

CONCUSSION SUMMARY

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Centers for Disease Control and Prevention (CDC) estimated that approximately 3.8 million Americans receive concussions annually, but several reasons indicate that this number may be too conservative. Because of the difficulty of diagnosing concussions, millions of Americans are undiagnosed. 1,608 subjects were recruited and enrolled in a study at a multispecialty private practice group in Manhattan. 292 patients reported concussions, indicating a prevalence rate of 22%. This figure is staggering compared to the severely underestimated 1% put forth by the CDC, which raises questions regarding the efficacy of concussion diagnosis as well as other common diagnoses at the primary care level. Similar to the concussion epidemic, my BMI study with New York State Governor Cuomo's former Commissioner of Health, Nirav Shah, found a 59% obesity rate by age 70 when utilizing proper measurements like the DEXA scan and leptin blood test compared to the NHANES obesity rate of 34% using BMI alone (Shah and Braverman, 2012).

Clinically, concussion patients present with additional neuropsychiatric conditions including: depression, anxiety, insomnia, obesity, violence, and mood instability. Individuals suffering from neuropsychiatric conditions often self-medicate using substances like marijuana for insomnia and anxiety treatment, cocaine for fatigue and depression, and alcohol for relaxation and mood enhancement. Obese individuals suffer from food addiction, leptin resistance and dopamine deficiency. Demented persons typically have further rates of head trauma and cognitive or thinking misperceptions, which results in long-term legal and illegal narcotic abuse. Traumatic injuries such as PTSD and other related conditions add to problems of brain health. Crime and violence occurs as the sequelae of brain health neglect: creating a society that fails those with brain disorders. Board-certified psychiatrists often treat these patients without asking for a concussion medical history. These physicians need to be re-trained to look at a medical history that includes concussion history. Therefore, it is no surprise that with no analysis of the first concussion, sports stars like Chris Benoit and Jovan Belcher have suffered fatal consequences of chronic traumatic encephalopathy (CTE) while athletes such as Muhammad Ali and Tony Dorsett have likely cases of dementia and CTE. The answer to combatting brain disease is through preventative treatments that ultimately reshape the way health care focuses its efforts on the brain – which should be the most tested organ.

Mass underdiagnosis of concussions can lead to a lack of precaution in recently concussed individuals, resulting in further injuries to the brain. Current studies have elucidated a link between early adulthood concussions and patterns of decline in late adulthood associated with abnormal aging. Existing methods of detecting concussions include neuropsychological testing, which is often ineffective as individuals purposely fail a baseline test in order to conceal signs of cognitive impairment when a concussion is sustained. While no test is perfect

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and indeed many athletes can fake tests (i.e. failed on purpose), it is therefore important to start neurocognitive testing earlier in life during or prior to high school when individuals have no incentive to manipulate results. In contrast, electrophysiological assessment of P300 latency and amplitude has proved to be accurate and has been termed 'the lie detector test' of concussion diagnosis. Patients with a history of concussion typically have slower processing speeds and decreased voltage on the P300 and may develop chronic traumatic encephalopathy, which is a degenerative brain disease often seen in athletes who suffer repeated blows to the head. P300 measurements taken in the period of middle to late adulthood and after years of sports performance, may be able to detect the lingering effects of concussions even after symptoms identified by neuropsychological evaluations have subsided.

Every person with a history of concussion should undergo examination with a P300. The P300 is inexpensive, widely available to researchers, and can be easily implemented in the clinic (Braverman et al., 2015; Braverman et al., 2013). Extracting specific ERPs from the P300 serve as "brain vital signs," critical for subsequent evaluation of dysfunction in concussion cases (Hajra et al., 2016). Examination with the P300 is imperative as concussions are risk factors for early-onset Alzheimer's disease (EOAD) and may lead to disinhibition (Mendez et al, 2015) as well as cause depressive symptoms, anxiety, substance misuse, behavior and/or cognitive changes, and sleep disorders (Finkbeiner et al., 2016; Tkachenko et al., 2016). Concussions can also affect the brain's structure by increasing dendritic branching and reducing synaptic density, which are associated with impulsivity (Hehar et al, 2015).

In regards to P300 results, we often see slowed processing speeds and decreased voltage. The negative correlations between response time and P300 amplitude suggest that the time necessary to accurately respond to targets increases as the efficiency of allocating processing resources decreases during highly demanding working memory tasks (Ozen et al. 2013). Concussion victims typically show a decrease in P300 amplitude and latency, an effect presumed to reflect alterations in attentional-cognitive processes, with the degree of impairment strongly related to the severity of post-concussion symptoms (Moore et al., 2014; Theriault et al., 2009; Dupuis et al., 2000; Pratap-Chand et al., 1988). These results suggest that a history of concussions may lead to persisting neurophysiological abnormalities that may even be present long after neuropsychological testing ceases to identify concussion symptoms. These results also disagree with those of other studies that suggest that there are either no long-term P300 abnormalities in individuals with histories of concussions, or that those abnormalities persist for up to six months after the last concussion was sustained. Further research should be conducted to investigate possible correlations between these shortened P300 latencies and the prevalence of neuropsychiatric disorders seen as a result of concussions.

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In addition to the P300, primary care physicians require more tools to identify 'silent' concussion injuries in their patient population, such as implementation of a concussion history questionnaire (Figure 1) as well as utilization of the 3T MRI coupled with NeuroQuant® software. Since the 3T MRI has an increased resolution 15 times that of 1.5T MRI, areas of anatomical atrophy can be readily screened and detected. Both children and adults can suffer from increased rates of cerebral atrophy, often a result of head trauma like concussions (Tables 1-2). In light of the gross underestimation of concussion incidences annually in the United States and recent findings regarding long-term effects, the measurement of P300 components and cerebral atrophy should be considered standard practice in primary care.

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FIGURES 1A-G:

Concussion without loss of consciousness: # of times _____ Date(s) _____

Concussion with loss of consciousness: # of times _____ Date(s) _____

Other Head Injury/injuries* (describe): _____

of times _____ Date(s) _____ *please consider any of the following:
Blow to head, auto accident, fight, sports injury, fall, other.

Were any of these head injuries/concussions within a four-week period of one another? Include specific dates if possible.

For each concussion or head injury did you:

Experience retrograde amnesia? Y/N

Experience anterograde amnesia? Y/N

Experience confusion/disorientation? Y/N

Experience other symptoms? Y/N; Please include list of other symptoms.

Go to the hospital? Y/N

Undergo a CT scan? Y/N

Undergo an MRI? Y/N

Undergo EEG? Y/N

Where on head was the injury? Please specify.

If playing sports, did you return to play during the same game/practice? Y/N

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Please circle ANYTHING and EVERYTHING that may apply to you. IT WILL BE MORE BENEFICIAL FOR CARE.

Brain Stress Test (EEG/QEEG)

Stroke / TIA

Head Injury, describe _____

Concussion without loss of consciousness

of times _____ Date(s): _____

Concussion with loss of consciousness *

of times _____ Date(s): _____

Smell or Taste hallucinations, Delusions

Space perception aberration

Out of body experiences

Visual spots, rims, flashes

Jamais Vu (something unfamiliar about familiar places or happenings)

An experience of feeling detached from, as if one is an outside observer of one's mental processes or body.

An experience of being automated or as if in a dream

Benign cranial nerve tumor

Encephalopathy, Papilledema

Person feigning illness

Multiple Sclerosis, Nonconvulsive epilepsy

Non-malignant liver tumor

Reactive Confusion, Panic Attacks

Toxic and infectious encephalopathy:

Epstein-Barr Virus

Lyme's Disease

CMV, Other viral infections

Seizures

Temporal lobe epilepsy:

Ritualistic behavior

Synesthesia (sound you can see)

Compulsive writing

Elevator plummeting feeling, stomach rises

TOVA - Has any of this ever occurred?

Absent-minded

Missed stop signs, Missed verbal cues

Impulsive, "Jumped the gun"

Frequently interrupt, Accident prone

Delayed in processing information, slow or not sharp

Not quick or not attend to things quickly

Pay attention inconsistently

Distracted or both sharp and inconsistent

Auditory Information Processing Stress Test

Stroke, Vertigo, Acoustic nerve tumor

Hearing loss, Tinnitus

Benign paroxysmal positional vertigo

Impairment of auditory discrimination

Unspecified disorder of the ear

Vertigo of central origin

Inactive Meniere's disease

Sensorineural hearing loss

Neural hearing loss

Conductive and sensorineural hearing loss

Central hearing loss

Abnormal involuntary movements

Disorders of the acoustic nerve

Dizziness, dizzy spells or giddiness

Lack of coordination

Auditory information processing difficulty

Visual Processing with Information Stress Test

Stroke, Multiple Sclerosis

Unspecified disorder of optic nerve and visual pathways

Optic neuritis, Papilledema, Optic papillitis

Optic atrophy, Toxic optic neuropathy

Disorders of visual pathways associated with neoplasm

Disorders of visual pathways associated with vascular disease in the brain

Disorders of visual pathways associated with inflammatory disease in the brain

Neuromyelitis optica

Blurred vision

Demyelinating disease of the CNS

Conversion disorder

Visual information processing difficulty

Cognitive / Thinking Efficiency Stress Test (P300)

Stroke

Memory loss, Learning disability

Smell hallucinations, Taste hallucinations

Papilledema

Cognitive thinking difficulty

Tech: _____

* Do you have a lot of head banging episodes? This might include football and other head injuries. Remember that trauma to the brain does not require loss of consciousness, concussion or seeing stars. There are plenty of people have silent heart attacks, large percentage are most strokes. Initially the first ones are always silent; people with many strokes have infarcts in the brain. Unfortunately these head traumas correlate to long term brain injury.

Reviewed by Dr. Eric Braverman

Comments

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Directions: Put a check mark next to each problem that applies to you NOW.
Put a "P" next to each one that has applied to you in the PAST.

<i>Dopamine</i> Symptoms of Deficiency	<i>Acetylcholine</i> Symptoms of Deficiency	<i>GABA</i> Symptoms of Deficiency	<i>GABA</i> Symptoms, continued...	<i>Serotonin</i> Symptoms of Deficiency
Poor concentration	Memory loss	Anxiety	Dizziness or	Sleep disorder
Constipation	Thinking problems	Trembling	lightheadedness	Carbohydrate craving
Low sex drive	Learning problems	Twitching	Unusual allergies	PMS
Difficulty achieving orgasm	Sexual dysfunction	Feeling shaky	Chest pain or discomfort	Hypertension
Impotence	Dyslexia	Feelings of dread	Restlessness	Arthritis
Obesity	Inflammatory disorders, arthritis	Backache	Rage	Constipation
Slow or rigid movements		Headache	Short temper	Allergies
Lack of quickness	Diabetes	Difficulty concentrating	Muscle tension/aches	Nausea
Shuffling gait	Glaucoma	Shortness of breath	Phobias/fears	Vomiting
Wide based gait	Eye disorders	Hyperventilation	Cough/choking	Insomnia
Poor walking	Cholesterol elevation	Hypervigilance	Fear of dying	Depression
Poor physical strength	Myasthenia gravis	Fatigability	Strange thoughts or pains	Memory loss
Poor blood sugar stability	Multiple sclerosis	Abnormal sense of smell	Blurred vision	Weight gain
Slow metabolism	Osteoporosis	Hyperactivity	High startle responses	Obsessive compulsive disorder
Hypoglycemia	Difficulty visualizing	Decreased libido	Tinnitus (ringing in ears)	
Diabetes	Difficulty concentrating	Sexual dysfunction	TMJ	Shyness
Mood swings	Difficulty remembering	Flushing and pallor	Seizures	Self-absorbed
Anger	Loss of immediate working memory	Difficulty swallowing	Muscle loss	Masochistic
High blood pressure	Poor attention	"Lump in throat"	Manic depression	Drama queen
Nicotine cravings	Rule breaker	Tachycardia	Mood swings	"Blues"
Sugar cravings	Drama queen	Palpitations	Chronic pain	Drug and alcohol addiction
Depression	Bipolar	Butterflies in stomach	Carbohydrate cravings	Thought confusion
Inability to gain or lose weight	Lack of idealism	Sweating	Depression	Co-dependency
Slow processing speed	Lack of creative IQ	Sleep disorders	High blood pressure	Lack of pleasure
Attention deficit	Omissions	Cold/clammy hands	Constipation	Lack of common sense
Narcolepsy	Blank-out attention problems	Diarrhea	Protein cravings	Lack of artistic appreciation
Excessive sleep	Lack of immediate memory	Hypersomnia/insomnia	Nausea	Slow reaction time
Poor attention	Irrational	Dry mouth (xerostomia)	Vomiting	Loner
Poor abstract thinking		Night sweats	Obsessive compulsive disorder	Perfectionist
Bone loss		Urinary frequency		
Kidney problems		Dribbling	Cardiac arrhythmias	
Anemia		Incomplete emptying of bladder	Unstable	
Thyroid disorders		Premenstrual, peri- menstrual or excessive bleeding	Anxious	
Digestion problems		Paresthesias	Lack of stability	
Joint pain		Depersonalization or derealization	Lack of emotional maturity	
Loner		IBS (Irritable bowel syndrome)	Lack of emotional IQ	
"Blue"		Fear of people or social events	Impulsive attention errors	
Lack of emotions			Global memory problems	
Variable attention			Not protective of loved ones	
Lack of working memory and concentration				
Procrastinator				
Hedonistic				

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Please circle **ANYTHING** and **EVERYTHING** that may apply to you. **IT WILL BE MORE BENEFICIAL FOR CARE.**

A. Signs and Symptoms That May Indicate the Need for Evaluation for Dementia

Cognitive changes

New forgetfulness, more trouble understanding spoken and written communication, difficulty finding words, not knowing common facts such as the name of the current U.S. President, disorientation

Psychiatric symptoms

Withdrawal or apathy, depression, suspiciousness, anxiety, insomnia, fearfulness, paranoia, abnormal beliefs, hallucinations

Personality changes

Inappropriate friendliness, blunting and disinterest, social withdrawal, excessive flirtatiousness, easy frustration, explosive spells

Problem behaviors

Wandering, agitation, noisiness, restlessness, being out of bed at night

Changes in day-to-day functioning

Difficulty driving, getting lost, forgetting recipes when cooking, neglecting self-care, neglecting household chores, difficulty handling money, making mistakes at work, trouble with shopping.

B. Symptom Checklist in the Evaluation of Dementia

Impaired Cognition	Impaired Function	Mood	Mental Phen.	Behaviors	Drives
Memory	Cooking	Depression	Low energy level	Verbal abuse	Poor appetite
Language	Finances	Self-deprecating	Apathetic	Uncooperative	Weight loss
Orientation	Housekeeping	Somatic complaint	Panic	Physically aggressive	Excessive appetite
Writing, reading	Shopping	Crying spells	Labile	"Sundowning"	Hypersexuality
Calculating	Driving	Diurnal variation	Irritable	Demands interaction	Hyposexuality
Recognizing	Hearing and sight	Withdrawn	Euphoria	Outbursts	Sleeping poorly
Attention	Dressing	Anxiety	Delusions	Catastrophic	Excessive sleep
Concentration	Mobility (falls)	Fatigues easily	Illusions	Noisy	Out of bed at night
Planning, organizing	Bathing, grooming	Death, suicidal	Rapid speech	Wandering	
Personality change	Feeding	Disinterested	Hallucinations	Hoarding, rummaging	
Executing	Continence	Anhedonic	Acute confusion	Sexual aggression	
Social rules				Intrusive	

Accidents: Please write down the number of times for each accident if they ever occurred to you.

Accidents	Car	Skiing	Falling	Breaking Bones	Getting Hit	Others
Severe						
Moderate						
Minor						

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Please answer/circle ANYTHING and EVERYTHING that may apply to you. IT WILL BE MORE BENEFICIAL FOR CARE.

Concussion without loss of consciousness: # of times _____ Date(s) _____

Concussion with loss of consciousness: # of times _____ Date(s) _____

Other Head Injury/injuries* (describe): _____ # of times _____ Date(s) _____

*please consider any of the following: Blow to head, auto accident, fight, sports injury, fall, other.

Were any of these head injuries/concussions within a four week period of one another? Include specific dates if possible.

For each concussion or head injury:

Where on head was the injury? _____

Did you experience retrograde amnesia (inability to recall short-term memories occurring prior to onset of the injury)? Y/N

Did you experience anterograde amnesia (inability to recall short-term memories occurring after onset of the injury)? Y/N

Did you experience confusion/disorientation? Y / N

Did you experience any noticeable memory decline? Y / N

Did you experience any seizures after the incident? Y / N

Did you experience other symptoms? _____

Did you go to the hospital? Y / N

Did you undergo a CT scan? Y / N

Did you undergo an MRI? Y / N

Did you undergo EEG? Y / N

If playing sports, did you return to play during the same game/practice?

Behavioral Changes in Temporal Lobe Epilepsy

Premonitory (Hours or Days Before Seizure)

Affective (depression, irritability, aggression)

Cognitive (confusion, impaired memory)

Behavioral (withdrawal)

Somatic (headache, change in body temperature, appetite, or thirst)

Simple Partial Symptoms

Sensory (illusions or hallucinations in olfactory, auditory, visual, or gustatory modes)

Autonomic/visceral (rising abdominal feeling, chest sensation, palpitation, piloerection)

Affective (depression, fear, anxiety, elation, laughing, crying, religious or sexual feeling)

Cognitive/experimental (confusion, altered familiarity [déjà vu, jamais vu], dreamy state, depersonalization, forced thoughts, distortion of time or body image)

Complex Partial Symptoms

Impaired consciousness (blank stare, arrest of ongoing behavior)

Automatisms (lip smacking, swallowing, fumbling or repetitive movements of hands, repetitive phrases, continuation of ongoing behavior [eg, walking, dealing cards])

Dystonic posturing of extremity, usually the hand

Postictal

Headache

Affective (depression, mania, aggression*)

Cognitive (confusion, amnesia, anomia, aphasia)

Psychosis

Interictal

Affective (depression, anxiety, irritability, hypomania, increased or decreased emotionality, aggression)

Cognitive (amnesia, anomia, psychomotor slowing, impaired executive and social functions)

Sexual (reduced libido, impotence, anorgasmia)

Personality (circumstantiality, humorlessness, hypergraphia, hypermoralism, obsessionalism, paranoia, religiosity, viscosity)

Psychosis

*Usually provoked by restraint.

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MCI Domain Assessment

Complete this form prior to any successful treatment:

What was your baseline assessment of existing deficits?

Have you or anyone close to you noticed declines in any of the following domains? (Since your 20s)

Please check any that apply

	<u>Domain</u>	<u>Yes</u>	<u>No</u>	<u>For Staff Use - any under 90th percentile</u>
1	Attention (deficits indicated by missing stop signs, jumping the gun, slow response time, or inconsistency in manner of response)	<input type="checkbox"/>	<input type="checkbox"/>	TOVA
2	Reaction Time	<input type="checkbox"/>	<input type="checkbox"/>	CNSVS, TOVA
3	Judgement (the ability to make good decisions)	<input type="checkbox"/>	<input type="checkbox"/>	CNSVS, TOVA
4	Learning ability (understanding concepts or instructions and ability to reason)	<input type="checkbox"/>	<input type="checkbox"/>	WMS, CNSVS, WAIS
5	Delayed recall - free (without assistance), cued (with assistance of stimulus or prompt), or serial (recall items/events in order in which they were learnt) (ability to retrieve information a given time period after which it was learnt)	<input type="checkbox"/>	<input type="checkbox"/>	WMS, CNSVS
6	Linguistic function (ability to communicate effectively)	<input type="checkbox"/>	<input type="checkbox"/>	MMSE
7	Verbal IQ (ability to analyze information and solve language based problems of a literary, logical, or social type; understanding relationships between language concepts and performing language analogies and comparisons)	<input type="checkbox"/>	<input type="checkbox"/>	WAIS
8	Performance IQ (ability to analyze and utilize visual information, such as drawing or completing pictures, manipulating blocks to build structures)	<input type="checkbox"/>	<input type="checkbox"/>	WMS III
9	Abstract IQ (ability to analyze information and apply knowledge in problem solving using theories, metaphors, or complex analogies; usually involves forming ideas about the nature of objects, ideas, and processes; problems are often visual and typically do not involve social ideas)	<input type="checkbox"/>	<input type="checkbox"/>	GAMA
10	Processing Speed (how quickly/efficiently the brain processes the information it receives; ability to think and learn quickly)	<input type="checkbox"/>	<input type="checkbox"/>	CNSVS, P300
11	Immediate Memory (A general change in ability to remember things, short lists, things from one second to the next, recent events, etc)	<input type="checkbox"/>	<input type="checkbox"/>	WMS, RANDT, MMSE
12	General Cognitive Functioning (broadly, the ability to think about ideas, analyze situations, and solve problems)	<input type="checkbox"/>	<input type="checkbox"/>	CNSVS

**if you answered yes to these please ask the practitioner for an MRI prescription

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225 Acoustic Nerve Tumor	331.83 Mild Cognitive Impairment		
242.90 Thyrotoxicosis w/o mention goiter	331.9 Unspecified Cerebral Degeneration		
244.9 Hypothyroidism	332.0 Parkinson's Disease	291.82 Alcohol Induced Insomnia	327.44 Parasomnia due to medical condition
266.2 B-Complex Deficiencies	332.10 Secondary Parkinsonism	292.85 Insomnia due to a drug or substance	327.49 Catahrensia (sleep-related groaning)
277.9 Unspecified Disorder of Metabolism	333.0 Degenerative dis. Basal ganglia	300.15 Dissociative disorder or reaction, nos	327.51 Periodic limb movement disorder
290.0 Senile Dementia	333.1 Essential and other forms of Tremor	307.40 Nonorganic sleep disorder, unspecified	327.52 Sleep related leg cramps
290.0-290.0 Senile/Presenile organic psychotic	333.1 Tremor, Essential-Specified	307.41 Transient disorder of initiating or maintaining sleep	327.53 Sleep related bruxism
290.10 Presenile Dementia Uncomplicated	333.2 Myoclonus	307.42 Persistent disorder of initiating or maintaining sleep	327.59 Other organic sleep movement disorders
290.11 Presenile Dementia with Delirium	333.3 Tics of organic origin	307.43 Persistent disorder of initiating or maintaining wakefulness	327.8 Other organic sleep disorders, unspecified
290.12 Presenile Dementia with Delusional	333.4 Huntington's Chorea	307.44 Persistent disorder of initiating or maintaining wakefulness	333.2 Myoclonus
290.12 Presenile dementia with Delusional / Paranoia	333.5 Other Chorea	307.45 Circadian rhythm sleep disorder of nonorganic origin	333.99 Other extra pyramidal disease and abn. movement disorders (restless legs syndrome)
290.13 Presenile Dementia with Depressive	333.6 Genetic Tension Dystonia	307.46 Sleep arousal disorder	345.00 Sleep-related epilepsy
290.13 Presenile Dementia / Depressive Type	333.71 Athetoid Cerebral Palsy	307.47 Other dysfunction of sleep stages	347.00 Narcolepsy, without cataplexy
290.20 Senile Dementia Delusion features	333.72 Acute Dystonia due to drugs	307.48 Repetitive intrusions of sleep	347.01 Narcolepsy, with cataplexy
290.21 Senile Dementia / Depressive Features	333.79 Other acquired tonic dystonia	307.49 Other specific disorder of sleep of nonorganic origin	347.10 Narcolepsy in conditions classified elsewhere, without cataplexy
290.3 Senile Dementia Delirium Features	333.81 Blepharospasm	327.00 Organic insomnia, unspecified	347.11 Narcolepsy in conditions classified elsewhere, with cataplexy
290.40 Arteriosclerotic dementia, uncomplicated	333.82 Orofacial Dyskinesia	327.01 Insomnia due to medical conditions	368.16 Sleep-related hallucinations
290.4 Vascular Dementia, Uncomplicated	333.82 Orofacial Dyskinesia abn. Movement	327.02 Insomnia due to mental disorder	518.81 Acute respiratory failure
290.41 Arteriosclerotic Dementia, with acute	333.83 Spasmodic Torticollis	327.09 Other Organic Insomnia	518.83 Chronic respiratory failure
290.41 Vascular Dementia with Delirium	333.84 Organic Writer's Cramp	327.10 Organic hypersomnia, unspecified	518.84 Acute and Chronic Respiratory Failure
290.42 Arteriosclerotic Dementia, Delusional	333.85 Sub acute dyskinesia due to drugs	327.11 Idiopathic Hypersomnia with long sleep	530.1 Sleep-related gastroesophageal reflux
290.42 Vascular Dementia w/ Delusion	333.90 Extra pyramidal disease, unspecified	327.12 Idiopathic Hypersomnia w/o long sleep	607.84 Impotence of organic origin
290.43 Arteriosclerotic Dementia, depressive	333.91 Stiff Man Syndrome	327.13 Recurrent Hypersomnia	729.1 Myalgia and myositis, unspecified
290.43 Vascular dementia w/ Depress mood	333.92 Neuroleptic malignant syndrome	327.14 Hypersomnia due to medical conditions	770.81 Primary apnea of newborn
290.8 Other senile psychotic conditions	333.93 Benign Shuddering Attacks	327.15 Hypersomnia due to mental disorder	780.52 Insomnia NOS
290.9 Unspecified Senile Psychotic Conditions	333.94 Restless Legs Syndrome	327.16 Hypersomnia	781.0 Abnormal involuntary movements
291.0 Alcohol withdrawal delirium	340 Multiple Sclerosis	327.17 Other Hypersomnia	784.0 Headache
291.1 Alcohol induced amnesiac disorder	341.8 Other Demyelinating Disease CNS	327.18 Hypersomnia due to mental disorder	786.04 Cheyne-Stokes respiration
291.2 Alcohol induced persisting dementia	345.00 Epilepsy Generalized Non-Convulsive	327.19 Other Hypersomnia	786.09 Other Respiratory Distress
291.3 Alcohol induced psych w/ hallucinations	345.10 Epilepsy Generalized Convulsive	327.20 Organic sleep apnea, unspecified	787.20 Difficulty in swallowing NOS
291.4 Idiosyncratic alcohol intoxication	345.2 Petit Mal Status	327.21 Primary Central Sleep Apnea	788.38 Nocturnal enuresis
291.5 Alcohol induced psychotic delusions	345.3 Grand Mal Status	327.22 High Altitude Periodic Breathing	
291.82 Alcohol induced sleeping disorder	345.40 Local related epilepsy partial se.	327.23 Obstructive sleep apnea (adult ; Pediatric)	
291.83 Other Alcohol Induced disorder	345.8 Epilepsy - Other Forms	327.24 Idiopathic sleep related nonobstructive	
291.9 Unspecified Alcohol mental disorders	345.9 Unspecified Epilepsy	327.25 Congenital central alveolar hypoventilation syndrome	
292.0 Drug Withdrawal	346.0 Classical Migraine	327.26 Sleep related hypoventilation/hypoxemia in conditions classifiable elsewhere	
292.11 Drug induced psychotic delusions	346.10 Common Migraine	327.27 Central sleep apnea in conditions classified elsewhere. Code first underlying cond.	
292.11 Drug induced psychotic hallucinations	346.20 Variants of Migraine	327.28 Central sleep apnea due to drug/substance	
292.2 Pathological drug intoxication	346.8 Other Migraine	327.29 Other organic sleep apnea	
292.81 Drug induced delirium	346.9 Migraine, Unspecified	327.30 Circadian rhythm sleep disorder, unspecified	
292.82 Drug induced dementia	347.0 narcolepsy w/o cataplexy	327.31 Circadian Rhythm sleep disorder, delayed sleep	
292.83 Drug induced amnesiac disorder	347.10 narcolepsy w/ cataplexy	327.32 Circadian rhythm sleep advance phase	
292.84 Drug induced mood disorder	348.0 Cerebral Cysts	327.33 Circadian rhythm irregular sleep wake	
292.85 Drug induced sleep disorders	348.1 Anoxic Brain Damage	327.34 Circadian rhythm sleep free running type	
292.9 Unspec. Drug induced Mental Disorder	348.2 Benign Intracranial Hypertension	327.35 Circadian rhythm sleep disorder-jet lag	
293.83 Mood disorder due to medical conditions	348.30 Encephalopathy, unspecified	327.36 Circadian rhythm sleep disorder shift work type	
294.19 Dementia, As classified in other disorders	348.31 Metabolic Encephalopathy	327.37.1.1 Circadian rhythm sleep disorder due to medical condition	
300.02 Generalized anxiety disorder	357.8 Demyelinating neuropathy	327.39 Circadian rhythm sleep disorder, other	
300.11 Conversion disorder	377.10 Unspecified Optic Disc Atrophy	327.40 Parasomnia, unspecified	
300.4 Dysphimic disorder	377.14 Glaucomatous atrophy	327.41 Confusional Arousals	
301.13 Cyclothymic disorder	377.30 Unspecified Optic Neuritis	327.42 REM sleep behavior disorder	
308.3 Acute stress disorder	377.41 Ischemic Optic Neuropathy	327.43 Recurrent isolated sleep paralysis	
300.81 Post-traumatic stress disorder	386.00 Unspecified Meniere's Disease		
310.1 Organic brain Syndrome	386.04 Inactive Meniere's Disease		
310.2 Post concussive memory loss	386.2 Vertigo of Central Origin		
311 Depressive disorder unspecified	388.30 Unspecified Tinnitus		
315.2 Unspecified Developmental Learning Disorder	389.11 Sensory Hearing Loss		
315.9 Learning Disorder Unspecified	389.12 Neural Hearing loss		
315.9 Unspecified delay in development	389.14 Central Hearing Loss		
331.0 Alzheimer's Disease	389.18 Sensorineural Hearing Loss		
331.11 Pick's Disease	780.00 Alteration of Consciousness		
331.19 Front Temporal Dementia (other)	780.4 Vertigo		
331.2 Senile degeneration of brain	780.93 Memory Loss		
331.3 Communicating Hydrocephalus	780.93 Memory Loss NOS		
331.4 Obstructive Hydrocephalus	854.00 Brain Injury		
331.7 Cerebral Degeneration Disease (elsewhere)	859.9 Trauma		
331.81 Reye's Disease	995.2 Adverse Effects of drug, medicine, etc.		
331.82 Dementia w/ Lewy Bodies			

HEAVY METAL TESTING

Aluminum 82108

585.1 Chronic kidney disease, Stage I
973.0 Antacids and antigastric secretion drugs

Arsenic 82174

985.1 Toxic effect of arsenic/compounds

Cadmium 82300

985.5 Toxic effects of cadmium/compounds

Mercury (82925)

985.0 Toxic effect of mercury and its compounds

Heavy Metal Screen, Quantitative, Ee (83018)

985.0 Toxic effect of mercury and its compnds.

985.1 Toxic effect of arsenic and its compnds.

985.2 Toxic effect of manganese and its compnds.

985.3 Toxic effect of beryllium and its compnds.

985.4 Toxic effect of antimony and its compnds.

Lead (82650)

984.0 Toxic effect of inorganic lead compounds

984.4 Toxic effect of organic lead compounds

984.9 Toxic effect of other lead compounds

984.9 Toxic effect of unspc lead compounds

V15.86 Contact with/suspected exposure to lead

CONCUSSION SUMMARY

TABLE 1:

Findings	Percent Positive (N=172 subjects)
Cysts	16 (9.3%)
Calcification	1 (0.6%)
Small Vessel Ischemia	80 (47%)
Demyelination	69 (40%)
Empty Sella	15 (9%)
Hippocampal Atrophy	54 (31%)
Temporal Atrophy	69 (40%)
Central Atrophy	89 (52%)
Bilateral Atrophy	20 (12%)
Ectasia	1 (0.6%)

CONCUSSION SUMMARY

TABLE 2:

Findings	Average Age	Percent Positive (N=19 subjects)
Hippocampal Atrophy	20 years	1/16 (6%)
Temporal Atrophy	21.4 years	5/16 (31%)
Frontal Atrophy	20.2 years	4/9 (44%)
Parietal Atrophy	24.5 years	2/9 (22%)
Limbic Atrophy	23.5 years	2/9 (22%)
Concussion	18.5 years	2/18 (11%)
Demyelination	19 years	1/18 (5.5%)
Bilateral Atrophy	25 years	1/18 (5.5%)
Reduced Fractional Anisotropy in Frontal Lobes	20 years	2/16 (12.5%)
Reduced Fractional Anisotropy in Centrum Semivale	21.1 years	15/16 (94%)
Periatrinal	17 years	1/16 (6%)