

WELCOME

Post-traumatic Headaches in the Military Population: Initial Management and Alternate Approaches

John L. Rigg, MD

Marc S. Husid, MD

The webinar will begin shortly

Continuing Education

This webinar has been approved for the following:

- **1.5 AMA PRA Category 1 Credits™**
- **1.5 Credits for Psychology**
- **1.5 Nursing Contact Hours**
- **1.75 CE Contact Hours for Physical and Occupational Therapists**
- **1.5 CEHs for Social Work**

To receive CE credits, you are REQUIRED to pre-register for this webinar. If you have not yet registered and received an email confirmation, please register at <http://dcoe.adobeconnect.com/dvbicjanuarywebinar/event/registration.html>.

Registration will remain open until 1:15 p.m. EST.

For full accreditation information, visit www.DVBIC.org and click on “Medical Providers” to access the Winter Webinar Series. It is the responsibility of the participant to understand his or her board’s continuing education requirements.

Additional Webinar Details

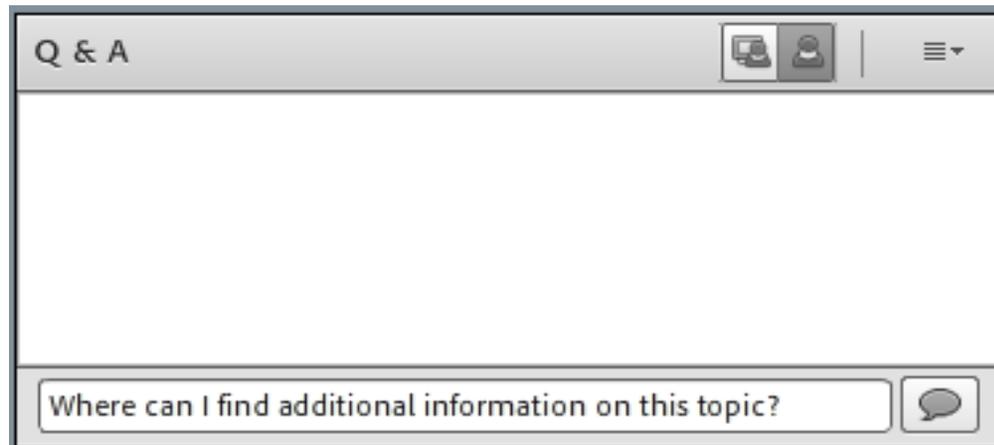
Audio will not be provided via Adobe Connect or DCO.

Please use the following dial-in information to access the audio portion of the webinar.

Dial-In Number: 888-469-0695

Participant Pass code: DCOE

Please submit your questions for the presenters using the **Q&A** box located on your screen. Our presenters will answer questions following the second presentation.



Overview

More than 262,000 U.S. service members have been diagnosed with traumatic brain injury (TBI) since 2000. Of those cases, more than 75 percent were classified as a mild TBI/concussion. Headache is one of the most common symptoms after a concussion and may persist for months to years after injury.

There are no FDA-approved medications for post-traumatic headache and only two — Botox and Topamax — are approved for chronic migraine. The majority of service members who have chronic post-traumatic headache/post-traumatic stress disorder (PTSD) are already on numerous medications for pain, sleep and mood, and are reluctant to add more. Physicians also are concerned about the possibility of drug interactions and/or side effects.

Service members with mTBI/PTSD almost always have numerous co-morbid medical, psychological, social, cultural and spiritual issues that must be addressed for treatment to be successful. In this webinar, we will discuss the multi-disciplinary approach we use to address post-traumatic headaches, as well as specific complementary treatments, such as acupuncture, Qi Gong and mind-body skills.



Dr. John L. Rigg



John L. Rigg, MD, FAAPMR, is actively involved in research and his current projects include investigating the effectiveness of hyperbaric oxygen to improve function after brain injury, developing a method of obtaining objective sleep data, and the use of omega-3 fatty acids to accelerate and improve recovery.

Traumatic Brain Injury Program Director
Neuroscience and Rehabilitation Center, Dwight D. Eisenhower Army
Medical Center, Fort Gordon, GA



Headache Treatment in an mTBI Clinic

John L. Rigg, MD
Traumatic Brain Injury Program Director
Dwight D. Eisenhower Army Medical Center
Fort Gordon, GA

Disclosures

- The views expressed in this presentation represent the views of the speaker and not those of the U.S. Army or Department of Defense
- I do not have a relevant financial relationship to disclose nor do I intend to discuss an off-label/investigative use of a commercial product.

Objectives

- Discuss the presentation of headache as one of the post-concussion symptoms that also include sleep disturbance, memory/cognitive problems, mood issues
- Review the unique affiliation of headache with post-combat stress in service members
- Discuss a multi-disciplinary approach to treatment not only of the symptoms, but also the cause

Discovery consists of seeing what everybody has seen and thinking what nobody has thought.

Albert Szent-Györgyi von *Nagyrapolt* – Hungarian-American biochemist, 1893-1986, awarded the Nobel Prize for Medicine in 1937 for his investigation of biological oxidation processes and of the action of ascorbic acid (vitamin C)

Typical Initial Presenting Symptoms of mTBI May Have Multiple Etiologies

- Headache
- Sleep disturbance
- Memory/cognitive problems
- Mood issues

mTBI + Post-traumatic Stress

- Both TBI and Post-traumatic Stress (PTS) are physiological injuries which need to be treated within the larger context of symptoms including insomnia, pain, mood issues, etc.
 - The perspective of PTS as a psychological injury versus TBI as a physical injury should be avoided
- Most effective treatment is multi-disciplinary and multimodal
- Effective treatment demands a holistic approach – looking at the entire body and not treating only one symptom
- Effectiveness of treatment may be improved by addressing multiple comorbid medical, psychological, social, cultural and spiritual issues

Initial Headache Treatment

- Pharmacological
 - Abortives
 - Prophylactic
- Relaxation/Stress Reduction
 - Referrals to Physical Therapists, Occupational Therapists, Recreational Therapists

Current Pharmacological Treatments

- Provide symptomatic treatment
- Do not “cure” the problems!
- Concern about the possibility of drug interactions and side effects
- What can be done to actually “heal” the injury?

Typical Medical Treatment Model

- Drugs/Surgery
- Psychosocial approach
- Complementary/alternative medicine

Team Approach

The greatest mistake in the treatment of diseases is that there are physicians for the body and physicians for the soul, although the two cannot be separated.

Plato

Multi-disciplinary Approach for mTBI

- Self-care
- Therapies that stimulate capacity for self healing
 - Physical Therapy, Occupational Therapy, Speech Language/Cognitive Therapy, counseling/cognitive-behavioral therapy, group support, diet, exercise, recreation, vocational rehabilitation
- Drugs/surgery

Create Realistic Expectations

Common Sense

“Thinking outside the box”

Stress

- Treatment and alleviation of stress will result in:
 - Improved sleep
 - Decreased headaches
 - Improved memory
 - Mood stabilization

Treatment of Post-combat Stress

- Mind/body skills
- Counseling to help patients recognize and relieve stress
- Cognitive Processing Therapy
- Empowerment
- Possible meds

Techniques Used in Mind-Body Medicine

- Deep-breathing exercises
- Muscle-stretching exercises
- Progressive muscle relaxation
- Physical exercise and movement
- Mental/guided imagery
- Meditation
- Spiritual practices
- Mindful and healthful eating
- Biofeedback

Placebo Effect

- Utilize it to benefit treatment
- Researchers from the University of Lincoln, Harvard Medical School and University of Connecticut conducted a meta-analysis of data from clinical trials of Z-drugs (non-benzodiazepine hypnotics) comparing drug effects with placebo effects
- 13 clinical trials containing 65 different comparisons and more than 4,300 participants
- Once the placebo effect is discounted, the drug effect is of “questionable clinical importance”
- Psychological treatments for insomnia can work as effectively as sleeping tablets in the short term and better in the long term

Effectiveness of non-benzodiazepine hypnotics in treatment of adult insomnia: meta-analysis of data submitted to the Food and Drug Administration. Huedo-Medina TB, Kirsch I, Middlemass J, Klonizakis M, Siriwardena AN. *BMJ*. 2012 Dec 17;345:e8343. doi: 10.1136/bmj.e8343.

Placebo Effect

- A meta-analysis of antidepressant clinical trials indicating that for most patients, difference between drug and placebo was not clinically significant

Initial Severity and Antidepressant Benefits: A Meta-Analysis of Data Submitted to the Food and Drug Administration. Kirsch I, Deacon BJ, Huedo-Medina TB, Scoboria A, Moore TJ, et al. PLoS Med. 2008;5(2):e45. doi: 10.1371/journal.pmed.0050045

- The magnitude of benefit of antidepressant medication compared with placebo increases with severity of depression symptoms and may be minimal or nonexistent, on average, in patients with mild or moderate symptoms. For patients with very severe depression, the benefit of medications over placebo is substantial.

Antidepressant drug effects and depression severity: a patient-level meta-analysis. Fournier JC, DeRubeis RJ, Hollon SD, Dimidian S, Amsterdam JD, Shelton RC, Fawcett J. JAMA 2010 Jan 6;303(1):47-53. doi: 10.1001/jama.2009.1943.



Treatment

Evidence-based guideline update: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society

Neurology 2012;78;1346

S. Holland, S.D. Silberstein, F. Freitag, et al.

CONCLUSIONS

- Petasites (a purified extract from the butterbur plant) is established as effective for migraine prevention (2 Class I studies)
- Riboflavin is probably effective for migraine prevention (1 Class I trial and 1 imprecise Class II study)
- Co-Q10 is possibly effective for migraine prevention (1 Class II study)
- A combination of soy isoflavones (60 mg), dong quai (100 mg), and black cohosh (50 mg) is possibly effective for migraine prevention (1 Class II study). Percutaneous estradiol is possibly effective for migraine prevention (1 Class II study); however, there is an increased risk of migraine recurring after estradiol patch discontinuation
- Magnesium is probably effective for migraine prevention (multiple Class II trials). MIG-99 (feverfew) is probably effective for migraine prevention (1 Class I study, 1 positive Class II study, and 1 underpowered negative Class II study)
- The efficacy of hyperbaric oxygen (HBO) for migraine prevention is unclear (1 imprecise negative Class II study)
- The efficacy of omega-3 for migraine prevention is unclear (1 imprecise Class I study)

Evidence-based guideline update: Report of the Quality Standards Subcommittee of the American Academy of Neurology and the American Headache Society

Neurology 2012;78;1346

S. Holland, S.D. Silberstein, F. Freitag, et al.

RECOMMENDATIONS

Level A

- The following therapy is established as effective and should be offered for migraine prevention:
 - Petasites (butterbur)

Level B

- The following therapies are probably effective and should be considered for migraine prevention:
 - NSAIDs: fenoprofen, ibuprofen, ketoprofen, naproxen, naproxen sodium
 - Herbal therapies, vitamins, and minerals: riboflavin, magnesium, MIG-99 (feverfew)
 - Histamines: histamine SC

Level C

- The following therapies are possibly effective and may be considered for migraine prevention:
 - NSAIDs: flurbiprofen, mefenamic acid
 - Herbal therapies, vitamins, and minerals: Co-Q10, estrogen
 - Antihistamines: cyproheptadine

Level U

- Evidence is inadequate or conflicting to support or refute the use of the following therapies for migraine prevention:
 - NSAIDs: aspirin, indomethacin
 - Herbal therapies, vitamins, and minerals: omega-3
 - Other: HBO

A Study Comprising 81 Migraineurs Showed a Significant Improvement with Magnesium (Mg)

- Attack frequency was reduced by 41.6% in the magnesium group and by 15.8% in the placebo group
- The active treatment group received 600 mg of trimagnesium dicitrate in a water-soluble granular powder taken every morning
 - Peikert A, Wilimzig C, Kohne-Volland R. Prophylaxis of migraine with oral magnesium: Results from a prospective, multi-center, placebo-controlled and double-blind randomized study. *Cephalalgia*. 1996;16:257-263.

Mg

- Koseoglu et al studied the prophylactic effects of 600 mg/day of oral magnesium citrate supplementation in patients with migraine without aura and found that active treatment resulted in a significant decrease in migraine attack frequency and severity
 - Koseoglu E, Talashoglu A, Gonul AS, Kula M. The effects of magnesium prophylaxis in migraine without aura. *Mag Res.* 2008;21:101-108.

Mg

- Another randomized controlled trial (RCT) showed no effect of oral magnesium on migraine likely because of the use of a poorly absorbed magnesium salt, as diarrhea occurred in almost half of patients in the treatment group
 - Pfaffenrath V, Wessely P, Meyer C, et al. Magnesium in the prophylaxis of migraine-A double-blind, placebo-controlled study. *Cephalalgia*. 1996;16:436-440.

Headache – Prophylactic Treatment

- Mg gluconate 400 mg qhs

Butterbur (Petasites hybridus)

- A perennial shrub found throughout Europe and parts of Asia
- Used for many centuries as a remedy for pain, fever, spasms, and wound healing
- Mechanism of action is not fully understood
- Likely acts through calcium channel regulation and inhibition of peptide leukotriene biosynthesis, thus influencing the inflammatory cascade associated with migraine
 - Eaton J. Butterbur, herbal help for migraine. *Nat Pharm.* 1998;2:23-24.
 - Pearlman EM, Fisher S. Preventive treatment for childhood and adolescent headache: Role of once-daily montelukast sodium. *Cephalalgia.* 2001;21:461.
 - Sheftell F, Rapoport A, Weeks R, Walker B, Gammerman I, Baskin S. Montelukast in the prophylaxis of migraine: A potential role for leukotriene modifiers. *Headache.* 2000;40:158-163.

Butterbur (Petasites hybridus)

- The pharmacologically active compounds in butterbur are sesquiterpenes such as petasin and isopetasin
- Also contains pyrrolizidine alkaloids, which are hepatotoxic and carcinogenic, these substances are removed in the commercially available preparations, such as those manufactured by Weber & Weber (Inning am Ammersee, Germany; Petadolex® and others)
- Nonetheless, patients should be advised to use only butterbur products that are certified and labeled “PA-free”

Butterbur (Petasites hybridus)

- In the first RCT, 50 mg of Petadolex® twice daily showed a significantly reduced number of migraine attacks and migraine days per month compared to placebo
 - Grossman M, Schmidrams H. An extract of *Petasites hybridus* is effective in the prophylaxis of migraine. *Int J Clin Pharmacol Ther.* 2000;38:430-435.
- An independent reanalysis of efficacy criteria was subsequently performed because of flawed statistical analyses in the original study, and confirmed the superiority of the butterbur extract over placebo for all primary variables of efficacy
 - Diener HC, Rahlfs VW, Danesch U. The first placebo-controlled trial of a special butterbur root extract for the prevention of migraine: Reanalysis of efficacy criteria. *Eur Neurol.* 2004;51:89-97.

Butterbur (Petasites hybridus)

- A three-arm, parallel-group RCT of 245 patients comparing Petasites extract 75 mg twice daily, Petasites extract 50 mg twice daily, and placebo twice daily
- Results showed that Petasites extract 75 mg twice daily was more effective than placebo in decreasing the number of monthly migraine attacks
- Maximum response was achieved after three months, resulting in an attack reduction of 58% with the higher dose of Petadolex®, compared to the placebo response of 28%
- Petadolex® was well tolerated in these studies, and no serious adverse events occurred
 - Lipton RB, Gobel H, Einhaupl KM, Wilks K, Mauskop A. Petasites hybridus root (butterbur) is an effective preventive treatment for migraine. *Neurology*. 2004;63:2240-2244.

Butterbur (Petasites hybridus)

- The most frequently reported adverse reactions were mild gastrointestinal events, especially eructation (burping)
- Petasites, like most other herbal preparations, should not be taken by pregnant women

Headache – Prophylactic Treatment with CoQ10 150 mg daily

- Two small studies thus far have shown some benefit of CoQ10 in migraine treatment
- In the first, an open-label study of 31 migraineurs who used 150 mg daily of CoQ10 for three months, 61% had at least a 50% reduction in migraine days
- Notably, supplementation was effective within the first month of treatment
- No significant adverse effects were noted
 - Rozen TD, Oshinsky ML, Gebeline CA, et al. Open label trial of Coenzyme Q10 as a migraine preventive. *Cephalalgia*. 2002; 22:137-141.

Prophylactic Treatment with CoQ10

- The second study, a small RCT (n = 42) assessing the efficacy of 100 mg of CoQ10 three times daily, found that CoQ10 significantly decreased attack frequency, headache days, and days with nausea
 - Sandor PS, DiClemente L, Coppola G, et al. Efficacy of coenzyme Q10 in migraine prophylaxis: A randomized controlled trial. *Neurology*. 2005;64:713-715

Prophylactic Treatment with Riboflavin

- Riboflavin, vitamin B2, is a component of two coenzymes (flavin adenine dinucleotide and flavin mononucleotide) that are cofactors in the electron transport chain of the Krebs cycle
- It plays a vital role in membrane stability and the maintenance of energy-related cellular functions

Prophylactic Treatment with Riboflavin

- One well-designed RCT found that it is beneficial in migraine prophylaxis
- Daily use of 400 mg riboflavin for three months resulted in a 50% reduction in attacks in 59% of patients, compared to 15% for placebo
- Two minor adverse reactions, diarrhea and polyuria, were reported in the treatment group
 - Schoenen J, Jacqy J, Lanaerts M. Effectiveness of high-dose riboflavin in migraine prophylaxis. *Neurology*. 1998;50:466-470.

Prophylactic Treatment with Riboflavin

- In a small study investigating the effects of different treatments on auditory evoked cortical potentials in migraineurs, riboflavin and beta blockers were shown to act on two distinct aspects of migraine pathophysiology
- The authors thus suggested that combining these treatments might increase their efficacy without concurrently increasing central nervous system side effects
 - Sandor PS, Afra J, Ambrosini A, Schoenen J. Prophylactic treatment of migraine with beta-blockers and riboflavin: Differential effects on the intensity dependence of auditory evoked cortical potentials. *Headache*. 2000;40:30-35.

Prophylactic Treatment with Riboflavin

- Another pharmacogenetic study demonstrated that riboflavin may be more effective in the treatment of migraine patients with non-H mitochondrial DNA haplotypes
 - DiLorenzo C, Pierelli F, Coppola G, et al. Mitochondrial DNA haplogroups influence the therapeutic response to riboflavin in migraineurs. *Neurology*. 2009;72:1588-1594.

Prophylactic Treatment with Riboflavin

- As riboflavin is effective in deficiencies of the electron transport chain complex I but not in mitochondriopathies related to an isolated complex IV deficiency, the authors suggested that mitochondrial haplogroups differentially influence the activity of the various complexes
- These results may have ethnic implications in that haplogroup H is predominantly found in the European population
 - Penn AMW, Lee JWK, Thuillier P, et al. MELAS syndrome with mitochondrial tRNA^{Leu} (UUR) mutation: Correlation of clinical state, nerve conduction, and muscle 31P magnetic resonance spectroscopy during treatment with nicotinamide and riboflavin. *Neurology*. 1992;42:2147-2152.
 - Bernsen PL, Gabreels FJ, Ruitenbeek W, Hamburger HL. Treatment of complex I deficiency with riboflavin. *J Neurol Sci*. 1993;118:181-187.

Feverfew

- Used to prevent or stop a migraine headache
 - 100-300 mg, up to four times daily, standardized to contain 0.2-0.4% parthenolides
 - Feverfew supplements may also be carbon dioxide extracted and dosed as follows: 6.25 mg, three times daily, for up to 16 weeks

Feverfew

- An herbal preparation used for centuries in the treatment of fevers, headache, infertility, toothaches, inflammation and arthritis
- Originally native to the Balkan mountains in Eastern Europe, now grows throughout Europe, North America, and South America
- Commercially available as the dried leaves of the weed plant *Tanacetum parthenium*, and its anti-migraine action is probably related to the parthenolides within these leaves

Feverfew

- Feverfew may act in migraine prophylaxis by inhibiting platelet aggregation as well as the release of serotonin from platelets and white blood cells
- It may also act as an anti-inflammatory agent through the inhibition of prostaglandin synthesis and phospholipase A
 - Heptinstall S, White A, Williamson L, Mitchell JRA. Extracts of feverfew inhibit granule secretion in blood platelets and polymorphonuclear leukocytes. *Lancet*. 1985;1:1071-1074.
 - Heptinstall S, Goenewegen WA, Spangenberg P, Loesche W. Extracts of feverfew may inhibit platelet behaviour via neutralisation of sulphhydryl groups. *J Pharm Pharmacol*. 1987;39: 459-465.
 - Pugh WH, Sambo K. Prostaglandin synthetase inhibitors in feverfew. *J Pharm Pharmacol*. 1988;40:743-745.
 - Makheja AM, Bailey JM. A platelet phospholipase inhibitor from the medicinal herb feverfew (*Tanacetum parthenium*). *Prostaglandins Leukot Med*. 1982;8:653-660.

Feverfew

- The efficacy of feverfew in migraine prophylaxis has been controversial, as many RCTs conducted in the past three decades have yielded contradictory results
- In addition, a 2004 Cochrane review of double-blind RCTs assessing the clinical efficacy and safety of feverfew in migraine prevention concluded that there was insufficient evidence to suggest that feverfew is more effective than placebo in migraine prophylaxis
 - Pittler MH, Ernst E. Feverfew for preventing migraine. *Cochrane Database Syst Rev.* 2004;(1): CD002286.

Feverfew

- No major safety or tolerability issues were identified, although side effects reported in the RCTs included gastrointestinal disturbances, mouth ulcers, and a “post-feverfew syndrome” of joint aches
- Inconsistent results from the above studies were attributed to wide variations in the strength of the parthenolides and differences in the stability of feverfew preparations
 - Draves AH, Walker SE. Parthenolide content of Canadian commercial feverfew preparations: Label claims are misleading in most cases. *Can Pharm J (RPC)*. 2003;136:23-30.
 - Willigmann I, Freudenstein J. *Production of a Stable Feverfew (Tanacetum Parthenium) Extract as an Active Substance for a Pharmaceutical Product. Poster Symposium. Vienna: Society for Medicinal Plant Research; 1998.*

Feverfew

- Subsequently, a new, more stable feverfew extract (MIG-99) was created
- In an initial RCT involving 147 patients, none of the MIG-99 doses were significant for the primary endpoint, although a subset of high-frequency migraineurs appeared to benefit from treatment
 - Pfaffenrath V, Diener HC, Fisher M, Friede M, Henneicke-von Zepelin HH. The efficacy and safety of *Tanacetum parthenium* (feverfew) in migraine prophylaxis – a double-blind, multicentre, randomized placebo-controlled dose-response study. *Cephalalgia*. 2002;22:523-532.

Feverfew

- In a follow-up multicenter RCT with 170 subjects randomized to 6.25 mg t.i.d. of MIG-99 or placebo, a statistically significant and clinically relevant reduction in migraine frequency in the MIG-99 group compared to placebo was reported
 - Diener HC, Pfaffenrath V, Schnitker J, Friede M, Henneicke-von Zepelin HH. Efficacy and safety of 6.25 mg t.i.d. feverfew CO₂-extract (MIG-99) in migraine prevention – a randomized, double-blind, multicentre, placebo-controlled study. *Cephalalgia*. 2005;25:1031-1041.

Feverfew

- Feverfew should not be used by pregnant women as it may cause uterine contractions resulting in miscarriage or preterm labor
- It can also cause allergic reactions; patients with allergies to other members of the daisy family, including ragweed and chrysanthemums, are more likely to be allergic to feverfew

Exercise – A Positive Effect on Migraine

- Pilot study developed a training program suitable for 16 migraine patients
 - Eight migraine patients completed a 10-week aerobic running exercise program consisting of three workouts per week. The program was developed by sports scientists especially to increase the fitness level
 - Control group of eight patients without any special physical training

Exercise – A Positive Effect on Migraine

- Migraine patients of the exercise group showed both a reduction in the number of migraine days per month ($p=0.048$) and the intensity of the attacks ($p=0.028$). An increase in fitness level resulted in a lowered stress level
 - Darabaneanu et al. Int J Sports Med. 2011 Jun;32(6):455-60.

Our lives are not determined by what happens to us, but by how we react to what happens; not by what life brings to us, but by the attitude we bring to life.

Anonymous

References

- Ademas, RE. et al. The Development of Predatory Aggression and Defense in the Domestic Cat. *Neurological Biology*. 1980; 30; 389-447.
- Bisson, J., Ehlers, A., Matthews, R., Pilling, S., Richards, D., Turner, S. Psychological Treatments for post-traumatic stress disorder: Systematic Review and Analysis. *British Journal of Psychiatry*. 2007;190:97-184
- Bolton, P., Bass, J., Betancourt, T., Speelman, L., Onyango, G., Clougherty, K., Neugebauer, R., Murray, L., Verdelli, H. Interventions for Depression Symptoms Among Adolescent Survivors of War and Displacement in Northern Uganda. *JAMA*. 2007;298(5):519-527.
- Bremner, JD. Long-term Effects of Childhood Abuse on Brain and Neurobiology. *Child Adolesc Psychiatr Clin N Am*. 2003; 12(2); 271-92.
- Bremner, JD, et al. MRI Based Measures of Hippocampal Volume in Patients with PTSD. *American Journal of Psychiatry*. 1995;152; 973-981.

References

- DeBellis, M et al. Development traumatology pt. I: biological stress systems. *Society of Biological Psych*, 1999; 45:1259-1270.
- Gordon, JS., Staples, JK., Blyta, A., Bytyqi, M., Wilson, A. Treatment of Post-traumatic Stress Disorder in Post-War Kosovar Adolescents Using Mind-Body Skills Groups: A Randomized Controlled Trial. *J Clin Psychiatry*. 2008; 69:1469-1476.
- Gordon, JS., Staples, JK. Effectiveness of a Mind-Body Skills Training Program for Healthcare Professionals. *Alt Therapies*. 2005 11(4): 36-41.
- Gordon, JS., Staples, JK., Blyta, A., Bytqi, M. Treatment of Posttraumatic Stress Disorder in Postwar Kosovo High School Students Using Mind-Body Skills Groups: A Pilot Study. *Journal of Traumatic Stress*. 2004 17(2): 143-147.
- Grassi-Oliveira R, Ashy M, Stein LM. Psychobiology of childhood maltreatment: effects of allostatic load? *Rev Bras Psiquiatr*. 2008 Mar;30(1):60-8.
- Heim, C., et al. Pituitary-Adrenal and Autonomic Responses to Stress in Women After Sexual and Physical Abuse in Childhood. *Journal of the American Medical Association*. 2000; 284(5); 592-597.

References

- Kaufman, J., et al. Effects of Early Adverse Experiences on Brain Structure and Function: Clinical Implications. *Society of Biological Psychiatry*. 2000;48; 778-790.
- Stein, MB, Yehuda, R, Koverola, C. & Hanna, C. Enhanced Dexamethasone Suppression of Plasma Cortisol in Adult Women Traumatized by Childhood Sexual Abuse. *Society of Biological Psychiatry*. 1997; 42; 680-686.
- Teicher, MH. et al. The Neurobiological Consequences of Early Stress and Childhood Maltreatment. *Neurosci Biobehav Rev*. 2003; 27(1-2); 33-44.
- Tol, W., Komproe, I., Susanty, D., Jordans, M., Macy, R., De Jong, J. School-based Mental Health Intervention for Children Affected by Political Violence in Indonesia: A cluster Randomized Trial. *JAMA*. 2008; 300(6)655-662.
- Van der Kolk, BA., Weisaeth, L. & Van Der Hart, O. "History of Trauma in Psychiatry." In Van Der Kolk, McFarlane & Weisaeth, eds. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society*. New York: Guilford Press, 1996; pp. 47-74.

References

- Van der Kolk, BA.. “The Body Keeps Score: Approaches to the Psychobiology of Posttraumatic Stress Disorder.” In Van Der Kolk, McFarlane & Weisaeth, eds. *Traumatic Stress: The Effects of Overwhelming Experience on Mind, Body, and Society*. New York: Guilford Press, 1996; pp. 214-241.
- Veterans Health Administration, Department of Defense. VA/DoD clinical practice guideline for the management of post-traumatic stress. Version 1.0. Washington (DC): Veterans Health Administration, Department of Defense; 2004 Jan.
- Wolmer L., Laor N., Dedeoglu C., Siev J., Yazgan Y. Teacher-mediated intervention after disaster: a controlled three-year follow-up of children’s functioning. *Journal of Child Psychology and Psychiatry*. Nov 2005; 46(11):1161-8.
- Wethington, H., Hahn, R., Fuqua-Whitley, D., Sipe, T., Crosby, A., Johnson, R. et al. The Effectiveness of Interventions to Reduce Psychological Harm from Traumatic Events Among Children and Adolescents. *Am J Prev Med*. 2008; 55(3)287-313.

References

- Barsby RW, Salan U, Knight DW, Hoult JR. Feverfew and vascular smooth muscle: extracts from fresh and dried plants show opposing pharmacological profiles, dependent upon sesquiterpene lactone content. *Planta Med.* 1993;59(1):20-25.
- Chen CF, Leung AY. Gene response of human monocytic cells for the detection of antimigraine activity of feverfew extracts. *Can J Physiol Pharmacol.* 2007;85(11):1108-15.
- De Weerd CJ, Bootsma HPR, Hendriks H. Herbal Medicines in migraine prevention. Randomized double-blind placebo controlled crossover trial of a feverfew preparation. *Phytomedicine.* 1996;3:225–230.
- Diener HC, Pfaffenrath V, Schnitker J, Friede M, Henneicke-von Zepelin HH. Efficacy and safety of 6.25 mg t.i.d. feverfew CO₂-extract (MIG-99) in migraine prevention--a randomized, double-blind, multicentre, placebo-controlled study. *Cephalalgia.* 2005;25(11):1031-41.

References

- Ernst E, Pittler MH. The efficacy and safety of feverfew (*Tanacetum parthenium* L.): an update of a systematic review. [Review] *Public Health Nutr.* 2000;3(4A):509-514.
- Evans RW, Taylor FR. "Natural" or alternative medications for migraine prevention. *Headache.* 2006;46(6):1012-8.
- Harel Z, Gascon G, Riggs S, Vaz R, Brown W, Exil G, Supplementation with omega-3 polyunsaturated fatty acids in the management of recurrent migraines in adolescents. *J Adolesc Health.* 2002 Aug;31(2):154-61.
- Henneicke-von Zepelin HH. Feverfew for migraine prophylaxis. *Headache.* 2006;46(3):531
- Johnson ES, Kadam NP, Hylands DM, Hylands PJ. Efficacy of feverfew as prophylactic treatment of migraine. *Br Med J.* 1985;291:569–573.
- Klepser TB, Klepser ME. Unsafe and potentially safe herbal therapies. *Am J Health Syst Pharm.* 1999;56(2):125-138; quiz 139-141.

References

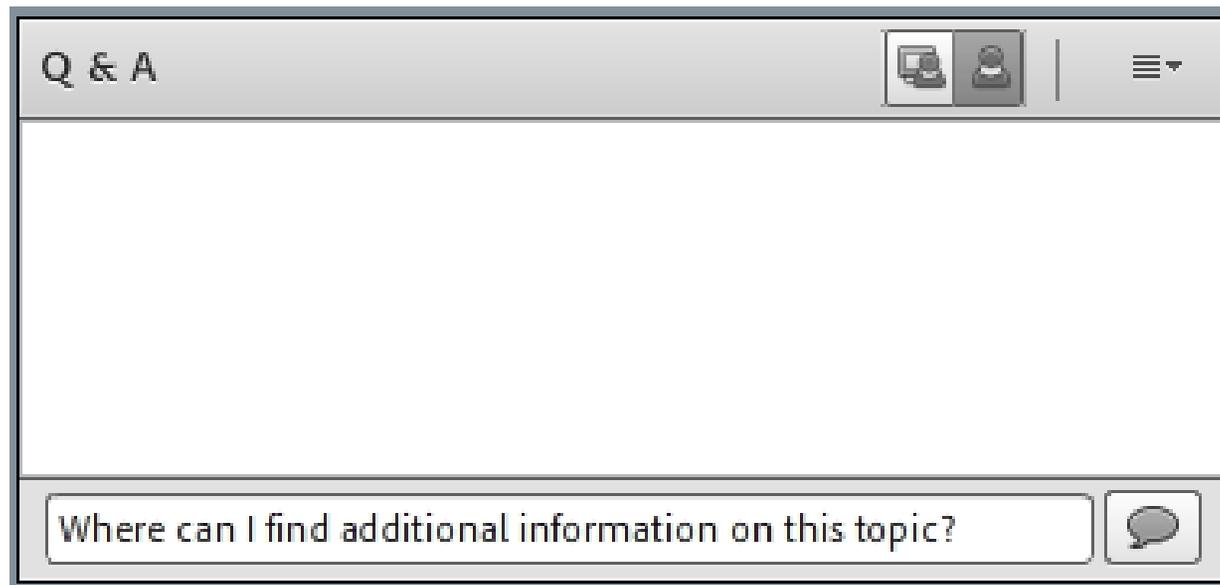
- Koseoglu E, Talaslioalu A, Gonul AS, Kula M. The effects of magnesium prophylaxis in migraine without aura. *Magnes Res.* 2008 Jun;21(2):101-8.
- Maizels M, Blumenfeld A, Burchette R. A combination of riboflavin, magnesium, and feverfew for migraine prophylaxis: a randomized trial. *Headache.* 2004;44(9):885-90.
- Mauskop A. Alternative therapies in headache. Is there a role? [Review] *Med Clin North Am.* 2001;85(4):1077-1084.
- Miller L. Herbal medicinals: selected clinical considerations focusing on known or potential drug-herb interactions. *Arch Intern Med.* 1998;158(20):2200–2211.
- Murphy JJ, Heptinstall S, Mitchell JR. Randomised double-blind placebo-controlled trial of feverfew in migraine prevention. *Lancet.* 1988;2:189–192.
- Palevitch D, Earon G, Carasso R. Feverfew (*Tanacetum parthenium*) as a prophylactic treatment for migraine: a double-blind controlled study. *Phytotherapy Res.* 1997;11:508–511.

References

- Pfaffenrath V, Diener HC, Fischer M, et al. The efficacy and safety of Tanacetum parthenium (feverfew) in migraine prophylaxis--a double-blind, multicentre, randomized placebo-controlled dose-response study. *Cephalalgia*. 2002;22(7):523-532.
- Pittler MH, Vogler BK, Ernst E. Feverfew for preventing migraine. [Review] *Cochrane Database Syst Rev*. 2000;(3):CD002286.
- Shrivastava R, Pechadre JC, John GW. Tanacetum parthenium and Salix alba (Mig-RL) combination in migraine prophylaxis: a prospective, open-label study. *Clin Drug Investig*. 2006;26(5):287-96.
- Silberstein SD. Preventive treatment of headaches. *Curr Opin Neurol*. 2005;18(3):289-92.
- Sun-Edelstein C, Mauskop A. Role of magnesium in the pathogenesis and treatment of migraine, *Expert Rev Neurother*. 2009 Mar;9(3):369-79.
- Vogler BK, Pittler MH, Ernst E. Feverfew as a preventive treatment for migraine: a systematic review. *Cephalalgia*. 1998;18(10):704-708.

Questions?

Please submit your questions for the presenters using the **Q&A** box located on your screen. Our presenters will answer questions following the second presentation.

A screenshot of a Q&A interface. The window has a title bar with the text "Q & A" on the left, a laptop icon, a person icon, and a menu icon on the right. The main area is a large empty text box. At the bottom, there is a text input field containing the text "Where can I find additional information on this topic?" and a speech bubble icon to its right.

Q & A

Where can I find additional information on this topic?

Dr. Marc S. Husid



Marc S. Husid, MD is a board-certified neurologist with 30 years of neurological experience, and was among the first physicians to attain board certification in headache management. The experience gained from seeing hundreds of service members with post-traumatic headaches, post-traumatic stress, and related comorbidities made it apparent that the traditional western approach to these patients had many limitations, and Dr. Husid began studying alternate approaches.

Chief, Outpatient Neurology, Headache Specialist, Acupuncture
Neuroscience and Rehabilitation Center, Dwight D. Eisenhower Army
Medical Center, Fort Gordon, GA



Headache Management

Marc S. Husid, MD
Chief, Outpatient Neurology,
Headache Specialist, Acupuncture
Dwight D. Eisenhower Army Medical Center
Fort Gordon, GA

Disclosures

- The views expressed in this presentation represent the views of the speaker and not those of the U.S. Army or Department of Defense
- I have no relevant financial relationships. As there are no FDA-approved medications for post-traumatic headache and only two medications approved for the treatment of chronic migraine (Topiramate and Onabotulinum toxin A), any other medications mentioned reflect my personal practice and that of recognized headache specialists around the country.

International Headache Society Criteria for Migraine

Migraine is an Episodic Headache lasting 4-72 hours with:

Any 2 of:

- Unilateral
- Throbbing
- Worsened by or causing avoidance of movement
- Moderate or severe

+

Any 1 of:

- Nausea or vomiting
- Photophobia and phonophobia

2+1 = Migraine

Keys to Treatment Success

- Doctor-patient relationship
- Headache diary
- Realistic expectations
- Education
 - Biologic nature of migraine and triggers

Matthew NT, Tfelt-Hansen P. The Headaches 3rd Ed. 433-440.

Nonpharmacologic Therapies

- Trigger and risk factor avoidance
- Proper diet, exercise, and sleep hygiene
- Use headache calendars – *essential*
- Biofeedback and stress management
- Cognitive therapy and psychotherapy
- Physical therapy, manipulation, acupuncture, reflexology)
- Vitamins, minerals, supplements, herbs:
(Vitamin B-2, magnesium, feverfew, petasites, melatonin and coenzyme Q10)

Optimizing Acute Treatment of Migraine Attacks

- Use effective doses
- Treat early in the attack (mild pain)
- Avoid medications with high medication overuse headache potential (AAC, butalbital, opioids)
- Choose appropriate route of delivery
- Review headache diary at each visit to monitor response to treatment

When To Consider Prevention?

- Significant interference with patient's daily routine despite acute treatment (infrequent, but profound disability)
- Frequency attacks (>2/week) with risk of developing medication overuse
- Failure, contraindication to, or troublesome side effects from, acute medications

Adapted from Silberstein et al. *Neurology*. 2000;55:754-763.

When To Consider Prevention?

- Patient preference (i.e., desire to have as few attacks as possible)
- Presence of uncommon migraine conditions with risk of permanent neurologic injury:
 - Hemiplegic/basilar migraine, migraine with prolonged aura, migrainous infarction

Adapted from Silberstein et al. *Neurology*. 2000;55:754-763.

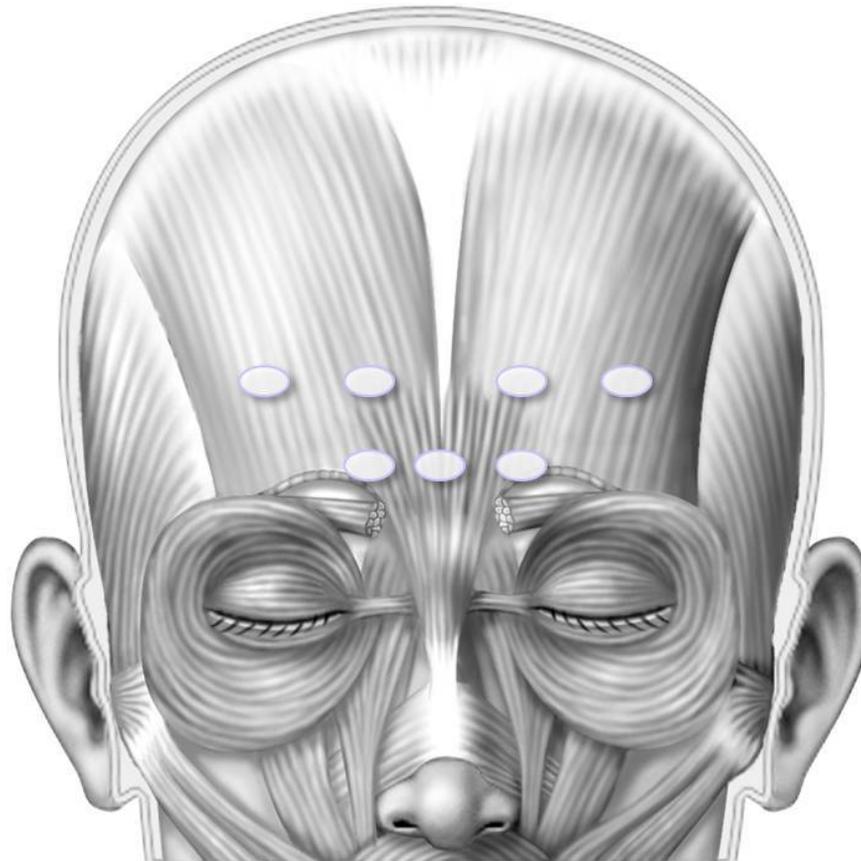
Principles of Preventive Treatment

- Start low, go slow, don't give up
- Give each treatment an adequate trial
- Avoid interfering, overused, and contraindicated drugs
- Be sure women of childbearing potential are aware of risks; pick medication least likely to have adverse effect on fetus (folate)

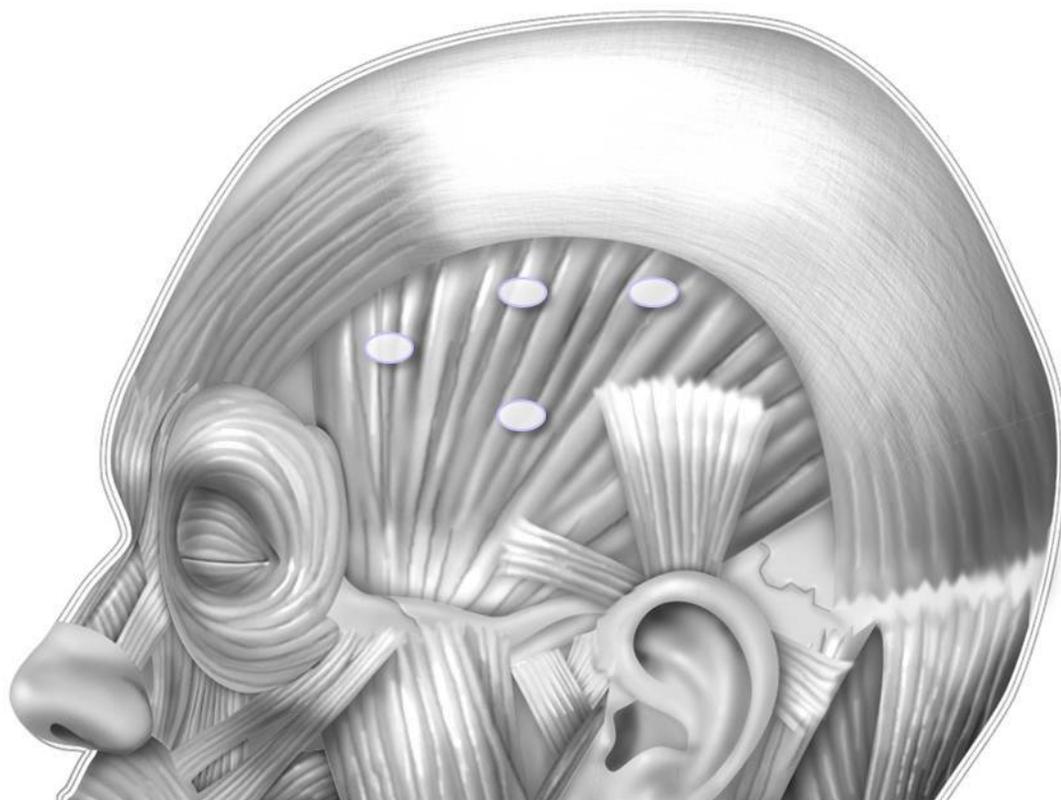
Principles of Preventive Treatment

- Involve patients in their care
- Take patient preferences into account
- Discuss rationale for a particular treatment, when and how to use it, possible side effects
- Address patient expectations – expected benefits of treatment and how long it will take to get there
- Consider comorbidity
- Periodically reassess and modify treatment

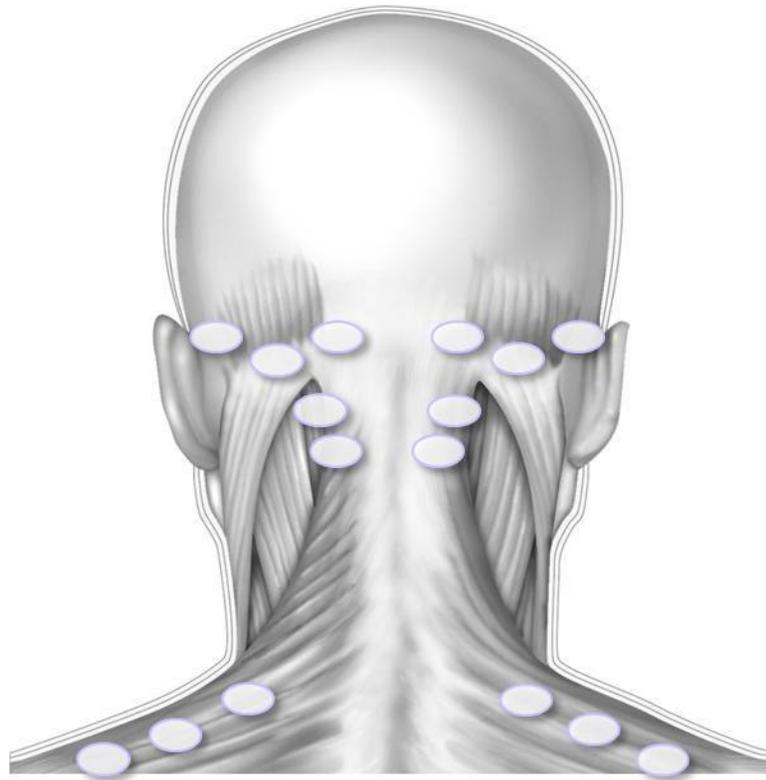
Botox Injection Sites



Botox slides used with permission of Allergan, manufacturer of Botox (Onabotulinumtoxin A)



Botox slides used with permission of Allergan, manufacturer of Botox (Onabotulinumtoxin A)



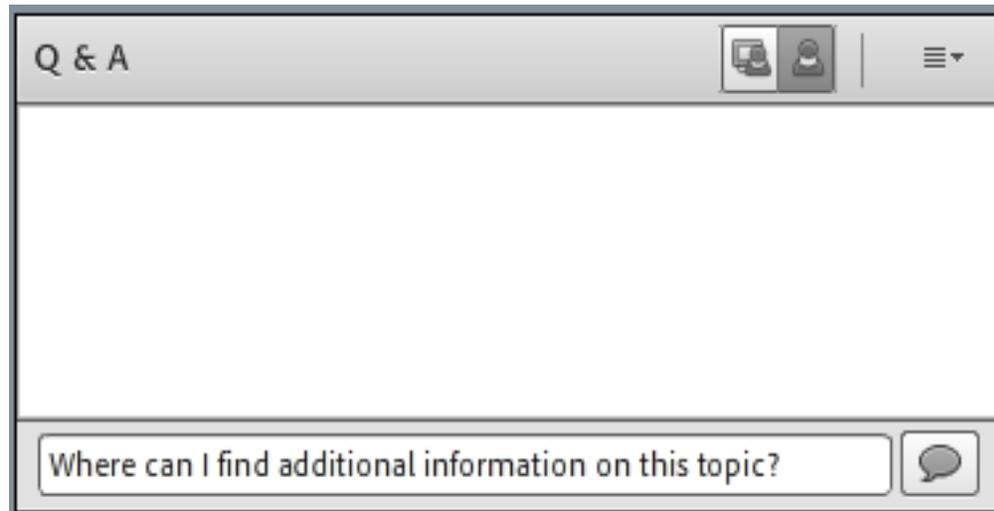
Botox slides used with permission of Allergan, manufacturer of Botox (Onabotulinumtoxin A)

Summary

- Recurrent disabling headache = migraine
- Migraine should be managed like any other chronic disease
- Understanding basic mechanism helps understand symptoms and rationale behind treatment
- Early treatment following onset of pain will improve response to treatment
- An ounce of prevention...

Questions?

If you have questions at this time, please submit them via the Q and A box located on the screen. Our speakers will address as many questions as time permits.



A screenshot of a Q & A interface. The window title is "Q & A". The main area is empty. At the bottom, there is a text input field containing the question "Where can I find additional information on this topic?" and a speech bubble icon to its right.

For additional TBI information and resources, visit

dvbic.org

DVBIC Resources

www.dvbic.org

The screenshot shows the DVBIC website homepage. At the top right, there is a navigation bar with links for 'Shopping cart', 'Contact Us', and a search box. Below this is the main header with the DVBIC logo and the text 'DEFENSE AND VETERANS BRAIN INJURY CENTER'. A secondary navigation bar contains links for 'Service Members & Veterans', 'Family & Friends', 'Medical Providers', 'About DVBIC & TBI', 'Educational Materials', 'Research', and 'DVBIC Locations'. The 'Educational Materials' link is circled in red. Below the navigation is a large banner image of a family looking at a book, with a 'Family Caregiver Guide' link and a 'Find a DVBIC location near you' button. To the right is a 'Download and order materials' button. Below the banner are three columns: 'Family & Friends', 'Service Members & Veterans', and a red 'Crisis Intervention (24/7)' button. At the bottom, there are sections for 'DoD Numbers for TBI', 'Featured Materials' (with links to 'Acute Concussion (mTBI) Educational Brochure' and 'HEADS Concussion Card'), and 'brainlinemilitary' with a link to 'A Change in Family Roles After a Brain Injury Can Be Difficult'.

Signs and Symptoms Fact Sheet

The screenshot shows the DVBIC website interface. At the top, there is a navigation bar with links for 'Shopping cart', 'Contact Us', and a search box. The main header features the DVBIC logo and the text 'DEFENSE AND VETERANS BRAIN INJURY CENTER'. Below this is a secondary navigation bar with categories: 'Service Members & Veterans', 'Family & Friends', 'Medical Providers', 'About DVBIC & TBI', 'Educational Materials', 'Research', and 'DVBIC Locations'. A '20 YEARS OF SERVICE' badge is visible on the left. The main content area displays the 'Signs & Symptoms Fact Sheet (English)' with two buttons, 'Add to Cart' and 'Download File', which are circled in red. A description of the fact sheet is provided, along with a thumbnail image of the document. To the right, there is a shopping cart notification and a 'If you like this, you might also like:' section with recommendations for other materials.

Shopping cart | Contact Us | Search

DEFENSE AND VETERANS BRAIN INJURY CENTER

Service Members & Veterans | Family & Friends | Medical Providers | About DVBIC & TBI | Educational Materials | Research | DVBIC Locations

20 YEARS OF SERVICE 1992-2012

Browse Materials
About Our Materials
Educational Materials
FAQs

Signs & Symptoms Fact Sheet (English)

Add to Cart **Download File** What's the difference?

This two-sided sheet, intended for all audiences, presents major physical, cognitive and emotional symptoms of concussion on the front, and coping and recovery tips on the back. Besides English, it is available in Spanish (pdf and hard copy), Estonian (pdf only), French (pdf only), Georgian (pdf only), German (pdf only), Italian (pdf only), Polish (pdf only), and Romanian (pdf only).

1-page handout, double-sided, 8.5"x11". For any audience.

Signs and Symptoms Fact Sheet (English)

CONCUSSION
A mild traumatic brain injury (MTBI) that results in the temporary alteration of brain function. The severity of the TBI is determined by the amount of time and signs that persist in a health care provider's office.

COMMON SIGNS AND SYMPTOMS

Physical	Cognitive
Headache	Memory loss
Nausea	Confusion
Blurred vision	Difficulty concentrating
Balance problems	Personality changes
Loss of consciousness	Slowed reaction time
Repetitive vomiting	Delayed or no return to normal
Seizures	Delayed or no return to normal
Loss of consciousness	Delayed or no return to normal
Repetitive vomiting	Delayed or no return to normal
Seizures	Delayed or no return to normal

DID YOU KNOW?
Concussion is a mild traumatic brain injury (MTBI) that results in the temporary alteration of brain function. The severity of the TBI is determined by the amount of time and signs that persist in a health care provider's office.

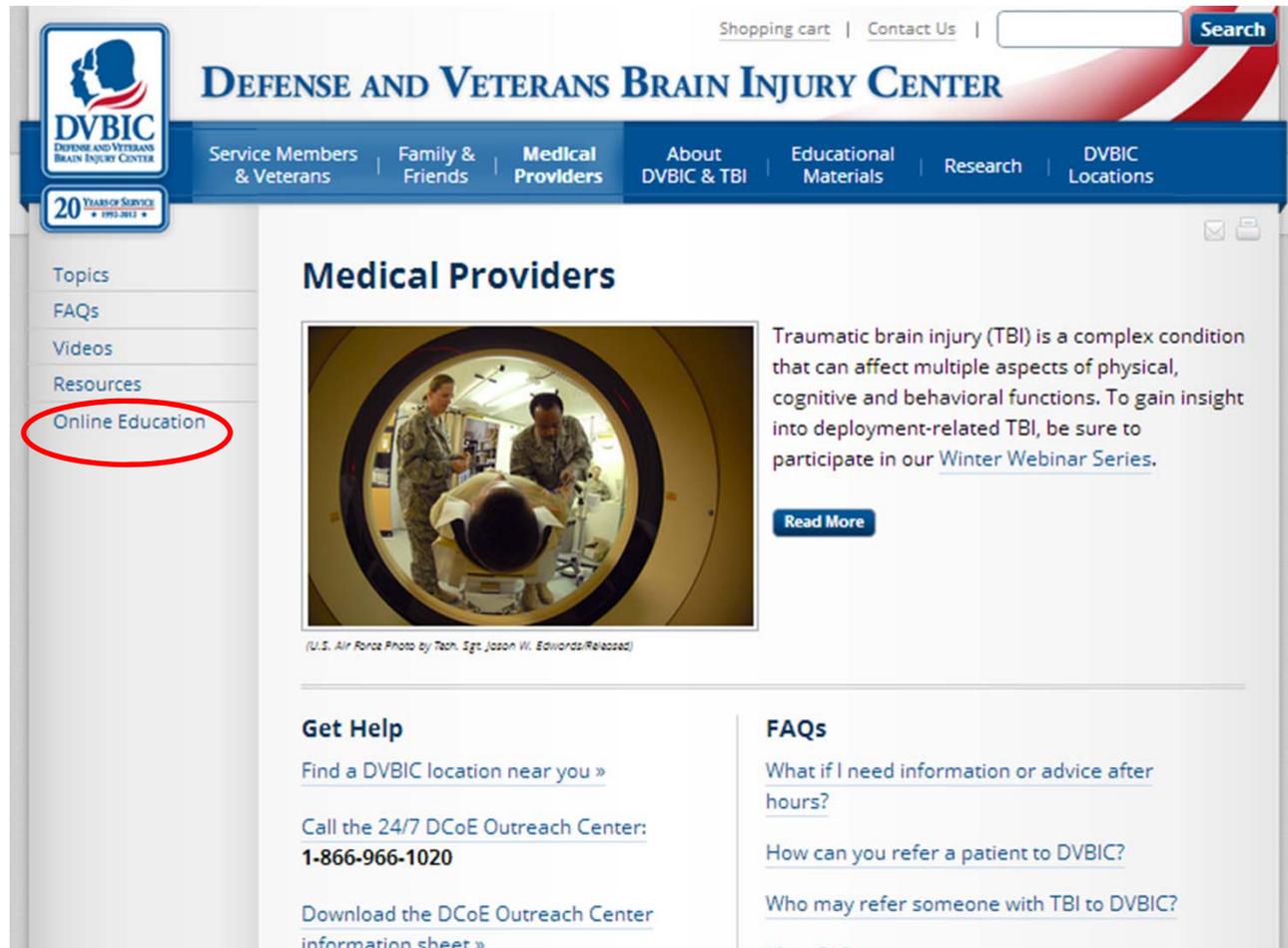
DEFENSE AND VETERANS BRAIN INJURY CENTER
www.dvbic.org

Medical Providers

The screenshot shows the DVBIC website with the following elements:

- Header:** Shopping cart | Contact Us | Search
- Logo:** DVBIC DEFENSE AND VETERANS BRAIN INJURY CENTER
- Navigation Menu:** Service Members & Veterans, Family & Friends, **Medical Providers** (circled in red), About DVBIC & TBI, Educational Materials, Research, DVBIC Locations
- 20 Years of Service:** 1992-2012
- Main Content Area:**
 - Family Caregiver Guide:** A detailed guide for those who provide care for service members and veterans with traumatic brain injury. Includes a photo of a family and a carousel of 5 images.
 - Find a DVBIC location near you »** (with a map of the US)
 - Download and order materials. »** (with images of brochures)
- Secondary Content:**
 - Family & Friends:** Learn about traumatic brain injury (TBI), find help for your loved one and more.
 - Service Members & Veterans:** Explore our resources, get answers to your FAQs, and watch service members tell their stories.
 - Crisis Intervention (24/7):** U.S. Department of Veterans Affairs (VA) Suicide Prevention Hotline 1-800-273-8255
- Featured Materials:**
 - DoD Numbers for TBI:** Worldwide numbers for service members diagnosed with TBI since 2000.
 - Acute Concussion (mTBI) Educational Brochure**
 - HEADS Concussion Card**
 - brainlinemilitary:** A Change in Family Roles After a Brain Injury Can Be Difficult. Read more at brainlinemilitary.org »
- In the News**

Online Education



The screenshot shows the homepage of the Defense and Veterans Brain Injury Center (DVBIC). The top navigation bar includes links for 'Shopping cart', 'Contact Us', and a search box. The main header features the DVBIC logo and the text 'DEFENSE AND VETERANS BRAIN INJURY CENTER'. Below this is a blue navigation bar with links for 'Service Members & Veterans', 'Family & Friends', 'Medical Providers', 'About DVBIC & TBI', 'Educational Materials', 'Research', and 'DVBIC Locations'. A '20 Years of Service' badge is visible on the left. The left sidebar contains a list of links: 'Topics', 'FAQs', 'Videos', 'Resources', and 'Online Education', which is circled in red. The main content area is titled 'Medical Providers' and features a photograph of two military personnel in a medical setting. Below the photo is a caption: '(U.S. Air Force Photo by Tech. Sgt. Jason W. Edwards/Released)'. To the right of the photo is a text block about Traumatic Brain Injury (TBI) and a 'Read More' button. Below the photo are sections for 'Get Help' and 'FAQs', each with several links.

Shopping cart | Contact Us | **Search**

DEFENSE AND VETERANS BRAIN INJURY CENTER

Service Members & Veterans | Family & Friends | **Medical Providers** | About DVBIC & TBI | Educational Materials | Research | DVBIC Locations

20 YEARS OF SERVICE 1992-2012

Topics
FAQs
Videos
Resources
Online Education

Medical Providers



Traumatic brain injury (TBI) is a complex condition that can affect multiple aspects of physical, cognitive and behavioral functions. To gain insight into deployment-related TBI, be sure to participate in our [Winter Webinar Series](#).

[Read More](#)

(U.S. Air Force Photo by Tech. Sgt. Jason W. Edwards/Released)

Get Help

[Find a DVBIC location near you »](#)

Call the 24/7 DCoE Outreach Center:
1-866-966-1020

[Download the DCoE Outreach Center information sheet »](#)

FAQs

[What if I need information or advice after hours?](#)

[How can you refer a patient to DVBIC?](#)

[Who may refer someone with TBI to DVBIC?](#)

Resources: Traumatic Brain Injury

www.dcoe.health.mil

DEFENSE CENTERS OF EXCELLENCE
For Psychological Health & Traumatic Brain Injury

Sign up Enter email address

oCoE Blog Facebook Twitter YouTube RSS S

About DCoE Psychological Health **Traumatic Brain Injury** Service Members & Families Media Center Training & Conferences 24/7 Help

VIDEO
Interview with T2 Leadership
T2 director Gregory Gahm, Ph.D. and deputy director Mark Reger, Ph.D. were recently featured in a research video vignette interview by the Congressionally Directed Medical Research Programs (CDMRP). Check it out and get the latest insights on evidence-based treatment for PTSD using technology.
More »

CDMRP
Department of Defense
Psychological Health/Traumatic Brain Injury Research Program
Randomized Clinical Trial of Virtual Reality and Prolonged Exposure Therapy for Active Duty Soldiers with PTSD
National Center for Telehealth and Technology

Gregory Gahm, PhD
Greg Reger, PhD

DHCC
Deployment Health Clinical Center
DHCC works to improve psychological health and deployment-related health care for our nation's warriors and their families

NCT
National Center for Telehealth and Technology
T2 develops telehealth and technology solutions for psychological health and traumatic brain injury to improve the lives of our nation's warriors and their families

DVBIC
Defense and Veterans Brain Injury Center
DVBIC serves military and family members with traumatic brain injuries through state-of-the-art clinical care

DCoE Outreach Center 24/7
866-966-1020
resources@dcoeoutreach.org
live chat with a specialist
We provide a trusted source of information on psychological health and traumatic brain injury issues and resources, and responses to your specific questions and needs.

Latest from DCoE
BLOG
Tips for Encouraging Your Loved One to Access Mental Health Services
BLOG
Job Searching Tips for the Veteran with PTSD or TBI
NEWS
DCoE 2013 Webinar Series Preview: First 4 Topics, Dates Announced

REAL WARRIORS * REAL BATTLES
REAL STRENGTH
inTransition
COACHING • CONNECTING • EMPOWERING
afterdeployment.org
Wellness resources for the military community.

Careers Contact Us Speakers Bureau Site Map Funding Opportunities FOIA No FEAR Act

Products: Traumatic Brain Injury

Sign up



DEFENSE CENTERS OF EXCELLENCE
For Psychological Health & Traumatic Brain Injury



About DCoE

Psychological Health

Traumatic Brain Injury

Service Members & Families

Media Center

Training & Conferences

24/7 Help

Home > Psychological Health > DCoE Products

[Psychological Health Info](#)
[Program Evaluation](#)
[Integrative Health & Wellness](#)
[Provider Resources](#)
[DCoE Products](#)
[PTSD Treatment Options](#)
[Tips for Treating mTBI and PTSD](#)

DCoE Products

Welcome to the Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE) resources section. Here you will find a central list of products and resources produced by DCoE, organized by topic. We encourage you to explore the broad range of resources we have available and, of course, to share with all who may find them useful.

Printed copies of select resources are available for military health care providers. Browse and order print materials.

Choose a topic from the list below to see a list of DCoE products.



Driving Following TBI Summary



Military TBI Case Management Newsletter 4



mTBI Pocket Guide Mobile Application



DoD ICD-9 Coding Guidance for TBI Fact Sheet



Assessment and Management of Dizziness Associated with Mild TBI Clinical Recommendation



DCoE DVBIC Cognitive Rehabilitation Report



TBI Web-Based Case Studies Flyer



Five Things You Need To Know About Concussion

85

Training and Conferences

Defense Centers of Excellence for Psychological Health and Traumatic Brain Injury (DCoE)

Sign up Enter email address

DEFENSE CENTERS OF EXCELLENCE
For Psychological Health & Traumatic Brain Injury

[DCoE Blog](#) [Facebook](#) [Twitter](#) [YouTube](#) [RSS](#) [StumbleUpon](#)

[About DCoE](#) [Psychological Health](#) [Traumatic Brain Injury](#) [Service Members & Families](#) [Media Center](#) [Training & Conferences](#) [24/7 Help](#)

Home > Training & Conferences

Continuing Education

Leadership Training Toolkit

Provider Training Resources

Provider Training Calendar

Conferences

Monthly Webinars

Educator Resources

Training Effectiveness Toolkit

DCoE Products

Training & Events

Events

- Upcoming Conferences
- Past Conferences
- PTSD and TBI Training Events
- Monthly Webinars

Training

- Continuing Education
- Leadership Training Toolkit
- Provider Training Resources
- Training Effectiveness Toolkit
- Educator Resources

[Back to top](#)

Careers
Contact Us
Concept Submission Form

Speakers Bureau
Site Map
Privacy Policy

Funding Opportunities
FOIA
USA.gov

No FEAR Act

DVBIC
DEFENSE AND VETERANS
BRAIN INJURY CENTER

**This presentation with audio will be
available online at**

<http://www.dvbic.org/online-education>

starting

January 25, 2013

Continuing Education

PRE-REGISTERED

ON or BEFORE January 11, 2013

Visit <http://conf.swankhealth.com/dvbic> and complete the online evaluation in order to receive a continuing education certificate.

PRE-REGISTERED

AFTER January 11, 2013 (but before 1:15 p.m. EST today)

The above website will be available starting **January 18, 2013**.

If you did not pre-register, you will not be able to receive continuing education credit for this event.

Website will close on February 13, 2013

Webinar Evaluation/Feedback

We want your feedback!

- Please take the Interactive Customer Evaluation found on the DVBIC website: www.dvbic.org/winter-webinar-series-hot-topics-traumatic-brain-injury
- Or send comments to dvbicwebinar@experient-inc.com

Future DVBIC Webinars

February 20, 2013

Overview of Imaging for TBI from Current Standards to Advanced Techniques

March 20, 2013

Intimacy: Sex, Drugs and TBI

