

GRAY MATTERS – “The Brain-Injured Soldier”

PODCAST - Part 2/March 6, 2008

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WELCOME BACK TO PART TWO OF OUR PODCAST ON THE BRAIN-INJURED SOLDIER.

WE CONTINUE OUR INTERVIEW WITH DR. JORDAN GRAFMAN OF THE NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE AT THE NATIONAL INSTITUTES OF HEALTH — WHO HAS BEEN STUDYING THE IMPACT OF POST-TRAUMATIC STRESS DISORDER AND TRAUMATIC BRAIN INJURY SINCE THE WAR IN VIETNAM.

RESEARCH IS STILL SCARCE ON BOTH CONDITIONS, BUT THAT’S LIKELY TO CHANGE WITH A RECENT INFUSION OF FUNDING FROM CONGRESS TO THE DEPARTMENT OF DEFENSE. A TOTAL OF 300 MILLION DOLLARS.

DR. GRAFMAN IS HOPEFUL ABOUT WHAT THIS FUNDING MIGHT SUPPORT.

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So at least one aspect of this funding is clearly going to be very clinically useful for both the soldier and the military health care system that is responsible for evaluating them when they return from Iraq and Afghanistan, or in Iraq and Afghanistan. It will also allow for the evaluation of soldiers before they go there so in case somebody was exposed you can get a pre and post test on these same soldiers. So part of the funding is going to go for that purpose. Part of the funding will be to develop a better understanding --particularly of blast injury— and how to evaluate it, treat it, what the neuro-mechanisms are that break down with the blast. And part of the funds will go towards developing better technologies for quicker evaluations on the battlefield, and also for measuring the effects of the blast. Right now we can only make crude estimates of your exposure to the blast, but now new miniaturized computerized sensors are being put in helmets in order to get a better handle on what their exposure has been.

MEANTIME, THERE’S ALREADY NEW RESEARCH ON THE COMPLICATED INTERPLAY BETWEEN MENTAL HEALTH CONDITIONS LIKE PTSD AND TRAUMATIC BRAIN INJURY. THE SYMPTOMS OF THESE CONDITIONS ARE OFTEN QUITE SIMILAR -- SO HOW DO DOCTORS TELL THEM APART?

With Post Traumatic Stress Disorder there are three main areas of the brain that seem to be important for its development and persistence. And they include the medial prefrontal cortex in the frontal lobes of the brain, and two structures in the temporal lobe of the brain – the amygdala and the hippocampus. And it turns out, that particularly with mild brain injury, that often those same structures just by virtue of where they lie in the skull are susceptible to damage. So you have an overlap of structures that in the case of a real brain injury are damaged physically – and in the case of PTSD can become dysfunctional in some way and therefore the symptoms that will emerge in each case can be somewhat similar. And so it will take a very good diagnostic work-up to tease those kinds of symptoms apart to see if they are due to actual physical damage to the brain versus a modulation of structure function due to the stressful experience itself. And so that's really going to be a challenge to try to tease those apart.

DR. GRAFMAN HAS ALSO RECENTLY PUBLISHED RESEARCH (IN THE FEBRUARY 2008 EDITION OF THE JOURNAL *NATURE NEUROSCIENCE*) ADDING ANOTHER SURPRISE TO OUR UNDERSTANDING OF THE INTERACTION OF PTSD AND TRAUMATIC BRAIN INJURY. VETERANS WITH INJURIES TO CERTAIN PARTS OF THE BRAIN WERE *LESS LIKELY* TO DEVELOP PTSD. THIS CAME OUT OF HIS VIETNAM HEAD INJURY STUDY WITH VETERANS HE'S BEEN FOLLOWING FOR MORE THAN TWENTY-FIVE YEARS.

And I think one of the things that this --at least in my mind -- emphasizes is the value in longitudinal studies of very selective populations because you can only study so much at any one time. The soldiers get fatigued, they get test fatigue. You can't really expect them to stay with you for months, so what you want to do is ask them if they would be willing to come in for a little bit and then return in a few years afterwards. And our ability to study these soldiers over a long period of time has led to many important findings including the ones with PTSD. None of this could be accomplished however unless we had a great spirit of volunteerism in these soldiers who believe they are not only helping us learn about the brain but potentially we can help improve the care of soldiers in future conflicts.

WHAT ARE THE IMPLICATIONS OF GRAFMAN'S LATEST FINDINGS? FIRST, HE SAYS, IT ALLOWS DOCTORS TO TARGET AREAS FOR MODIFICATION, APPLYING NEW INTERVENTIONS LIKE TRANSCRANIAL MAGNETIC STIMULATION.

Transcranial magnetic stimulation in essence allows you to send a magnetic pulse through the scalp, through the skull, into the cortex of the brain that underlies where the magnetic coil is. And it can change the electrical signaling in that region briefly. It can turn it off to some degree, it can hyperactivate it. And by doing those kinds of modulatory changes you very temporarily-- because it's reversible -- affect the functions of those regions. But perhaps by affecting it -- and in our case the argument would be -- by sort of down-regulating the functions in those regions temporarily -- it might help supplement another kind of treatment strategy --perhaps a cognitive therapy. And overall that might make it easier then, for soldiers to recover from the emotional trauma.

DR. GRAFMAN SAYS HIS GOAL IS TO IMPROVE ALL ASPECTS OF THE HEALTHCARE SYSTEM FOR SOLDIERS.

It is simply not learning enough to treat these soldiers and evaluate them. It is as important that the military and later veteran's and civilian health care system -- adopt these strategies and adopt these treatment and evaluation aims as routine. So that if and when the next conflict emerges we are well prepared and thoughtful ahead of time so we don't have to back track as we're doing now in Iraq to try to introduce new research or new treatments.

AND GRAFMANS SAYS THERE IS STILL MORE RESEARCH ON THE HORIZON TO BENEFIT THE BRAIN-INJURED SOLDIER -- LIKE HELPING TO IDENTIFY WHO IS AT RISK.

New research that's on the horizon will help us understand who's at risk for having slower recoveries of function from brain injury or who might be at risk for developing Post Traumatic Stress Disorder. And this comes from field of neurogenetics. It will also help health professionals target those soldiers for treatment when they come back-- and also understanding the effects of this experience throughout the life span.

Our Vietnam soldiers are among the first close to be studies from very close to their injury throughout the lifespan. And I think the more those kinds of studies occur, the more we will better understand issues about neuroplasticity, recovery of function, and then later in life, declines -- and potentially understanding if there is an increased risk for the development of dementia.

There are many things to continue to learn. These soldiers are great teachers and they are wonderful to work with. And I am going to be hopefully in the future, studying soldiers now from Iraq and Afghanistan who have had injuries. And

they will join their Vietnam comrades in helping teach us about how the brain responds to both brain injury and emotional trauma.

SPECIAL THANKS TO DR, JORDAN GRAFMAN, CHIEF OF COGNITIVE NEUROSCIENCE AT THE NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE AT THE NATIONAL INSTITUTES OF HEALTH

YOU'VE BEEN LISTENING TO A SPECIAL GRAY MATTERS PODCAST, FROM THE DANA ALLIANCE FOR BRAIN INITIATIVES.