

WHAT DOES SUBSTANCE ABUSE DO TO YOUR BRAIN?

by

Scott Warrick, JD, MLHR, SPHR

WORKPLACE FACTS

Most drug users are employed. Of the 13.4 million illicit drug users age 18 or older in the U.S. in 2001, 10.2 million (76.4 percent) were employed either full or part time.

Employed drug abusers cost their employers about twice as much in medical and Workers' Compensation claims as their drug-free coworkers.

Source: U.S. Department of Health and Human Services. Substance Abuse and Mental Health Services Administration. (2002, September 4). Results from the 2001 National Household Survey on Drug Abuse: Volume I. Summary of National Findings (Office of Applied Studies, NHSDA.)

<http://www.samhsa.gov/oas/nhsda/2k1nhsda/vol1/chapter2.htm#2.empl>

Also, The International Labour Organization's "InFocus Programme on Safety and Health at Work" reports:

- **Absenteeism is 2-3 times higher for drug and alcohol users than for other employees,**
- **Employees with chemical dependence problems may claim 3 times as many sick days and file 5 times as many workers' compensation claims,**
- **In many workplaces, 20 to 25 per cent of accidents at work involve intoxicated people injuring themselves and innocent victims and**
- **On-the-job use of drugs/alcohol account for 15%-30% of ALL accidents at work.**

Is It An Employer's Business What An Employee Does On His/Her Own Time?

Yes. Studies show that off the job drug use affects on the job performance and safety. The residual affect of various drugs can impair one's ability to reason and function for days after ingesting the substance. Marijuana, for instance, affects one's depth perception, which explains why marijuana users tend to "rear end" others when driving and why they get their fingers caught in machines at work. As a result, drug and alcohol users are:

- **3.6 times more likely to injure themselves or another person in a workplace accident,**
- **5 times more likely to be injured in an accident off the job which, affects their attendance and/or performance on the job,**

- **One-third less productive than non-drug using employees and**
- **Incur 300% higher medical costs than non-drug using employees.**

Unfortunately, these “users” also spread other problems in the workplace:

- 44% sell drugs to other employees and 18% steal from co-workers to support their habits.

~~ Source: OHS Safety and Health Services

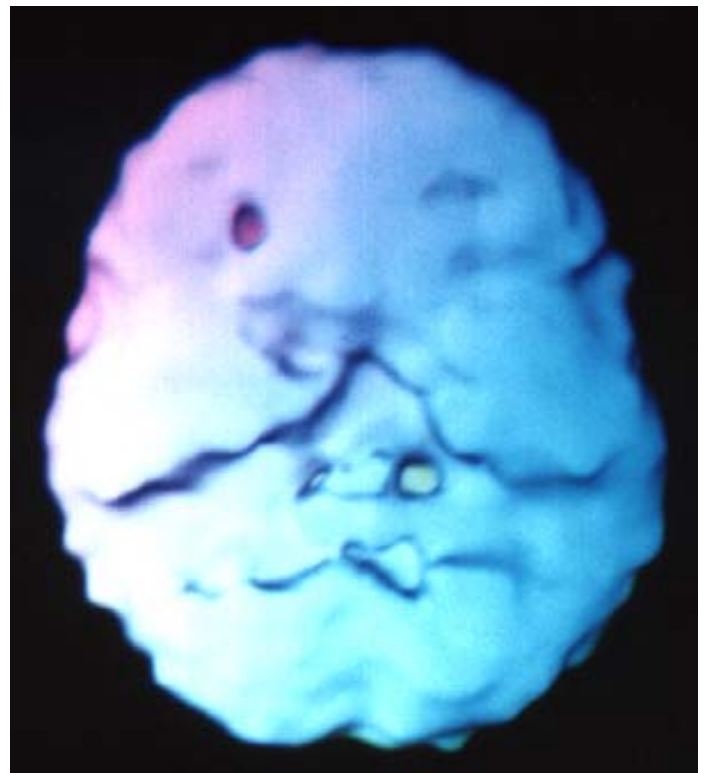
What Does A “Normal” Brain Look Like?

SURFACE SCANS

(FOREHEAD is at the top of the Scan)



TOP SURFACE BLOOD FLOW VIEW



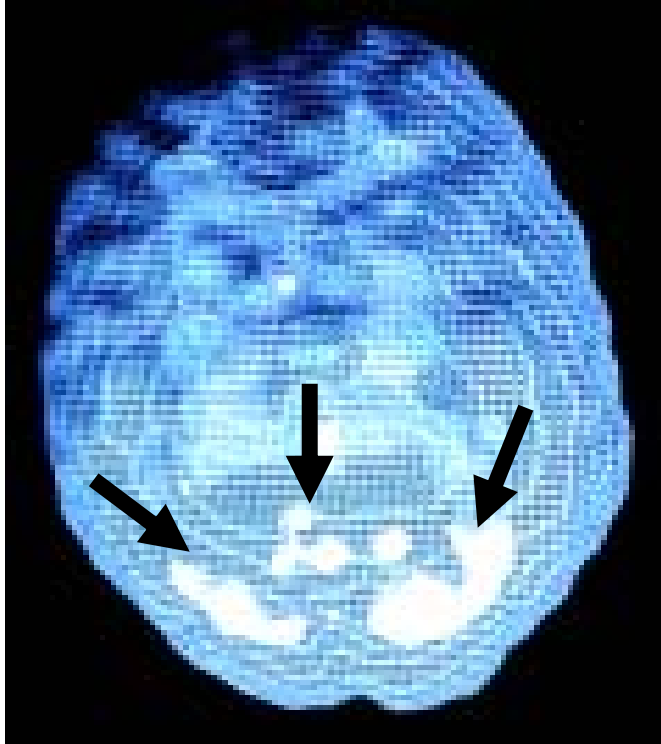
UNDER SURFACE BLOOD FLOW VIEW

These are two “surface” SPECT scans indicating blood flow to the brain. The one on the left is looking down on the brain. The one on the right is a view looking up into the brain. This is how blood flow in a brain **SHOULD** look. Notice how full these scans look. The top view is rounded and full looking. The one on the right is also full and reveals the natural curvatures of the brain.

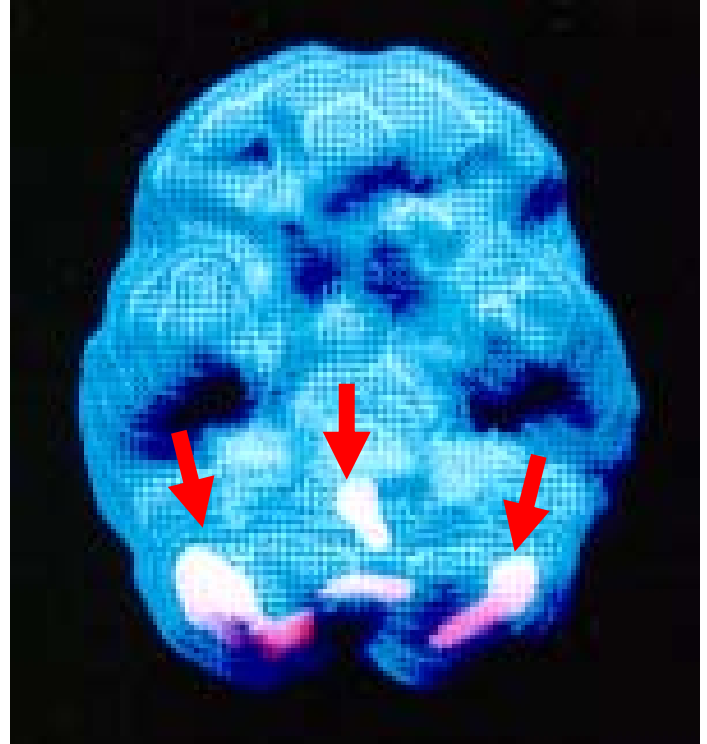
What Does A “Normal” Brain Look Like?

ACTIVITY SCANS

(FOREHEAD is at the top of the Scan)



TOP VIEW



UNDERVIEW

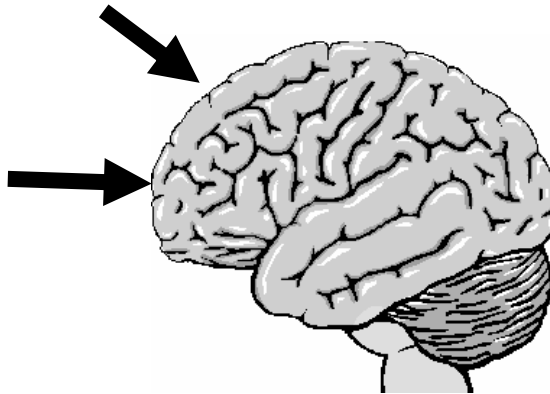
These are two “activity” SPECT Scans indicating metabolic activity in the brain. Again, the one on the left is looking down on the brain. The one on the right is a view looking up into the brain. This is how a brain’s activity level **SHOULD** look. The darkened areas, or “red” spots, are 15% “hotter.”

These scans show a nice “cool” blue or gray color. The back of the head (bottom of the scan) is lit up. This is the **cerebellum**. The cerebellum integrates information from the brain that indicates your position and movement and uses this information to coordinate limb movements. This area is a hotter area since your body movements and coordination is constantly “running.”

FUNCTIONAL AREAS OF THE BRAIN

In order to understand the brain, one must understand how it works. In short, there are 5 major brain systems that relate to behavior.

The Frontal Lobes



The frontal lobes control such functions as decision making, judgment, organization, etc. Commonly, these functions are referred to as “Executive Functions.” This is the part of the brain that makes us human. It comprises 30% of the human brain. In short, the frontal lobes determines our...

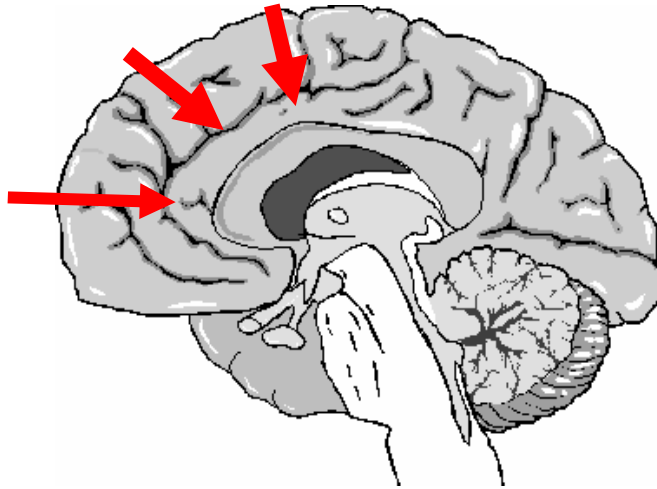
FUNCTIONS

attention span
perseverance
judgment
impulse control
organization
self-monitoring and supervision
problem solving
critical thinking
forward thinking
learning from experience
ability to feel and express emotions
influences the limbic system
empathy

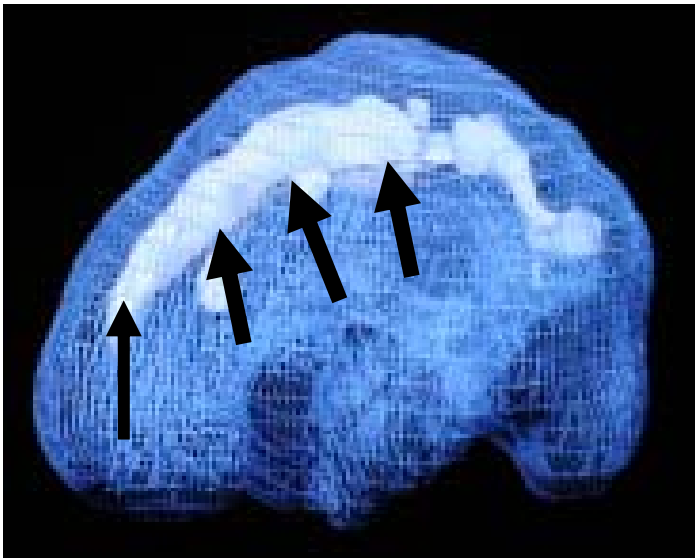
PROBLEMS

short attention span
distractibility
lack of perseverance
impulse control problems
hyperactivity
chronic lateness, poor time management
disorganization
procrastination
unavailability of emotions
misperceptions
poor judgment
trouble learning from experience
short term memory problems
social and test anxiety

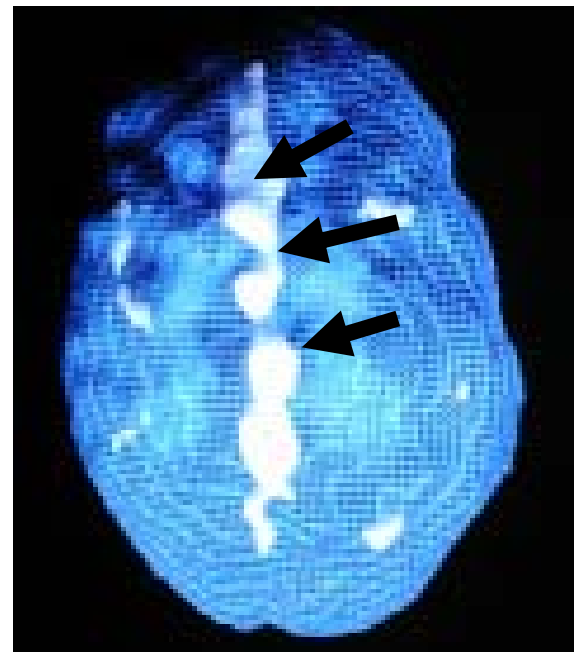
The Cingulate Gyrus (The “Stick Shift”)



(FOREHEAD is at the top of the Scan)



LEFT SIDE VIEW



TOP VIEW

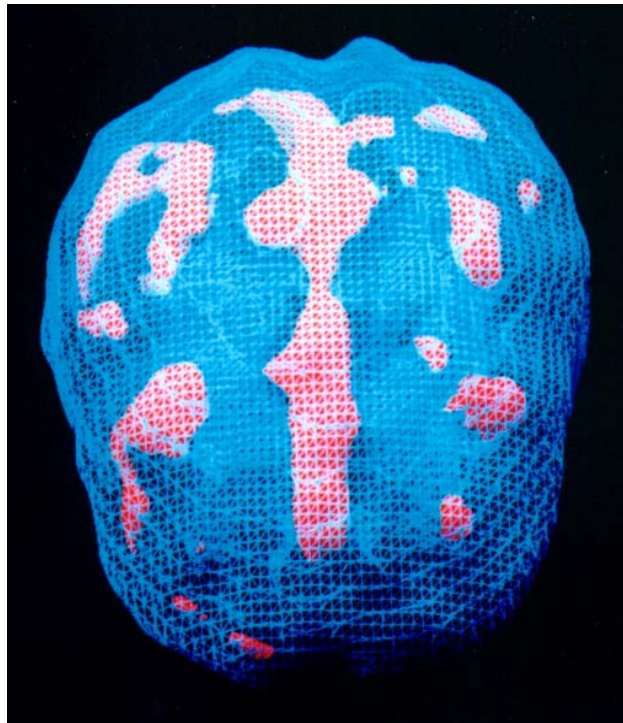
FUNCTIONS

allows shifting of attention
cognitive flexibility
adaptability
helps the mind move from idea to idea
gives the ability to see options
helps you go with the flow
cooperation

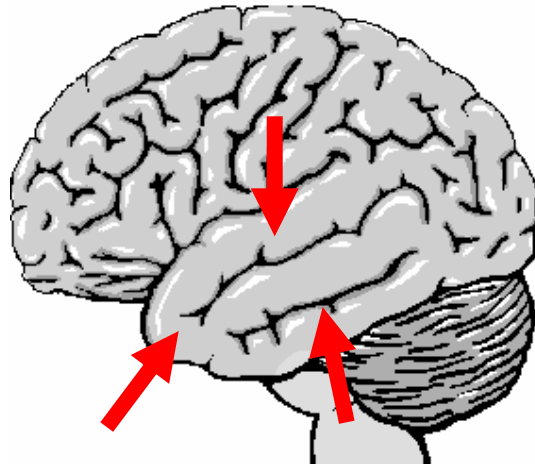
PROBLEMS

worrying
holds onto hurts from the past
stuck on thoughts (obsessions)
stuck on behaviors (compulsions)
oppositional behavior, argumentative
uncooperative, tendency to say no
addictive behaviors
(substance abuse, eating disorders, chronic pain)
cognitive inflexibility
obsessive compulsive disorder
OCD spectrum disorders
eating disorders, road rage

PMS!



The Temporal Lobes (“Sideburns”)



Dominate Side (usually left)

understanding and processing language
intermediate term memory
long term memory
auditory learning
retrieval of words
complex memories
visual and auditory processing
emotional stability

Non-Dominate Side (usually right)

recognizing facial expression
decoding vocal intonation
rhythm
music
visual learning

PROBLEMS

Dominate Side (usually left)

aggression, internally or externally driven
dark or violent thoughts
sensitivity to slights, mild paranoia
word finding problems
auditory processing problems
reading difficulties
emotional instability

Non-Dominate Side (usually right)

difficulty recognizing facial expression
difficulty decoding vocal intonation
implicated in social skill struggles

PROBLEMS

Either One or Both Temporal Lobes

memory problems, amnesia

headaches or abdominal pain without a clear explanation

anxiety or fear for no particular reason

abnormal sensory perceptions, visual or auditory distortions

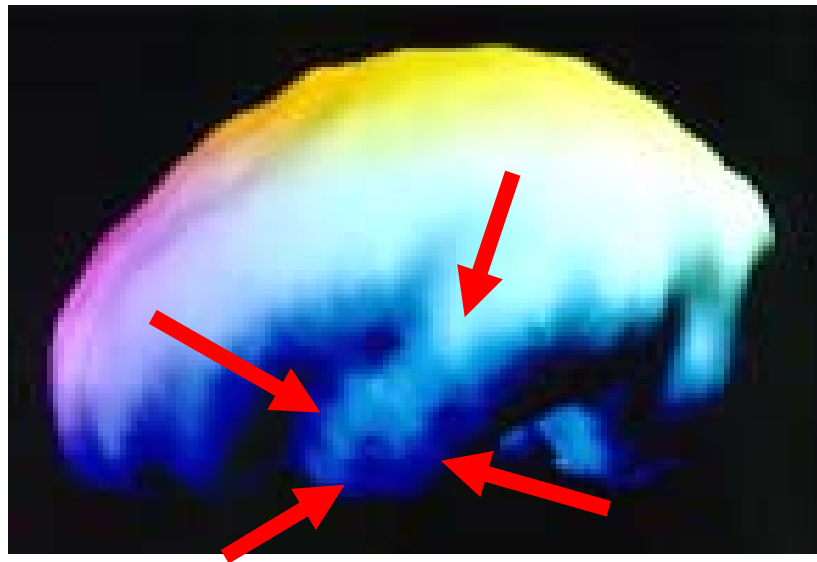
feelings of déjà vu or jamais vu

periods of spaciness or confusion

religious or moral preoccupation

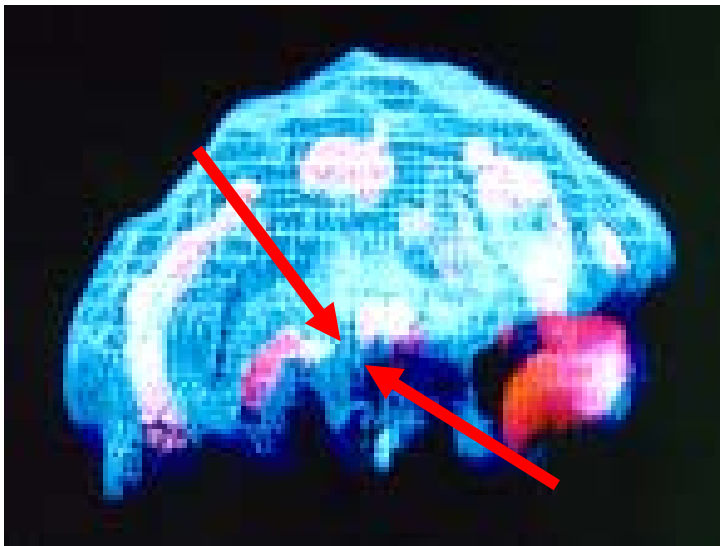
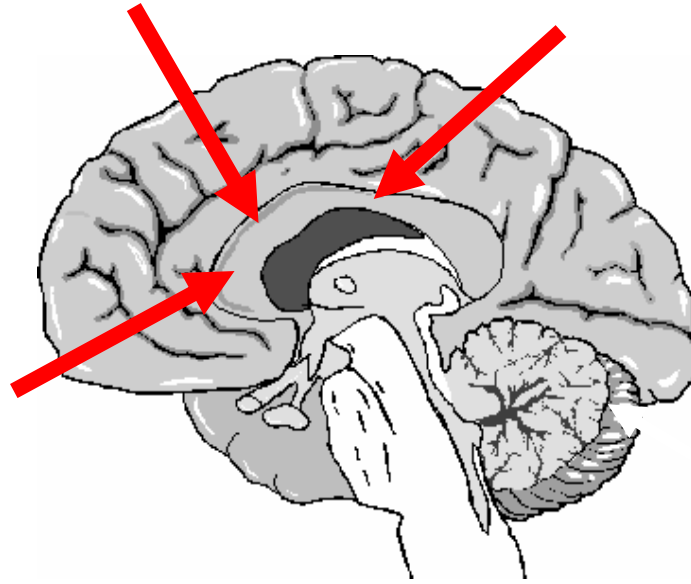
hypergraphia, excessive writing

seizures

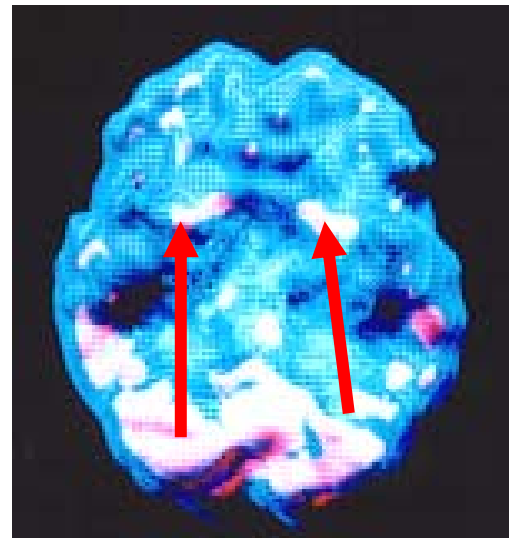


**SIDE SURFACE SHOT VIEW OF HEALTHY BLOOD FLOW TO
A LEFT TEMPORAL LOBE**

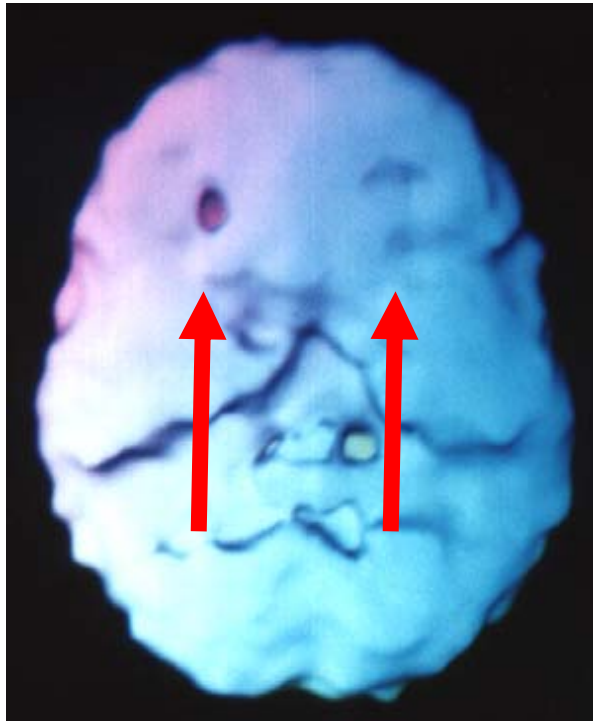
The Basal Ganglia System



Left Side Activity Shot



Underside Activity Shot



Underside Blood Flow Shot

Nice Full Blood Flow To These Areas

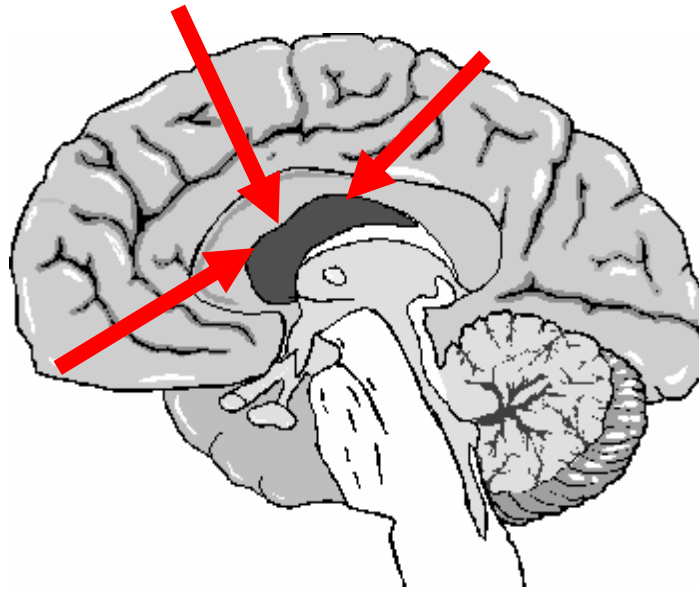
FUNCTIONS

integrates feeling and movement
shifts and smoothes fine motor behavior
suppression of unwanted motor behaviors
sets the body's idle or anxiety level
enhances motivation
pleasure/ecstasy

PROBLEMS

anxiety, nervousness
panic attacks
physical sensations of anxiety
tendency to predict the worst
conflict avoidance
Gilles de la Tourette's Syndrome/tics
muscle tension, soreness
tremors
fine motor problems
headaches
low or excessive motivation

The Deep Limbic System



FUNCTIONS

sets the emotional tone of the mind
filters external events with internal perspective
(emotional coloring)
tags events as internally important
stores highly charged emotional memories
modulates motivation
controls appetite and sleep cycles
promotes bonding

directly processes the sense of smell
modulates libido

PROBLEMS

moodiness, irritability, clinical depression

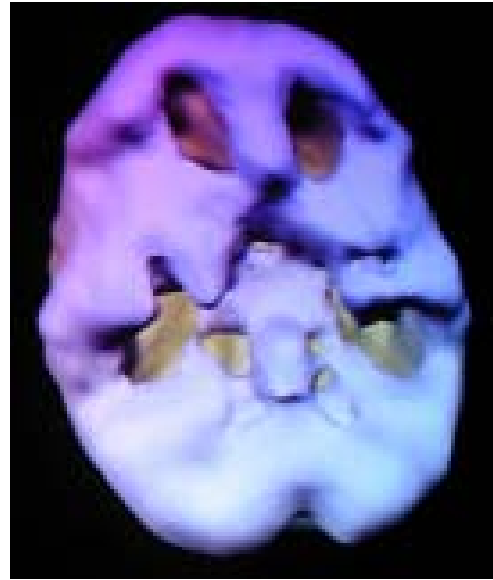
increased negative thinking
perceive events in a negative way
decreased motivation
flood of negative emotions
appetite and sleep problems
decreased or increased sexual responsiveness
social isolation

ALCOHOL AND DRUG ABUSE

Marijuana



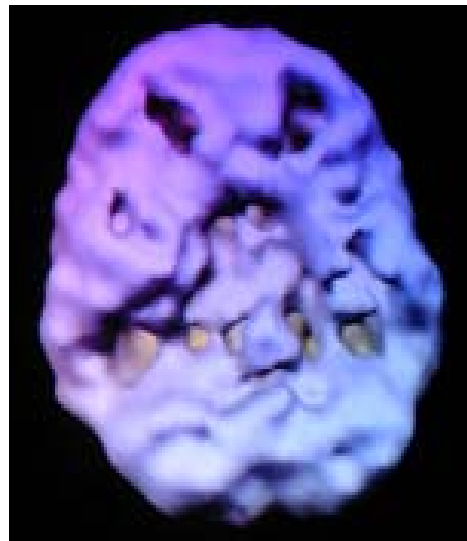
18 yr. old: 3 year history of 4 x week use



16 yr. old: 2 year history of daily abuse



38 yr. old: 12 years of daily use

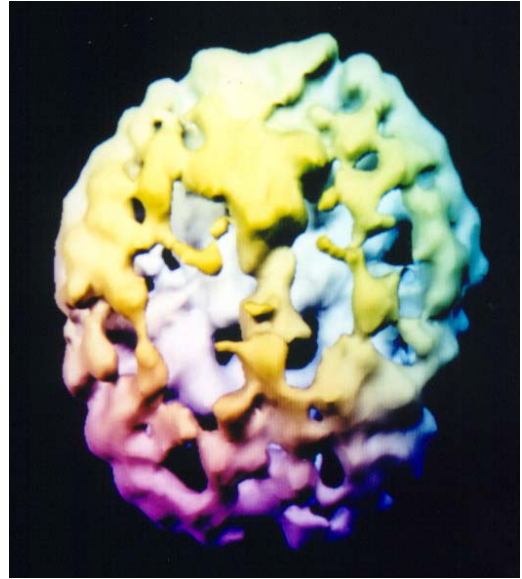


28 yr. old: 10 years of mostly weekend use

Heroin & Methadone



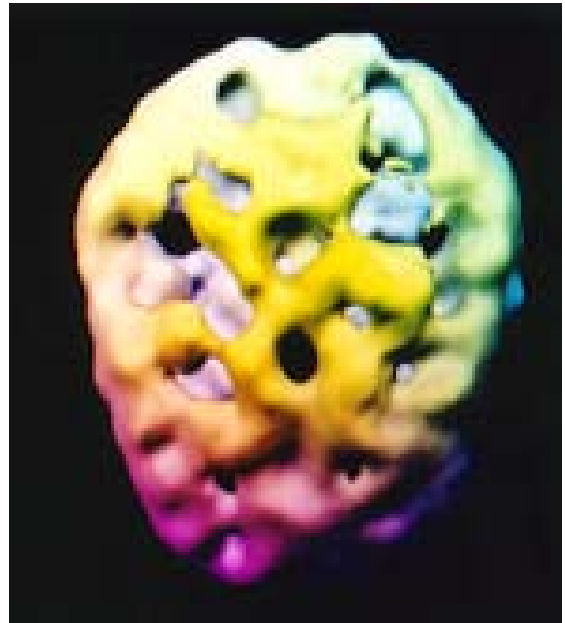
Normal Brain



39 yr. old: 25 year history of frequent heroin use

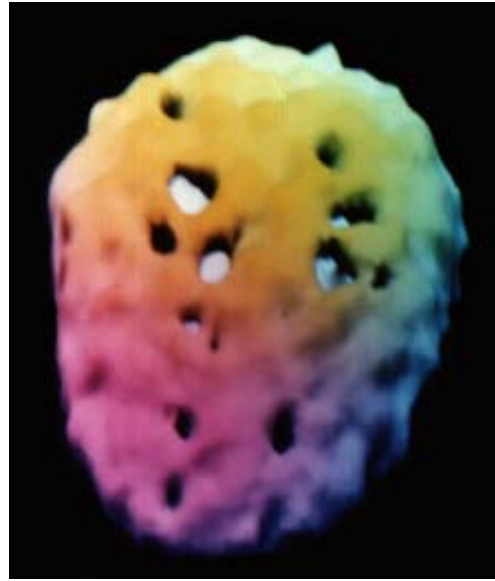


39 yr. old: 25 year history of frequent heroin use



40 yr. old: 7 years on methodone

Cocaine & Methamphetamine



52 yr. old: 28 yr. history of frequent methadone use 24 yr. old: 2 years of frequent cocaine use



28 yr. old: 8 yr. history of frequent methadone use 36 yr. old: 10 years of frequent methadone use

Alcohol

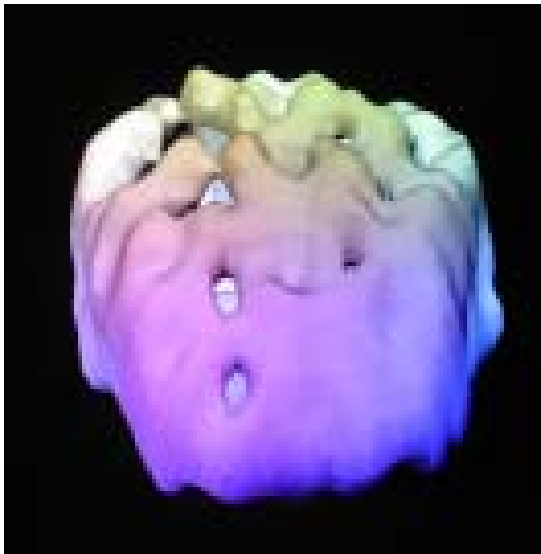
38 yr. old: 17 years of heavy weekend use



TOP SURFACE BLOOD FLOW VIEW



UNDER SURFACE BLOOD FLOW VIEW

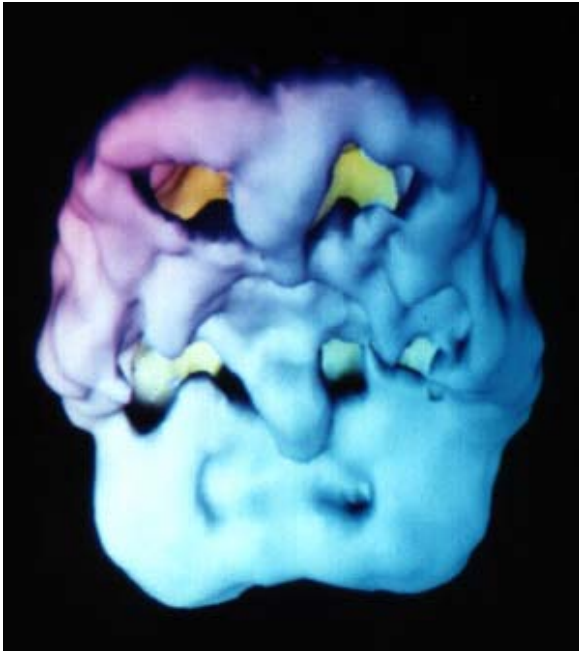


FRONT SURFACE BLOOD FLOW VIEW

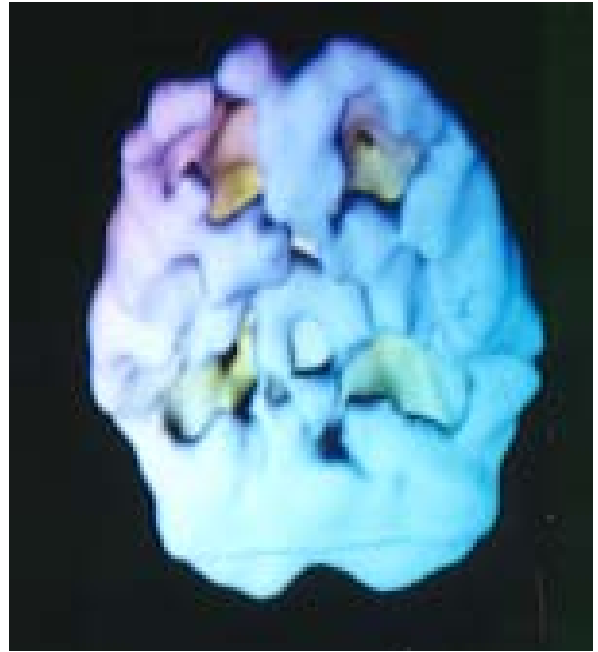


RIGHT SIDE SURFACE BLOOD FLOW VIEW

Alcohol



44 yr. old: 18 yrs. Of daily use of alcohol



45 yr. old: 25 years of daily alcohol use

Heavy Nicotine & Caffeine Abuse

45 y/o -- 27 year history of heavy use: 3 packs of cigarettes and 3 pots of coffee daily



WHAT TESTING SHOULD I PUT INTO PLACE?

NEVER put a Substance Abuse Testing Program into place unless you intend to follow through with it. However, most employers should at a minimum have the following testing policies in place:

Reasonable Suspicion Testing & Post-Accident Testing

It is rare to find an employer that does not want to control its safety, productivity and attendance record. Also, most employers want to have the ability to test their employees if they suspect alcohol or drug abuse is occurring in their workplaces. Reasonable Suspicion and Post Accident Substance Abuse Testing can be a great asset in attaining these goals.

Too many employers adopt Pre-Employment Testing or Random Testing, but then never want to do anything about an employee's substance abuse problem if "they like" that employee. If you are not going to take action when substance abuse is discovered, then it is better if you do not test at all. (Of course, by "taking action" I am referring to terminating the employee or sending the employee to be assessed for possible drug/alcohol rehabilitation.)

Other types of testing available to employers are the following: Safety Sensitive Position Testing, Transfer/Promotion Testing, Customer Required Testing, Follow-Up Testing Department of Transportation Testing Requirements, and the Bureau of Workers' Compensation Rate Reduction Testing.

A proper policy will also address the odor of alcohol, the use of prescription drugs, tampering with a specimen or the test itself, which includes diluting the specimen by drinking a gallon of water before taking the test, and voluntary self-disclosure by an employee. The policy should also define a workplace accident as also involving damage to property in addition to individuals. (i.e., Apparent damage to property of \$250 or more.) Employers should also seriously consider requiring employees who test positive on a test and go through rehabilitation to sign a "Conditional Return To Work Agreement" before being allowed to return. These Agreements allow the employer to test the employee whenever the employer wants for the next 2-3 years, they require the employee to continue with his/her treatment for an elongated period of time, etc.