

**Table 14.1.** Epidemiology of Selected Neurological Disorders in the United States

Condition	Prevalence	Incidence	Gender	Age	Race/Ethnicity
Parkinson's disease (PD)	1 million (1 in 300)	50,000 new cases/year (three- to fourfold increase expected)	More common in men than women	1% <50 years 2.5% >70 years	No racial predilection
Multiple sclerosis (MS)	380,000 people (1 per 850)	Incidence has been increasing	Affects women two times as often as men	Affects young adults age 15–50 years old	Higher in temperate regions and less along equator
Cerebrovascular accidents (CVAs)	4.7 million (survivors); 3rd most common cause of death	Over 700,000 new cases a year (averages one stroke/minute)	Increased incidence in young men and old women	Onset age 20–40 years 28% <65 years 50% >75 years	Increased incidence in racial/ethnic minorities
Amyotrophic lateral sclerosis (ALS) [Lou Gehrig's]	30,000 cases of ALS in the United States	More than 5000 people/year	Affects men more than women	Generally diagnosed after age 55 years	No preference
Traumatic brain injuries (TBIs)	More than 75,000 deaths from TBI/year (400 per 100,000 disabled survivors)	More than 1.7 million TBIs every year	Young men ages 16–24 account for nearly 50% of all motor vehicle accidents	Infants (shaken baby syndrome) and older adults from falls; two-thirds of TBI occur in persons <36, with vehicular accidents accounting for 50%	No preference
Epilepsy	3 million	About 200,000 new cases/year; 0.5% overall; 10% of the U.S. population will have a seizure in a lifetime	No gender prevalence	Increased incidence with age; as many as 1% of children under 20, 3% of those who are 75+	Higher among racial minorities than among Caucasians

**Table 14.2.** Medications Used in the Management of Parkinson's Disease (PD)<sup>a</sup>

Drug Classes	Examples/Drugs	Drug Effect	Adverse Effect	Dental Concerns
Dopamine precursor	Levodopa (L-dopa) Carbidopa/levodopa <i>Sinemet CR</i> ®	Drug precursor that is metabolized into dopamine in the brain	Dyskinesia, fatigue, headache, anxiety, confusion, insomnia, orthostatic hypotension	When uncontrolled movements occur, sedation may be needed to treat; caution when getting up from dental chair; L-dopa—dry mouth
Dopamine agonists	Bromocriptine <i>Parlodol</i> ® Pramipexole <i>Mirapex</i> ® Ropinirole HCl <i>Requip</i> ®	Mimics the action of dopamine	Psychosis (hallucinations, delusions), orthostatic hypotension, nausea dyskinesia	Caution when getting up from dental chair; Mirapex® interacts with erythromycin
Dopamine-releasing agent	Amantadine <i>Symmetrel</i> ®	Enhances dopamine transmission	Anticholinergic effects: sedation, urinary retention, peripheral edema, nausea, constipation, confusion	Dry mouth, nausea, sedation, caution when leaving dental chair
Monoamine oxidase B inhibitor	Selegiline <i>Eldépyl</i> ®/ <i>Zelapar</i> ®	Prevents metabolism of dopamine in the brain	Dizziness, orthostatic hypotension, nausea	Caution when leaving dental chair. No adverse problems with using epinephrine or levonordrelin
Catechol-O-methyltransferase (COMT) inhibitors	Tolcapone <i>Tasmar</i> ® Entacapone <i>Comtan</i> ®	Used with levodopa to prevent breakdown in intestine, allowing more levodopa to reach the brain	Dyskinesia, psychosis, orthostatic hypotension, nausea, diarrhea, abnormal taste	Caution with use of vasoconstrictors; monitor vital signs and limit dose to two carpaloes containing 1:100,000 epinephrine or less; aspirate injections
Anticholinergic	Trihexyphenidyl HCl <i>Antane</i> ® Benztropine mesylate <i>Cogentin</i> ®	Blocks the effect of acetylcholine (another brain neurotransmitter) to rebalance its levels with dopamine	Sedation, urinary retention, dry mouth	Dry mouth

<sup>a</sup> Modified from Little, Falace, Miller, and Rhodus, 2008. Table of Drugs Used in the Management of PD. pp. 477–478.  
CR, controlled release; HCl, hydrochloride.

**Table 14.3.** Medications Used in the Medical Management of Multiple Sclerosis (MS)<sup>a</sup>

<b>Drug Classes</b>	<b>Examples/Drugs</b>	<b>Drug Effect</b>	<b>Adverse Effects</b>	<b>Dental Concerns</b>
<b>Primary drugs</b>				
Corticosteroids	Methylprednisolone	Anti-inflammatory	Immunosuppression/adrenal suppression Transient flu-like symptoms	Consider adrenal and immune response None described
Interferon beta-1a	Avonex®, Rebif®	Slows disease progression		
Interferon beta-1b	Betaseron®			
<b>Alternatives</b>				
Glatiramer acetate	Copaxone® injection	Reduce rate of clinical relapse	Ulcerative stomatitis, lymphadenopathy, salivary gland enlargement	None described
Mitoxantrone	Novantrone® infusion	Arrests cell cycle and used as last resort	Leukopenia, cardiac problems, leukemia, mucositis, stomatitis	
GABA agonist	Baclofen	Antispastic	Sedation	None described
GABA receptor Activators	Benzodiazepines: lorazepam, diazepam	(Manage spasticity)		
Modifies calcium Release in muscle	Dantrolene			
Alpha-2 adrenergic agonist	Tizanidine (Zanaflex®)			
Anticholinergics	Ditropan®, Detrol®	Bladder control	Sedation, urinary retention	Dry mouth
Dopamine-releasing agent	Amantadine (Symmetrel®)	Helps to reduce fatigue	Anticholinergic effects: sedation, urinary retention, peripheral edema, nausea, constipation, confusion	Dry mouth, nausea, sedation, caution when leaving dental chair
Antiseizure	Carbamazepine (Tegretol®) Phenytoin (Dilantin®)	Prevents paroxysmal events	Toxic levels may cause confusion	Gingival overgrowth
Antidepressants	Serotonin reuptake inhibitors (Prozac®) Tricyclic antidepressants (Elavil®)	Manage depression occurring in >50% of MS patients	Anticholinergic effects: sedation, urinary retention, peripheral edema, nausea, constipation, confusion	Dry mouth, nausea, sedation, caution when leaving dental chair

<sup>a</sup> Modified from Little, Falace, Miller, Rhodus, 2008, p. 483.  
GABA, gamma-aminobutyric acid.

**Table 14.4.** Medications Commonly Used in the Management of Epilepsy<sup>a</sup>

Indication	Medication	Main Side Effects
Primarily partial seizures	Carbamazepine ( <i>Tegretol</i> ®)	Ataxia, dizziness, diplopia, agranulocytosis, thrombocytopenia, liver dysfunction
	Lamotrigine ( <i>Lamictal</i> ®)	Ataxia, dizziness, diplopia, blurred vision, somnolence, headache, nausea, vomiting, rash
Primarily absence seizures	Clonazepam ( <i>Klonopin</i> ®)	Ataxia, drowsiness, general CNS depression, abnormal behavior, palpitations, muscle weakness
	Ethosuximide ( <i>Zarontin</i> ®)	GI upset, liver failure, weight gain, tremors, alopecia
Tonic-clonic seizures	Phenytoin ( <i>Dilantin</i> ®)	Ataxia, confusion, lethargy, gingival overgrowth, blood dyscrasias, skin rash, allergic reaction
	Phenobarbital	Drowsiness, CNS depression, megaloblastic anemia (rare)
	Topiramate ( <i>Topamax</i> ®)	Mood disturbances, confusion, sedation, paresthesias, hyperthermia, acidosis
	Valproic acid ( <i>Depakene</i> ®)	GI upset (indigestion, nausea, and vomiting, cramping, diarrhea, constipation), hypersalivation, anorexia, increased appetite, agranulocytosis, thrombocytopenia
	Divalproex sodium ( <i>Depakote</i> ®)	
Status epilepticus	Midazolam ( <i>Versed</i> ®)	Respiratory depression, decreased blood pressure, nausea, vomiting, diplopia, mood swings

<sup>a</sup> Adapted from Rhodus and Miller, 2008.

GI, gastrointestinal; CNS, central nervous system.

**Table 14.5.** Suggestions for Dental Professionals Working with Left-CVA Patients

Left Brain Damage (L-CVA) Findings	Implications
Paralysis to right side	Because this patient has trouble communicating, it is easy to <i>underestimate</i> his or her abilities, which may be nonverbal. Use simple drawings or write directions to communicate.
Speech and language deficits	
Behavior style: slow, cautious, disorganized	Do not rush the patient in doing things.
Memory deficits: auditory	Communicate by eliminating extraneous stimuli; do not raise voice or use "baby talk"; substitute pantomime and demonstration for words; divide tasks into simple steps; give frequent, accurate, and immediate positive feedback; and ask simple and brief questions.
Anxious	Use stress-reduction techniques.

Modified from Stroke Association Org, 2011.

**Table 14.6.** Suggestions for Dental Professionals Working with Right-CVA Patients

Right Brain Damage (R-CVA) Findings	Implications
Paralysis to left side	Because this patient can speak and write, it is easy to <i>overestimate</i> his or her abilities.
Spatial and perceptual deficits	
Behavior style: quick and impulsive	Do not allow the patient to do things such as transfer by himself unless you are there to watch and help if needed.
Memory deficits: visual including visual field cuts	Move slowly around a patient's head. If moving too quickly into a patient's visual area, the risk of a patient suddenly moving is great.
Cannot monitor self (one-sided neglect)	Most patients will need assistance in brushing the left side of their mouth, as they will not be able to "crossover" to the neglected side; may pouch food on the left side.

Modified from Stroke Association Org, 2011.

**Table 14.7.** Management of Seizure Risk in the Epileptic Patient

Management Concern	Recommendation
Is there something I need to do to prevent seizure(s) during dental care?	For well-controlled patients: normal care Poorly controlled: consult with physician: May require adjustment of anti-seizure medications. Consider treatment with sedation/general anesthesia.
How can I eliminate the precipitating factors for an "aura"?	Careful position of dental light and avoid known precipitating factors. Consider using an extraoral mouthprop (molt).
If a grand mal seizure (status epilepticus) occurs, will I be ready to provide emergency care?	1) Clear area, move bracket and instruments. 2) Place chair in supported supine position. 3) Remove foreign bodies from the person's mouth if possible (but no blind finger sweep). 4) Turn head to sideways to avoid aspiration. 5) Passively restrain to prevent patient from falling out of chair or hitting object. 6) Time the duration of seizure.
Following a seizure in my office, what do I need to do to provide postseizure care?	1) Turn patient's head to side to avoid aspiration. 2) Examine patient for traumatic injuries. 3) Discontinue care and arrange for transport.
If a seizure lasts for more than 5 minutes or my patient becomes cyanotic, in my practice what should I do?	1) Activate emergency rescue system (call 911). 2) Assure patient has an airway and is breathing adequately. 3) If not breathing on his or her own, support airway and give supplemental oxygen. 4) If equipped and trained, give parenteral 10mg diazepam or 5 mg midazolam.

Adapted from Robbins.<sup>4</sup>

**Table 14.8.** ASA Risk According to Stroke Status and Dental Management Recommendations

<b>Stroke Status</b>	<b>Recommendations</b>
ASA I No stroke risk factors	No modifications needed
ASA II One or more stroke risk factors	Refer to physician for medical treatment of risk factors and counsel patient to quit or modify risk factors.
ASA III History of one or more TIAs or stroke, with or without neurological deficits at least 6 months before dental treatment	Refer for evaluation to medical facility if risk factors not being treated. Manage in dental office according to deficit present.
ASA IV History of TIA or stroke, with or without neurological deficits, within 6 months of dental treatment	Deferral of dental treatment for at least 6 months due to the fact that TIA/CVA recurrence is highest within the first year. Up to 25% of patients who have a TIA will die within 1 year.

Modified from Malamed, S. *Medical Emergencies in the Dental Office*. 5th ed., 2000.