

Oral Health Fact Sheet for Dental Professionals

Adults with Traumatic Brain Injury

Traumatic brain injury (TBI), a form of acquired brain injury, occurs when a sudden trauma causes damage to the brain. TBI can result when the head suddenly and violently hits an object, or when an object pierces the skull and enters brain tissue. Symptoms of a TBI can be mild, moderate, or severe, depending on the extent of the damage to the brain. (National Institute of Neurological Disorders and Stroke/NIH)

Prevalence

- TBI is significantly more common among males
- 8–9% lifetime prevalence among individuals 30–59 years of age
- Average annual rate: Emergency Department Visits and Hospitalizations:
 - * 20–24 years of age = 668.8:100,000
 - * >75 years of age = 572.6:100,000
 - * Other ages intermediate
- 1.7 million individuals sustain a TBI each year in the United States:
 - * 52,000 die
 - * 275,000 are hospitalized
 - * 1.4 million (nearly 80%) are treated and released from an emergency department
- TBI is a contributing factor to nearly a third of all injury-related deaths

Manifestations

General

- Wide range of functional changes affecting thinking, language, learning, emotions, behavior, and sensation.
- TBI can cause epilepsy and increase the risk for conditions such as Alzheimer's disease, Parkinson's disease, and other brain disorders that become more prevalent with age.

Clinical

- Cervical spine injury
- Spasticity, rigidity, and ataxia/tremors
- Feeding disorders including dysphagia
- Behavior change (impulsivity, changes in activity level, aggression, irritability, social withdrawal, and apathy)
- Cognitive impairments (learning disability, memory problems, and difficulty with visual spatial and visual motor tasks)
- Language disorders
- Vision and hearing impairments
- Sleep disturbances/sleep apnea

Oral

- Oral/dental trauma from TBI or self-injurious behaviors
- Bruxism
- GERD (Gastro-esophageal Reflux Disease)
- Inadequate oral hygiene due to cognitive impairments, spasticity, and ataxia

Potential Other Disorders/Concerns

- Seizures
- Depression/anxiety
- Post-traumatic stress disorder
- Personality disorders
- Substance abuse

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Management

Medication

The list of medications below are intended to serve only as a guide to facilitate the dental professional's understanding of medications that can be used for Traumatic Brain Injury or conditions associated with TBI. Medical protocols can vary for individuals with TBI, from few to multiple medications.

Manifestations from TBI vary; therefore, a wide range of medications may be prescribed:

SYMPTOM	MEDICATION	SIDE EFFECTS
Depression Repetitive Behaviors	SSRIs (Selective Serotonin Reuptake Inhibitor) <i>Escitalopram</i> (Lexapro) <i>Fluoxetine</i> (Prozac) <i>Paroxetine</i> (Paxil) <i>Sertraline</i> (Zoloft)	Xerostomia, dysphagia, nausea, anxiety, dizziness, nervousness, headache, sweating, bruxism. Suicidal risk through age 24. Do not prescribe with MAOIs.
	SNRIs (Serotonin-Norepinephrine Reuptake Inhibitor) <i>Duloxetine</i> (Cymbalta) <i>Venlafaxine</i> (Effexor, Effexor XR)	Xerostomia, dysphagia, nausea, anxiety, dizziness, nervousness, headache, sweating, bruxism. Suicidal risk through age 24. Do not prescribe with MAOIs.
	Atypical antidepressants <i>Bupropion</i> (Wellbutrin)	Xerostomia, dysgeusia, stomatitis, gingivitis, glossitis, bruxism, dysphagia, angioedema. Suicidal risk through age 24. Corticosteroids may increase risk of CNS stimulating seizures.
	TCAs (Tricyclic Antidepressants) <i>Amitriptyline</i> (Elavil) <i>Desipramine</i> (Norpramin) <i>Imipramine</i> (Tofranil)	Xerostomia, dysgeusia, stomatitis, sialadenitis, tongue edema, discolored tongue. Suicidal risk through age 24. Local anesthetics with epinephrine may cause severe prolonged hypertension – use with caution.

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SYMPTOM	MEDICATION	SIDE EFFECTS
Aggressive Behaviors	Anti-psychotics <i>Olanzapine</i> (Zyprexa) <i>Risperidone</i> (Risperdal) <i>Paliperidone</i> (Invega)	Xerostomia, sialorrhea, dysphagia, dysgeusia, stomatitis, gingivitis, tongue edema, glossitis, discolored tongue, dyskinesia, dystonia, angioedema.
	Anticonvulsants <i>Carbamazepine</i> (Tegretol) <i>Valproate</i> (Depakote, Depakene)	Xerostomia, stomatitis, glossitis, dysgeusia. Excessive bleeding may result when either medication is combined with aspirin or NSAIDs. Valproate – oral petechia.
	<i>Lamotrigine</i> (Lamictal)	Angioedema of mouth, lips, tongue or face; oral lesions, xerostomia, nausea, headache, blurred vision, double vision, Stevens-Johnson syndrome (uncommon, severe).
Hyperactivity	Stimulants <i>Amphetamine & Dextroamphetamine</i> (Adderall, Dexedrine, Dextrostat)	Xerostomia, increase in heart rate and blood pressure, dysgeusia, bruxism, motor tics, dyskinesias.
	<i>Methylphenidate, Dexmethylphenidate</i> (Ritalin, Concerta, Focalin)	Xerostomia, increase in heart rate and blood pressure, erythema multiforme, motor tics, dyskinesias.
	Non Stimulants <i>Atomoxetine</i> (Strattera)	Xerostomia, increase in heart rate and blood pressure.
	Antihypertensives <i>Clonidine</i> (Catapres) <i>Guanfacine</i> (Tenex, Intuniv)	Xerostomia, dysphagia, sialadenitis, dysgeusia.
Seizures	Anticonvulsants <i>Carbamazepine</i> (Tegretol)	Xerostomia, stomatitis, glossitis, dysgeusia, bone marrow suppression. Excessive bleeding may result when combined with aspirin or NSAIDs.
	<i>Valproate</i> (Depakote, Depakene)	Xerostomia, stomatitis, glossitis, dysgeusia, oral petechia. Excessive bleeding may result when combined with aspirin or NSAIDs.
	<i>Phenytoin</i> (Dilantin)	Xerostomia, gingival hyperplasia.
	<i>Gabapentin</i> (Neurontin)	Xerostomia, fever, mood changes, erythema multiforme, kidney failure, thrombocytopenia, viral infections, hyperkinesia, other neurologic symptoms.

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SYMPTOM	MEDICATION	SIDE EFFECTS
Seizures <i>continued</i>	<i>Levetiracetam</i> (Keppra)	Hostility, irritability, mood changes, depression, anorexia, infection, gingivitis.
	<i>Lamotrigine</i> (Lamictal)	Angioedema of mouth, lips, tongue or face; oral lesions, xerostomia, nausea, headache, blurred vision, double vision, Stevens-Johnson syndrome (uncommon, severe).
Muscle Spasticity and Rigidity	Muscle relaxants and antispasmodics	
	<i>Baclofen</i> (Lioresal)	Xerostomia (uncommon), angioedema of mouth, lips, tongue or face.
	<i>Diazepam</i> (Valium)	Drowsiness, dystonia, double vision, xerostomia or hypersalivation, seizures, CNS and respiratory depression, paradoxical CNS stimulation, tiredness, syncope, fatigue, ataxia, depression, headache, nausea. Alcohol, and drugs that cause sedation, may increase the sedative effect of diazepam. Use with caution for persons with sleep apnea.
	<i>Dantrolene sodium</i> (Dantrium)	Drowsiness (alcohol can increase this effect), weakness, dizziness, tachycardia (increased heart rate), abnormal blood pressure, diarrhea, constipation, liver failure. Use caution in combining with drugs that cause CNS depression.
	<i>Tizanidine</i> (Zanaflex, Sirdalud)	Drowsiness (alcohol can increase this effect), xerostomia, dizziness, hypotension, weakness, somnolence. Do not prescribe with ciprofloxacin or fluvoxamine. Fluoroquinolone antibiotics, such as floxacin and norfloxacin, interfere with tizanidine metabolism. Use caution in combining with drugs that cause CNS depression.

Behavioral: Depending on the presentation and severity of the brain injury, the patient may have difficulty cooperating in the dental chair and adhering to oral hygiene regimens.

- Plan a pre-appointment (in person/phone) to discuss the patient's special needs prior to the first visit, if necessary.
- Determine the level of cognitive and functional abilities and explain each procedure at the appropriate of understanding. Use short, clear instructions. Use Tell-Show-Do approach when introducing new procedures if necessary. Give positive verbal reinforcement. As appropriate, provide verbal and/or tactile reassurances.
- Do not force limbs into unnatural positions or attempt to stop uncontrolled body movements. Exert a firm, gentle pressure to calm shaking limbs.

Dental Treatment and Prevention

- As tolerated, consider prescribing a mouth guard for patients with severe bruxism or self-injurious behavior.
- Dysphagia management during treatment: Place the patient in as upright position as possible to keep airway open, with head turned to one side. Use suction (high volume helps to minimize aspiration) frequently or as tolerated and consider lower utilization of water.
- Ask patient (or caregiver) for medication updates at each appointment. Medication changes can affect the appropriate care of the patient from a medical and/or appointment management standpoint.
- Powered toothbrushes may be too stimulating for some adults and should be recommended only after determining if the adult will tolerate one.
- Seizure management during treatment: **Remove** all dental instruments from the mouth. **Clear** the area around the dental chair. **Stay** with the patient and turn patient to one side. **Monitor** airway to reduce risk of aspiration. **Note time** seizure begins: if seizure continues >3 min call **EMS** – Danger of Status Epilepticus (potentially life threatening).
- As needed for patients with xerostomia:
 - * Educate on proper oral hygiene (brushing, flossing) and nutrition.
 - * Recommend brushing teeth with a fluoride containing dentifrice before bedtime. After brushing, apply neutral 1.1% fluoride gel (e.g., Prevident 5000 gel) in trays or by brush for 2 minutes. Instruct patient to spit out excess gel and NOT to rinse with water, eat or drink before going to bed.
 - * Recommend xylitol mints, lozenges, and/or gum to stimulate saliva production and caries resistance.

Some patients with Traumatic Brain Injury are fed by tube. Patients fed by tube typically have low caries, rapid accumulation of calculus, GERD (Gastro-esophageal Reflux Disease), oral hypersensitivity, and are at high risk for aspiration in the dental chair. Swallowing difficulties may occur with thin or thick liquids. No antibiotic premedication is needed for Gastric or Nasogastric tubes. Position the patient in as upright a position as possible and utilize low amounts of water and high volume suction to minimize aspiration.

Look for signs of physical abuse during the examination. Note findings in chart and report any suspected abuse to 1-866-ENDHARM (www.dshs.wa.gov/endharm.shtml) as required by law. Abuse is more common in people with developmental disabilities and often manifests in oral trauma.

Additional Information: [Special Needs Fact Sheets for Providers and Caregivers](#)

Adults with Traumatic Brain Injury continued

Below are references and resources which, although some are labeled for children, are very helpful for reviewing implications in adults.

References

- Corrigan, J.D., Whiteneck, G., Mellick, D. (2004) Perceived needs following traumatic brain injury. *J Head Trauma Rehabi.* (3):205–16.
- Centers for Disease Control – [National Center for Injury Prevention and Control](#)
- Andrews, K. (2005) Rehabilitation practice following profound brain damage. *Neuropsychological Rehabilitation* 12(3): 461–472
- Taylor, H.G., Yeates, K.O., Wade, S.L., Drotar, D., Stancin, T., Minich, N. (2002) A prospective study of short- and long-term outcomes after traumatic brain injury in children: behaviour and achievement. *Neuropsychology*, 16: 15–27.
- McKinlay, A., Grace, R.C., Horwood, L.J., Fergusson, D.M., Ridder, E.M., MacFarlane, M. (2008) Prevalence of traumatic brain injury among children, adolescents and young adults: Prospective evidence from a birth cohort. *Brain Injury*, 22(2): 175–81.
- [NIH Institute for Traumatic Brain Injury](#)

Additional Resources

- [NIH Institute for Traumatic Brain Injury](#)
- [Brain Injury Association of America](#)
- [ASTDD-Special Needs](#)
- [Block Oral Disease, MA](#)
- Free of charge CDE course: [NIDCR CDE](#) (2 CDE hours)



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For persons with disabilities, this document is available on request in other formats. To submit a request, please call 1-800-525-0127 (TTY/TDD 1-800-833-6388).