

Active Minds

A program to sharpen your mind

Active Minds Newsletter

Issue 8 - August 2007



**Brain imaging:
there is more than
one way to get pic-
tures of your brain**

**In this issue,
Dr. Michelon tells you
about**

**Do you want to stay
mentally sharp and/or
increase your brain
power?**

**Do your residents
need mental stimula-
tion?**

**Are your clients in-
terested in a Memory
Workshop?**

Contact Dr. Michelon
to schedule a group
or an individual trial
session!

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For more info on
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Brain Imaging

Looking inside the brain

Brain imaging, also called neuroimaging, allows one to produce images of the brain. Structural imaging provides information about the shape and volume of the brain (CT and MRI). Functional imaging shows which brain cells are active when one performs a specific task (fMRI, PET). You have probably heard about some of these techniques. Here is how they work...

CT or CAT scans

Computed tomography or computed axial tomography is a technique that takes a large number of two-dimensional X-rays images. These images are used to digitally compute 3D images of the inside of the brain.

The word "tomography" is derived from the Greek "tomos" (slice) and "graphein" (write).

The most frequent reason for a head CT is to diagnose cerebrovascular accidents and intracranial hemorrhage. It is also often used to evaluate facial and skull fractures.

MRI scans

MRI stands for Magnetic Resonance Imaging. This technique uses magnetic fields and radio waves to generate 2- or 3-D images of the brain.

MRI is used to detect tumors and other pathologies that affect the tissues of the brain (e.g., multiple sclerosis). Compared to CT, it is more precise and harmless to the patient (no potentially dangerous X-rays). However, CT is much cheaper and more widely used.



fMRI scans

Functional Magnetic Resonance Imaging relies on the magnetic properties of oxygenated and deoxygenated hemoglobin.

This technique produces images of changing blood flow in the brain associated with neural activity. The images show which brain structure is activated during performance of different tasks.

fMRI is used to detect early changes in the brain following strokes or other brain diseases.

PET scans

PET stands for Positron Emission Tomography. The technique was first developed by Phelps et al. at the Washington University School of Medicine in 1975.

It measures the emission generated by a short-lived radioactive tracer injected to the patient (using the bloodstream). The 2- or 3-D images produced show brain activity.

PET is used to detect tumors and for the diagnosis of brain diseases. Since the 1990s, fMRI has supplanted PET due to its low invasiveness, lack of radiation exposure, and relatively wide availability.



Imaging Alzheimer's disease

Both structural and functional imaging are used to help in the diagnosis of Alzheimer's.

Researchers have identified both structural changes (shrinkage in specific areas) and functional changes (reduced brain activity in certain brain areas) associated with Alzheimer's.

Unfortunately, in early cases the damage to the brain is too diffuse and makes too little difference in terms of brain volume or brain activity to differentiate the early damage from the normal brain changes that accompanies normal aging. Scientists still have to agree on standardized values that would allow for a diagnosis.