need to be aware that TBI may be a health condition affecting their clients. Through observation and questioning, counselors can try to identify clients whose functioning is affected by TBI and who may require special strategies in their treatment for SUD. Counselors also can incorporate these important facts into relapse prevention messages for all clients: that substance abuse increases the likelihood of a first or recurrent TBI and that TBI compounds the brain function problems caused by substance abuse.

What Is TBI?

TBI is a disruption of normal brain function that occurs when the skull is struck, suddenly thrust out of position, penetrated, or struck by blast pressure waves.[1,2] Common causes of TBI include:

- Falls from a height or on the same level.
- Motor vehicle crashes, which may include collision of the head against a windshield or steering wheel or whiplash (the brain striking the skull, scraping against its base, or twisting).
- An object hitting the head, such as a bullet, flying debris, or a falling object.
- The head colliding with an object (e.g., a wall) or with another person (e.g., in a contact sport).
- Assaults causing either blunt or penetrating trauma.
- Explosions in which an intense wave of pressure passes through the skull.

The initial trauma tears, shears, or destroys brain tissue. These effects may cause a second injury cascade in the brain including internal bleeding, edema (swelling), oxygen deprivation, and neurochemical responses leading to cell death. A TBI can affect a single, specific region of the brain (a focal injury), neural cells and tissues distributed throughout the brain (a diffuse injury), or both.

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How Common Is TBI?

Each year, an estimated average of 1.7 million TBIs occur in the United States. Of those sustaining these injuries, 52,000 die, 275,000 are hospitalized, and 1.365 million—nearly 80 percent—are treated and released from emergency departments. Potentially hundreds of thousands more individuals sustain TBI each year but are not included in the data sets used to form these estimates because they do not seek medical treatment or because they are treated in physicians' offices, urgent care clinics, or Federal, military, or Veterans Affairs hospitals.[3]

In every age group, TBI rates are higher for males than for females. Among the age groups that have the highest proportions of TBI are adolescents ages 15–19 and adults ages 75 and older.[3] Sports-related TBIs alone are estimated at between 1.6 million and 3.8 million each year.[4] For service members in Iraq or Afghanistan, the main TBI risk is from an improvised explosive device (IED) such as a roadside bomb. Helmets and body armor provide some protection against penetrating head injury and, to a lesser extent, head-impact events. However, the brain remains vulnerable to the effects of blast waves from IEDs. Gunshot wounds as well as combat- or training-related falls and motor vehicle crashes are other causes of service-related TBI. It is estimated that some 320,000 of the 1.64 million service members deployed to Iraq and Afghanistan through October 2007 may have incurred TBI.[5]

What Are the Links Between SUD and TBI?

Epidemiological surveys have established that acute intoxication or SUD dramatically increases risk of TBI and impairs TBI recovery. The data are described below.

History of substance abuse is a risk factor for TBI. Among patients hospitalized for TBI, between one-third and four-fifths have histories of substance misuse, with alcohol being the most commonly reported misused substance.[6,7,8]

Alcohol use at time of injury is a common occurrence with TBI. Approximately three-quarters of all patients with TBI have measurable amounts of alcohol in their blood when admitted to the hospital,[8] and one-third to one-half of them are intoxicated at the time of injury.[6,7]

Prior TBI is common among individuals in substance abuse treatment. In a review of five studies of people in substance abuse treatment, estimates for prior TBI ranged from 38 percent to 63 percent.[9] In another study of 7,784 adults in State-funded substance abuse treatment programs, almost one-third of persons assessed at intake reported a history of one or more head injuries for which they lost consciousness or were hospitalized at least 1 night.[10]

Substance abuse is linked to worse outcomes from TBI. Brain imaging studies and neuropsychological testing indicate that SUD and TBI compound the negative effects each has on brain structure and function.[9] A substance abuse history is associated with worse outcomes from TBI including greater likelihood of mortality, complications, and poorer hospital or emergency department discharge status,[6] as well as ongoing disability and nonproductivity a year or more after brain injury.[11]

Substance abuse is linked to recurrent TBI. TBI related to alcohol use increases the risk of subsequent TBI, often alcohol-related; this risk extends for several years after the first injury.[12]

It is not yet known whether a TBI itself increases risk of SUD in persons otherwise not at psychological or psychiatric risk of addiction at the time of injury. Some evidence suggests that TBI, especially to frontal cortex regions, may induce deficits in executive function (cognitive processes affecting mental control and self-regulation) that confer risk for SUD generally.[13]

How Is TBI Diagnosed?

TBI is initially diagnosed as mild, moderate, or severe, based on the individual's condition at the time of injury. About 75 percent of all TBIs are mild.[14] Concussion is often used as a synonym for mild TBI, especially in reference to sports injuries.

A TBI diagnosis is based on one or more of the following criteria: loss of consciousness, memory loss for events immediately before or after the injury, confusion and disorientation, and neurologic signs such as a wound to the skull, seizures, or headache[15] (a person who does not lose consciousness may still be diagnosed with TBI if other criteria are met). Brain imaging techniques such as computed tomography or magnetic resonance imaging (commonly referred to as CT scan and MRI, respectively) can sometimes capture signs of TBI. Patients with moderate or severe TBI may have pronounced physical symptoms such as paralysis.

Compared with moderate or severe TBI, mild TBI can be difficult to diagnose because the acute symptoms and signs resolve quickly in most people and there may not be a visible head wound to indicate injury. In many cases, brain imaging is inconclusive and does not aid in diagnosis.[15] Also, many people who incur a mild TBI do not seek medical treatment. As a result of these diagnostic challenges, clients in substance abuse treatment may not report a prior TBI when providing their medical history on admission.

What Are the Effects of TBI?

In the days or weeks after a brain injury, cognitive effects may emerge involving the ability to think efficiently, multitask, and persevere at a task without becoming mentally exhausted or irritable.[16] Some individuals have impaired executive function. Their sensory functions may be affected so that light levels seem too bright and normal noises too loud and distracting. These people also may have reduced capacity to read, see, or hear. Social judgment, self-awareness, and regulation of emotions may be affected. Exhibit 1 lists common effects of TBI. This list should be interpreted with caution, because many of the effects are characteristic of other psychiatric disorders, including affective disorders and addiction. Substance abuse treatment counselors should therefore be aware that these effects may be difficult to differentiate from the effects of a psychiatric disorder, SUD, or withdrawal. The level and duration of TBI effects vary dramatically from person to person depending on the severity and location of the brain injury, time that has elapsed since injury, the individual's age when injured (injury during childhood and adolescence carries more risk), health and cognitive status of the individual before injury, rehabilitation provided after injury, and substance abuse history.

Exhibit 1. Common Effects of TBI

Motor and Sensory Effects	Cognitive Problems	Emotional Effects
• Dizziness, lightheadedness, or vertigo • Fatigue or lethargy • Gait disorders[17] • Headaches and other pain symptoms • Nausea[17] • Sensory impairments (blurred vision, sensitivity to light or sound, ringing in the ears, persistent noxious smell or taste in mouth, itching)[18] • Sleep disturbances • Weakness[17]	• Executive function problems affecting ability to organize thoughts and plans, follow through on intended actions, do abstract reasoning, solve problems, make judgments, or read[18] • Impaired attention and concentration • Language and communication impairments[18] • Reduced cognitive speed and endurance[16] • Reduced multitasking abilities[16] • Worsened memory	• Aggression and irritability • Anxiety • Apathy or lack of spontaneity • Difficulty regulating emotions • Impulsive, disruptive, or socially inappropriate behavior • Lack of self-awareness (including lack of awareness of cognitive deficits)[16] • Personality changes[18]

Source: Note 19 unless otherwise indicated.

Are TBI Effects Permanent?

Many individuals with TBI make a full recovery—some quickly and others over weeks or months. However, even mild TBI can have long-lasting cognitive and behavioral effects that impair the ability to work and engage in usual activities. Multiple TBIs are cumulative in effect and, even if mild, can result in severe brain damage.

Approximately 1 percent of the U.S. civilian population, or 3.17 million people, are living with a long-term disability from TBI that may limit their ability to work or perform daily activities without assistance.[20] Some individuals who appear to have recovered find that their symptoms recur when they are under stress.

How Does TBI Affect Substance Use?

TBI is strongly associated with subsequent abstinence or reduced consumption.[21,22,23] Factors contributing to reduced substance use include intense clinical monitoring during hospitalization or advice from outpatient healthcare providers to abstain, decreased access to alcohol or drugs (e.g., because of physical disability or close monitoring by caregivers), decreased tolerance to substances, or decisions to make life changes after the brain injury. For some, however, the reduction in use is only temporary.[23]

A minority begins drinking or increases alcohol consumption in the first year after injury.[21,22] A history of substance abuse before sustaining a TBI is a risk factor for heavy drinking afterward.[21,22] In addition, stimulants and opioid analgesics frequently used to treat cognitive disruption or pain from the TBI have abuse potential. These substance use patterns have several implications for treatment counselors:

- TBI can be a triggering event that impels clients to reform their substance use patterns.
- Elapsed time from TBI increases the risk for return to former patterns of abuse.
- Individuals with abuse patterns before the injury may need increased continuing care and extra emphasis on relapse prevention.

Is TBI Linked to Other Conditions Besides SUD?

Several conditions that frequently co-occur with SUD also co-occur with TBI. These conditions can complicate the substance abuse treatment provider's effort to determine whether TBI is contributing to a client's difficulty in treatment.

Risk is elevated for psychiatric disorders following TBI. Susceptibility is greatest for depression, generalized anxiety disorder, and PTSD.[24,25,26] Conversely, risk is elevated for TBI among individuals diagnosed with such psychiatric disorders.[27]

Suicide Risk

The risk for committing suicide is two to four times greater for individuals with TBI than for the general population.[28] Even mild brain injury increases risk. When a psychiatric disorder or SUD co-occurs with TBI, the risk for attempted or completed suicide is further increased.[28,29]

Chronic pain is another disorder that can co-occur with a client's TBI. It affects about half of all individuals with TBI, even those with mild injury.[30] The co-occurrence of PTSD with TBI appears to exacerbate pain.

How Can a Counselor Tell Whether a Client Is Affected by TBI?

Consistent failure in completing tasks, disinterest, inappropriate social behavior, lack of self-awareness, and tangential speech (making irrelevant and unrelated statements) are among the red-flag behaviors of the person with TBI. They also are typical for the client in substance abuse treatment. Counselors are advised to investigate whether head injury is involved before imposing consequences for a client's nonadherent treatment behavior. Counselors can ask questions using simple, nonmedical terms: "Have you ever been knocked out?" or "Did you lose any memory after being hit?" For young clients especially, it may be appropriate to ask about involvement with contact

sports such as football that may have caused hits to the head. To help differentiate between a true thought disorder, psychosis, and other psychiatric disorders, it is important to use a valid and reliable structured or semistructured interview when conducting an assessment. Exhibit 2 provides links to such tools. Counselors should follow their facility's procedures for referring clients with suspected TBI impairments to a physician (preferably one who is familiar with both SUD and TBI) for a thorough assessment.

Exhibit 2. TBI Screening and Management Tools

The Ohio Valley Center for Brain Injury Prevention and Rehabilitation has developed a screening tool for use by nonexperts to identify clients who may need support in treatment because of a TBI history. The T-B-I Screening Tool uses a series of questions to help clients recall and characterize head injuries.[31] It also includes information for working with clients who have TBI. The tool can be accessed at http://www.tbied.com/media/2009/06/15/TBI-Screening_v2_.pdf.

A clinical practice guideline from the Department of Veterans Affairs and the Department of Defense includes a structured interview for collecting head trauma event characteristics (Appendix B) as well as management guidance for the individual with concussion/mild TBI.[32] It can be accessed at http://www.healthquality.va.gov/mtbi/concussion_mtbi_full_1_0.pdf.

Treatment Improvement Protocol (TIP) 29: *Substance Use Disorder Treatment for People With Physical and Cognitive Disabilities* can be accessed at http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=hssamhsatip&part=A52487.[33]

Clients referred into treatment for TBI may be able to access a range of rehabilitative services, including exercises to improve memory, problemsolving ability, attention span, speech, reading, and physical functioning; instruction in coping and compensatory strategies; and skills and vocational retraining. TBI treatment also can include therapy and medication to treat injury symptoms such as seizures, pain, anxiety, depression, or sleep problems.

What Strategies Should Counselors Use for Clients With TBI?

The tools listed in Exhibit 2 can be helpful to substance abuse treatment counselors who have clients with TBI-related cognitive limitations. Such clients can benefit from a low-stimulus counseling environment with few distractions and frequent rest breaks. They also are best supported by structured instruction, presented in a variety of formats and aimed at helping them acquire adaptive and coping skills.

Counselors may need to keep the pace slow and to repeat information frequently, in short and concise segments. Feedback (including feedback on behavior) should be specific, immediate, direct, and positive. Counselors should keep in mind that inappropriate client behavior may be unintentional; in such cases, the client can benefit from gentle redirection. Counselors should avoid confrontation, which can agitate the client and shut down thinking. Counselors also can encourage clients to rehearse desired actions and to adopt reminder systems such as calendars, lists, or electronic devices like those described in Exhibit 3 (see next page). Other actions counselors can take are suggested below.

Coordinate with other providers of care. Collaborative care teams can include physicians as well as specialists for physical and neurological rehabilitation, psychiatric disorders, vocational rehabilitation, employment services, and family support services. Case management services are helpful for clients with co-occurring SUD and TBI.[34] If the case manager is not from the substance abuse treatment facility, the counselor may have to educate the case manager about substance abuse treatment and how it affects a client's needs.

Promote an expectation that the brain injury will heal. Many TBIs resolve over time. This reassurance can contribute to recovery from TBI. The client who is frustrated and discouraged can be helped by knowing that the head will continue to "clear" and his or her

Exhibit 3. Assistive Technologies for Clients With TBI

Cell phones, smart phones, and other forms of personal digital assistants can be used by clients with cognitive issues to remember essential information, navigate daily tasks, be reminded of appointments or times to take medication, and stay focused on treatment goals. Counselors can send the client text messages or voice reminders (these can be automated), and they can help the client program the devices to provide timer beeps, visual cues, maps, or other cognitive aids. A database of the burgeoning variety of assistive devices and software is available at http://www.abledata.com.

ability to adhere to the recovery plan will improve with time and practice.

Educate clients about the need to remain abstinent to avoid another TBI.[8] Counselors can reinforce the client's motivation for recovery by emphasizing that relapse can worsen the adverse cognitive and emotional effects of his or her TBI. Relapse also increases risk of a repeat TBI, which can cause even greater brain damage.

Encourage clients to join a TBI support group. Rehabilitation facilities often organize TBI support groups. Alternatively, substance abuse treatment programs can form in-house groups or provide peer mentors for clients affected by TBI.

Provide incentives. A small gift certificate (e.g., $20) for completing the intake process can accelerate the decision by a person with TBI to commit to a substance abuse treatment plan.[35] Gift certificates also can positively affect early attendance and retention.[36]

Offer motivational support. Clients with TBI may benefit from systematic motivational counseling (an intensive form of motivational counseling) when it is used as an adjunct to other therapeutic techniques.[37] Booster sessions following motivational counseling may help clients remain abstinent.

Support client's coping skills. Positive coping styles (e.g., actively addressing the problem, using humor to counteract stress, making time for enjoyable activities) help the client with SUD and TBI adjust to the distress that accompanies decreased functional ability. These adjustments in turn may reinforce effective coping.[38]

Resources for Additional Information

Brain Injury Association of America
http://www.biausa.org

Brainline.org
http://www.brainline.org

Centers for Disease Control and Prevention, National Center for Injury Prevention and Control Traumatic Brain Injury Page
http://www.cdc.gov/TraumaticBrainInjury/index.html

Defense and Veterans Brain Injury Center
http://www.dvbic.org

National Institute of Neurological Disorders and Strokes, Traumatic Brain Injury Information Page
http://www.ninds.nih.gov/disorders/tbi/tbi.htm

Relevant Publications From SAMHSA

TIP 29: *Substance Use Disorder Treatment for People With Physical and Cognitive Disabilities* (SMA) 08-4078

Anger Management for Substance Abuse and Mental Health Clients: A Cognitive Behavioral Therapy Manual (SMA) 08-4213; also available in Spanish (SMA) 07-4188

Anger Management for Substance Abuse and Mental Health Clients: Participant Workbook (SMA) 08-4210; also available in Spanish (SMA) 08-4189

These publications can be ordered from the Substance Abuse and Mental Health Services Administration (SAMHSA) by calling 1–877–SAMHSA–7

(1–877–726–4727). They can also be downloaded from the Knowledge Application Program Web site at http://www.kap.samhsa.gov.

Notes

[1]Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. (2009). *Traumatic brain injury.* Retrieved September 21, 2010, from http://www.cdc.gov/traumaticbraininjury

[2]Taber, K. H., Warden, D. L., & Hurley, R. A. (2006). Blast-related traumatic brain injury: What is known? *Journal of Neuropsychiatry & Clinical Neurosciences, 18*(2), 141–145.

[3]Faul, M., Xu, L., Wald, M. M., & Coronado, V. G. (2010). *Traumatic brain injury in the United States: Emergency department visits, hospitalizations, and deaths, 2002–2006.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

[4]Langlois, J. A., Rutland-Brown, W., & Wald, M. M. (2006). The epidemiology and impact of traumatic brain injury: A brief overview. *Journal of Head Trauma Rehabilitation, 21*(5), 375–378.

[5]Tanielian, T. J., & Jaycox, L. H. (2008). *Invisible wounds of war: Psychological and cognitive injuries, their consequences, and services to assist recovery.* Santa Monica, CA: RAND Corporation.

[6]Corrigan, J. D. (1995). Substance abuse as a mediating factor in outcome from traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 76*(4), 302–309.

[7]Parry-Jones, B. L., Vaughan, F. L., & Cox, W. M. (2006). Traumatic brain injury and substance misuse: A systematic review of prevalence and outcomes research (1994–2004). *Neuropsychological Rehabilitation, 16*(5), 537–560.

[8]Taylor, L. A., Kreutzer, J. S., Demm, S. R., & Meade, M. A. (2003). Traumatic brain injury and substance abuse: A review and analysis of the literature. *Neuropsychological Rehabilitation, 13*(1/2), 165–182.

[9]Corrigan, J. D. (2005). Substance abuse. In W. M. High, Jr., A. M. Sander, M. A. Struchen, & K. A. Hart (Eds.), *Rehabilitation for traumatic brain injury* (pp. 133–155). New York: Oxford University Press.

[10]Walker, R., Cole, J. E., Logan, T. K., & Corrigan, J. D. (2007). Screening substance abuse treatment clients for traumatic brain injury: Prevalence and characteristics. *Journal of Head Trauma Rehabilitation, 22*(6), 360–367.

[11]Willemse-van Son, A. H., Ribbers, G. M., Verhagen, A. P., & Stam, H. J. (2007). Prognostic factors of long-term functioning and productivity after traumatic brain injury: A systematic review of prospective cohort studies. *Clinical Rehabilitation, 21*(11), 1024–1037.

[12]Winqvist, S. H., Luukinen, H., Jokelainen, J., Lehtilahti, M., Näyhä, S., & Hillbom, M. (2008). Recurrent traumatic brain injury is predicted by the index injury occurring under the influence of alcohol. *Brain Injury, 22*(10), 780–785.

[13]Bjork, J. M., & Grant, S. J. (2009). Does traumatic brain injury increase risk for substance abuse? *Journal of Neurotrauma, 26*(7), 1077–1082.

[14]Gerberding, J. L., & Binder, S. (2003). *Report to Congress on mild traumatic brain injury in the United States: Steps to prevent a serious public health problem.* Atlanta, GA: Centers for Disease Control and Prevention, National Center for Injury Prevention and Control.

[15]Ruff, R. M., Iverson, G. L., Barth, J. T., Bush, S. S., Broshek, D. K., & the NAN Policy and Planning Committee. (2009). Recommendations for diagnosing a mild traumatic brain injury: A National Academy of Neuropsychology education paper. *Archives of Clinical Neuropsychology, 24*(1), 3–10.

[16]Lux, W. E. (2007). A neuropsychiatric perspective on traumatic brain injury. *Journal of Rehabilitation Research and Development, 44*(7), 951–962.

[17]Department of Veterans Affairs. (2004). *Traumatic brain injury.* Retrieved September 21, 2010, from http://www.publichealth.va.gov/docs/vhi/traumatic_brain_injury.pdf

[18]National Institute of Neurological Disorders and Stroke. (2002). *Traumatic brain injury: Hope through research.* NIH Publication No. 02-2478. Retrieved September 21, 2010, from http://www.ninds.nih.gov/disorders/tbi/detail_tbi.htm

[19]American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

[20]Zaloshnja, E., Miller, T., Langlois, J. A., & Selassie, A. W. (2008). Prevalence of long-term disability from traumatic brain injury in the civilian population of the United States, 2005. *Journal of Head Trauma Rehabilitation, 23*(6), 394–400.

[21]Bombardier, C. H., Temkin, N. R., Machamer, J., & Dikmen, S. S. (2003). The natural history of drinking and alcohol-related problems after traumatic brain injury. *Archives of Physical Medicine and Rehabilitation, 84*(2), 185–191.

[22]Horner, M. D., Ferguson, P. L., Selassie, A. W., Labbate, L. A., Kniele, K., & Corrigan, J. D. (2005). Patterns of alcohol use 1 year after traumatic brain injury: A population-based, epidemiological study. *Journal of the International Neuropsychological Society, 11*(3), 322–330.

[23]Ponsford, J., Whelan-Goodinson, R., & Bahar-Fuchs, A. (2007). Alcohol and drug use following traumatic brain injury: A prospective study. *Brain Injury, 21*(13–14), 1385–1392.

[24]Kennedy, J. E., Jaffee, M. S., Leskin, G. A., Stokes, J. W., Leal, F. O., & Fitzpatrick, P. J. (2007). Posttraumatic stress disorder and posttraumatic stress disorder-like symptoms and mild traumatic brain injury. *Journal of Rehabilitation Research and Development, 44*(7), 895–920.

[25]Rogers, J. M., & Read, C. A. (2007). Psychiatric comorbidity following traumatic brain injury. *Brain Injury, 21*(13–14), 1321–1333.

[26]Silver, J. M., Kramer, R., Greenwald, S., & Weissman, M. (2001). The association between head injuries and psychiatric disorders: Findings from the New Haven NIMH Epidemiologic Catchment Area Study. *Brain Injury, 15*(11), 935–945.

[27]Vassallo, J. L., Proctor-Weber, Z., Lebowitz, B. K., Curtiss, G., & Vanderploeg, R. D. (2007). Psychiatric risk factors for traumatic brain injury. *Brain Injury, 21*(6), 567–573.

[28]Teasdale, T. W., & Engberg, A. W. (2001). Suicide after traumatic brain injury: A population study. *Journal of Neurology, Neurosurgery and Psychiatry, 71*(4), 436–470.

[29]Mainio, A., Kyllönen, T., Viilo, K., Hakko, H., Särkioja, T., & Räsänen, P. (2007). Traumatic brain injury, psychiatric disorders and suicide: A population-based study of suicide victims during the years 1988–2004 in northern Finland. *Brain Injury, 21*(8), 851–855.

[30]Nampiaparampil, D. E. (2008). Prevalence of chronic pain after traumatic brain injury: A systematic review. *JAMA, 300*(6), 711–719.

[31]Ohio Valley Center for Brain Injury Prevention and Rehabilitation. (2009). *T-B-I screening.* Retrieved September 21, 2010, from http://www.tbied.com/media/2009/06/15/TBI-Screening_v2_.pdf

[32]Department of Veterans Affairs/Department of Defense (Management of Concussion/mTBI Working Group). (2009). *Clinical practice guideline: Management of concussion/mild traumatic brain injury.* Retrieved September 21, 2010, from http://www.healthquality.va.gov/mtbi/concussion_mtbi_full_1_0.pdf

[33]Center for Substance Abuse Treatment. (1998). *Substance use disorder treatment for people with physical and cognitive disabilities.* Treatment Improvement Protocol 29. HHS Publication No. (SMA) 08-4078. Rockville, MD: Substance Abuse and Mental Health Services Administration.

[34]Heinemann, A. W., Corrigan, J. D., & Moore, D. (2004). Case management for traumatic brain injury survivors with alcohol problems. *Rehabilitation Psychology, 49*(2), 156–166.

[35]Corrigan, J. D., Bogner, J., Lamb-Hart, G., Heinemann, A. W., & Moore, D. (2005). Increasing substance abuse treatment compliance for persons with traumatic brain injury. *Psychology of Addictive Behaviors, 19*(2), 131–139.

[36]Corrigan, J. D., & Bogner, J. (2007). Interventions to promote retention in substance abuse treatment. *Brain Injury, 21*(4), 343–356.

[37]Cox, W. M., Heinemann, A. W., Miranti, S. V., Schmidt, M., Klinger, E., & Blount, J. (2003). Outcomes of systematic motivational counseling for substance use following traumatic brain injury. *Journal of Addictive Disorders, 22*(1), 93–110.

[38]Anson, K., & Ponsford, J. (2006). Coping and emotional adjustment following traumatic brain injury. *Journal of Head Trauma Rehabilitation, 21*(3), 248–259.

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