

Neuropsychiatric Aspects
of Physical Disease

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Points to be made

1. A good social history still trumps neuroscience, genetics, neuroimaging, AI... you get my drift.
2. The canary people will be the looking glass into our health future, if we aren't careful.
3. Psychiatry bet on the wrong horse.

Miracles are not
contrary to nature,
but what we know about
nature.

- St. Augustine

What we know...

Neurological Disorders versus Psychiatric Disorders

At a practical level, the neuropsychological changes associated with cerebral disease include poor affect control or a lack of affect, changes in intellectual functions, impairment of memory and orientation, and defective judgment

Tucker, Differentiating Neurological Disorders from Psychiatric Disorders, Seminars in Clinical Neuropsychiatry, 2002 Jul;7(3): 163-9

Neurological Disorders versus Psychiatric Disorders

. . . These changes in themselves have great impact not only on the patient, but on his her interactions with others, perhaps especially family members. Family members or other caregivers often believe, erroneously, that the abnormal behavior evidenced by the patient is willful or directed at them. . . .

Tucker, Differentiating Neurological Disorders from Psychiatric Disorders, Seminars in Clinical Neuropsychiatry, 2002 Jul;7(3): 163-9

Neurological Disorders versus Psychiatric Disorders

... It is vital that those caring for the patient understand that the observed behaviors are not under the voluntary control of the patient.

Tucker, Differentiating Neurological Disorders from Psychiatric Disorders, Seminars in Clinical Neuropsychiatry, 2002 Jul;7(3): 163-9

Common Diagnostic Tests

Common to determine if cognitive or mental disorders are due to a general medical condition.

Complete blood count	Chest radiograph
Electrolytes	Electrocardiogram
Fasting glucose	Structural brain imaging: CT/MRI Functional MRI
Blood urea nitrogen and creatinine	Positron emission tomography
Calcium, magnesium, and phosphorus	Single photon emission computed tomography
Liver function tests	Electroencephalography
Thyroid function tests	Human immunodeficiency virus
Rapid plasma reagin/Venereal Disease Research Laboratory	Ceruloplasmin
Vitamin B ₁₂ and folate	Specific drug level (e.g., lead, mercury)
Erythrocyte sedimentation rate	Catecholamines
Arterial blood gases	Porphobilinogens
Toxicology	
Urinalysis	
Cerebrospinal fluid for biomarkers, infectious agents	

Differential Diagnosis ∂ Dx

∂Dx Depression

- Hypokalemia
- Hyperthyroidism
- Hypothyroidism
- Infectious mononucleosis
- Occult malignancy
- Pancreatic carcinoma
- Postviral infection syndrome
- Steroid psychosis
- Vascular dementia

∂Dx Anxiety

- | | |
|-----------------------------|---|
| ▪ AIDS/HIV | ▪ Impending myocardial infarction |
| ▪ Cerebral arteriosclerosis | ▪ Internal hemorrhage |
| ▪ Encephalitis | ▪ Mitral valve prolapse |
| ▪ Epilepsy | ▪ Paroxysmal atrial tachycardia and other cardiac |
| ▪ Essential hypertension | ▪ Arrhythmias |
| ▪ Hyperthyroidism | ▪ Pheochromocytoma |
| ▪ Hyperventilation syndrome | ▪ Postconcussion syndrome |
| ▪ Hypocalcemia | ▪ Pulmonary embolism |
| ▪ Hypoglycemia | ▪ Subacute bacterial endocarditis |
| ▪ Hypokalemia | ▪ Temporal lobe disorder |

∂Dx Mania

- AIDS/HIV
- Antidepressant-induced mania
- Amphetamine-induced mania
- Bronchodilator-induced mania
- Decongestant-induced mania
- Delirium
- Hyperthyroidism
- L-Dopa-induced mania
- Postencephalitic syndrome
- Steroid-induced mania

∂Dx Thought Disorder

- AIDS/HIV
- Dementia due to Pick's Disease
- Dementia of the Alzheimer's type
- Endocrine disease
- Frontal lobe neoplasm
- Migraine equivalent
- Pernicious anemia
- Steroid psychoses
- Syphilis
- Temporal lobe epilepsy
- Liver dysfunction
- Vascular dementia

∂Dx Violent Behavior

- Cerebral infection
- Cerebral neoplasm
- Electrolyte Imbalance
- Hepatic disease
- Hypoglycemia
- Hypoxia
- Infection
- Renal disease
- Temporal lobe epilepsy
- Vitamin deficiency

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Pharmacological management of neurobehavioral disorders following traumatic brain injury: A state-of-the-art review

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Abstract — Pharmacological management of neurobehavioral disorders following traumatic brain injury (TBI) is a complex and evolving field. The authors review the current state of knowledge on the management of neurobehavioral disorders following TBI, focusing on the use of pharmacological agents. The review covers the management of neurobehavioral disorders following TBI, focusing on the use of pharmacological agents. The review covers the management of neurobehavioral disorders following TBI, focusing on the use of pharmacological agents. The review covers the management of neurobehavioral disorders following TBI, focusing on the use of pharmacological agents.

Key words: agitation, aggression, alcohol, attention, depression, dementia, memory, neurobehavioral, pharmacology, traumatic brain injury.

More complex than agitation...

Selected Memory Systems

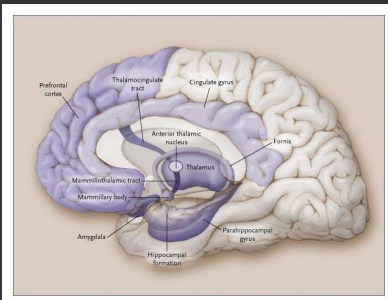
Table 1. Selected Memory Systems.

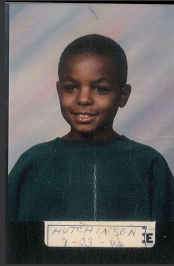
Memory System	Major Anatomical Structures Involved	Length of Storage of Memory	Type of Awareness	Examples
Episodic memory	Medial temporal lobes, anterior thalamic nucleus, mammillary body, fornix, prefrontal cortex	Minutes to years	Explicit, declarative	Remembering a short story, what you had for dinner last night, and what you did on your last birthday
Semantic memory	Inferolateral temporal lobes	Minutes to years	Explicit, declarative	Knowing who was the first president of the United States, the color of a lion, and how a fork differs from a comb
Procedural memory	Basal ganglia, cerebellum, supplementary motor area	Minutes to years	Explicit or implicit, nondeclarative	Driving a car with a standard transmission (explicit) and learning the sequence of numbers on a touch-tone phone without trying (implicit)
Working memory	Phonologic: prefrontal cortex, Broca's area, Wernicke's area Spatial: prefrontal cortex, visual-association areas	Seconds to minutes; information actively rehearsed or manipulated	Explicit, declarative	Phonologic: keeping a phone number "in your head" before dialing Spatial: mentally following a route or rotating an object in your mind

Confabulation

- Memories lost in time
- Failure to make fine-grained distinctions within memory
- Impaired retrieval
- Can be induced without temporal confusion
- Introduction of idiosyncratic themes unique to confabulators
- A sign of temporal lobe dysfunction

Gilboa et al, "Mechanisms of spontaneous confabulations: a strategic retrieval account" *Brain*, June 2006, p. 1413





Is there a diagnosis?

Case Studies

Drug-Induced Mania

I respectfully demand that I not be subjected to any retaliation, harassment, intimidation, discrimination, punishment, revenge, torment, fear, bullying, badgering, goading, taunting, decreased service, attacks, extra attention to annoy, baiting to commit rule violations, reprisals, injustices, vengeance, requitals, hindrances or losses by Nurse Carolyn, or other personnel, either directly or indirectly by her or through others associated with King County or Jail Health Services, as a result of the fact I filed this or any other grievance or complaint.

Drug-Induced Mania

Traumatic Brain Injury

Traumatic Brain Injury

- Dentist: loss of consciousness and oxygen to the brain after a skiing accident
- May have caused loss of cognitive functioning, resulting in memory loss, agitation, anxiety when multi-tasking and depression

Case Study

Traumatic Brain Injury

- After life threatening injury, doctors are usually consumed with saving someone's life that impact to cognitive functioning is overlooked.
- Dysexecutive function commonly shows up in short term memory and accentuation of behavior rather than loss of overlearned memory and new behaviors

Case Study

Dysexecutive Syndrome

Dysexecutive Syndrome

- Pilot: Psychological factors do not appear to underlie the cognitive deficits.
- History of long-term learning and processing difficulties, it is likely that the cognitive deficits are the result of longstanding learning disabilities for which he has been able to compensate for years.

Case Study

Dysexecutive Syndrome

- The change in testing format to open-ended questions brought his processing deficits to the awareness of his employer.
- If the pilot were required to rely upon his own mental abilities, without access to his compensatory systems, he would likely have difficulties flying.
- Robert Cray concert

Case Study

Delirium

Delirium

- Mother-Daughter
- History of severe alcoholism
- Began drinking in early teens
- Short-term binge drinking

Case Study

Diabetes

Diabetes

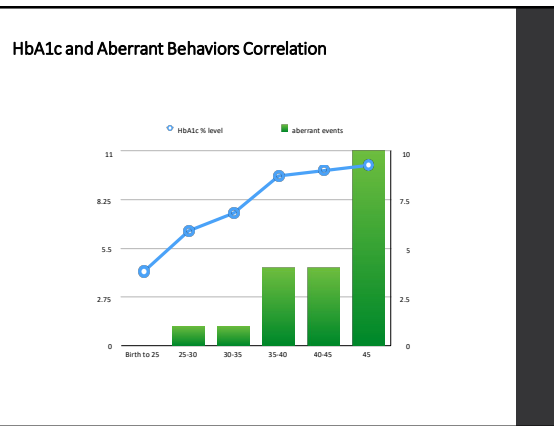
- As a result of his diabetes, developed congestive heart failure, a cardiac disorder secondary to long standing pressure on his heart.
- More than 30% of persons diagnosed with diabetes also have cardiac disease, secondary to hypertension, elevated cholesterol, and kidney disease.

Case Study

Diabetes

- Symptoms of diabetes and other chronic diseases, e. g., tiredness, nausea, difficulty sleeping, and mild cognitive impairment.
- Decades of uncontrolled diabetes caused pathological changes in his brain

Case Study



Cerebellar Cognitive Affective Syndrome

Cerebellar Cognitive Affective Syndrome

- Irritability
- Loss of blood due to suicide attempt
- MRI/MRA/PET findings
- History of poor planning, impulsivity, and difficulty weighing and deliberating

Case Study

Cerebellar Cognitive Affective Syndrome

Superior aspects of the cerebellum - the part of the brain which controls motor functions, such as balance. The cerebellum also has neurological connections to frontal areas of the brain which provide impulse control, monitoring of social circumstances, mood regulation, and irritability.

Case Study

Cerebellar Cognitive Affective Syndrome

Brain impairment also impacts his occipital lobe – neuroimaging findings indicate significant brain dysfunction in the occipital lobe, as well as the connections between the occipital and the frontal lobes. It has been documented that affective and cognitive stability are impaired when these connections are disrupted.

Case Study

Cerebellar Cognitive Affective Syndrome

Congenital brain impairment - loss of blood flow to the left Posterior Inferior Cerebellar Artery (PICA) is consistent with Cerebellar Cognitive Affective Syndrome, the neuropsychiatric manifestation of impaired PICA function.

Case Study



Neurosarcoidosis

- 20 year history in the military, marathon runner
- Severe sardoisis – cardiac, pulmonary, renal
- Difficulty breathing, increased activity, forced to go on disability
- Changes in physical functioning, behavior and cognitive functioning

Case Study

1. Always think medically
2. Don't assume
3. History, history, history.
