

PTSD 101

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COURSE TRANSCRIPT FOR:

What is PTSD?

Course Instructor: Matthew Friedman, M.D., Ph.D.

Slide 1: What is PTSD?

Good day. My name is Matt Friedman. I'm the Executive Director of the National Center for PTSD in the Department of Veterans' Affairs, and what I'm going to do today is provide an overview about the diagnosis of Posttraumatic Stress Disorder (PTSD).

Slide 2: Historical Overview of Traumatic Reactions: Late 19th Century

PTSD has been around by other names for a long time. People can state that the poets and authors, writers of old, noticed PTSD. Some people claim that in Homer's *Iliad* and *Odyssey* that Achilles and Odysseus had what we would now call PTSD. Charles Dickens recognized it. Shakespeare's *Henry V* had it. But in more contemporary times, when the medicalization of the impact of traumatic stress usually war zone-, combat-stress became noticed by physicians and mental health practitioners, we go back to the late 19th century, both in Europe and the United States.

In Europe, the psychoanalysts Sigmund Freud and Forensier noticed altered psychological functioning among German and Austrian soldiers involved in the Franco-Prussian War, the War of 1870, etc. On this side of the Atlantic, one could say that the medicalization of this began with the American Civil War. Since that time there have been a number of different ways that people have attempted to understand or explain the fact that invisible injuries; no bleeding, no broken bones, but exposure to a war zone stress could produce sometimes incapacitating problems.

So the first slide, which is entitled "A Historical Overview of Traumatic Reactions in the Late 19th Century", kind of lists some of these reactions. As you can see, there are two columns. On the one hand, these explanations, hypotheses, models if you will, were in the medical/neurological domain: Soldier's heart, Da Costa syndrome, neurocirculatory asthenia-these were all diagnoses about altered cardiovascular function that were thought to be due to combat stress.

Shell-shock was more of a neurological explanation that came out of the First World War, the theory being that exposure to the blasts of the big artillery guns used in that trench warfare somehow damaged or disconnected the neuronal connections in the brain and therefore, it was shell-shock. It's kind of ironic that in the current war in Iraq and Afghanistan we have a *bona fide* shell-shock. We call it traumatic brain injury and clearly, many people who have traumatic brain injury also have PTSD, but that's a lecture for another time.

On the right-hand side of the slide you see some of the psychiatric models that were made to try to explain this. In the Civil War, the idea of nostalgia, that the reason why a young troop from Vermont was having trouble was because he was nostalgic for being back in the Green Mountains, where he was fighting in Georgia or along the Mississippi River near Vicksburg. In Europe *Schreck neurosis*, or fright neurosis, was another psychological model. Gross stress reaction, and here we see the 1st use of the word stress in this conjunction, this was in the DSM, which was deleted in the DSM-II. Combat fatigue, or combat exhaustion, which is a quasi-psychological/quasi-physical problem. And of course war neurosis, which really was a psychoanalytic understanding of the problems that happened to people in a war zone.

Now there was also a civilian equivalent to this: Railway spine. Again, people who had been in train accidents in the late 19th century, who were incapacitated despite no visible injury, this was another neurological model to explain these problems.

Slide 3: Later Descriptions of Traumatic Reactions (1940's – 1980's)

This next slide moves forward in time. In the 1940s to 1980s, there were a number of what we would now call posttraumatic reactions, all of which were basically named by the nature of the traumatic stress itself. So rape trauma syndrome; survivor syndrome, not just for soldiers and sailors, but also for survivors of concentration camps; war neurosis, as I said earlier; shell shock; and post-Vietnam syndrome, which was really the term that was being used in the 70's and 60's, when people...veterans from Vietnam first came home and sought treatment from VA and other practitioners.

Slide 4: PTSD: DSM-III (1980)

Here we begin the history of PTSD, and it starts in 1980 and it starts with the American Psychiatric Association's 3rd edition of its Diagnostics and Statistical Manual; DSM-III. This is the first time that PTSD, by the name of PTSD, became established as a diagnosis, and the stressor criterion was that people had to have been exposed to a "recognizable stressor that would evoke significant symptoms of distress in almost anyone." So that was the original A criterion, the stressor criterion.

The DSM-III had three symptom clusters, and this was based much on clinical experience as well as on models that Marty Horowitz had been developing. There was a reexperiencing cluster of symptoms. There was a numbing cluster, and then there was a kind of a potpourri of other symptoms-and there were a total of 12 symptoms in the original DSM-III.

Slide 5: PTSD: DSM-III-R (1987)

In 1987, the DSM-III was revised to the DSM-III-R, and there were some important changes to the PTSD diagnosis. The definition of a traumatic event was narrowed to be "an event outside the range of usual human experience" and that would be "markedly distressing to almost anyone." I think what was really important about this was that still in the late 80s, 1987, the belief was that traumatic events were "outside the range of normal human experience." What

we've discovered is that that isn't the case, that in the United States, a country mostly at peace, more than half of all adult men and women will have been exposed to at least one traumatic stressor in the course of their lives. So clearly, traumatic events are not outside the range of normal human experience, but that knowledge was not available in the late 80s. It wasn't until the DSM-IV that that became clear.

In the DSM-III-R, the avoidance symptoms were separated, and there are two: The C1 and C2, avoidance of traumatic-related thoughts and avoidance of situations, and the D-cluster, which in DSM-III was kind of a hodge-podge of different symptoms, became consolidated into what we now call the hyperarousal cluster including hypervigilance, decreased concentration and irritability, as well as some of the other symptoms: the startle reaction and insomnia.

So the DSM-III-R expanded the number of symptoms from 12 to 17. The duration and onset criteria were added. In other words, PTSD had to persist. You couldn't have it before a month had elapsed to give normal adaptive mechanisms a chance to kick in. And as I said earlier, we discovered that traumatic exposure is not outside the range of normal human experience. And also the DSM-III did not allow for the fact that for some people, an event might be traumatic and for other, more resilient people, the same event might not be at all traumatic. So the whole issue of individual differences was not addressed in the DSM-III-R.

Slide 6: PTSD: DSM-IV (1994)

This next slide is on the DSM-IV, and here the stressor criterion was expanded. It became a two part criterion. First of all, the event had to be "experienced, witnessed, or be confronted by the death or serious injury to self or others". That was an expansion of the criterion. So it's no longer something outside the range of normal human experience. And this is really the important change, what we call the A2 criterion, which brought in individual differences: that it wasn't enough to have been in the wrong place at the wrong time, but you had to have had an intense emotional reaction. In the DSM-IV, it was characterized as fear, helplessness, and horror.

In the DSM-IV, it basically kept the three symptom clusters that were in the DSM-III: the reexperiencing, the avoidance/numbing, and the hyperarousal symptoms. The onset had to persist beyond a month beyond your original traumatic exposure. And this is in another final important finding, the F criterion. Now this was true in all psychiatric diagnoses in the DSM-IV, that in addition to having the symptoms themselves, these symptoms had to be incapacitating. They had to cause significant distress or impairment of functioning. So the F criterion is a very key addition of the DSM-IV, and it's a key for all DSM-IV diagnoses.

Slide 7: Acute Stress Disorder: DSM-IV (1994)

Now since it's about acute stress disorder...now since, by definition, you couldn't get PTSD until a month had elapsed after your exposure to the traumatic event; whether it was a war zone event, a rape, a World Trade Center attack, etc., the question was what to do-we needed a diagnosis for people who were severely effected within that first month of time. Now remember, the reason why a month had to elapse was because most people who are exposed to traumatic

stress never develop PTSD, because they are resilient and other resilient mechanisms kick in. But other people aren't.

But the question for practitioners was how can we characterize, what diagnosis can be made available to us. And so a new diagnosis was created called Acute Stress Disorder, and the acute stress disorder had the same stressor criterion: That you had to be exposed to the event and you had to have an intense emotional reaction. It kept the intrusion symptoms: the nightmares; emotional arousal and physiological arousal; on re-exposure, the flashbacks. It kept the avoidance symptoms. It kept the arousal symptoms. But what was significant about acute stress disorder is it also added dissociative symptoms.

At that time, and people are challenging that at this point, it was felt that to have an acute dissociative reaction in the immediate aftermath of a traumatic event was a predictor of PTSD. And so you had to have three different dissociative symptoms. It could be fragmented thoughts, derealization, depersonalization, numbing or psychogenic amnesia. But what we found was, since the DSM-IV, many, many people develop PTSD without ever having had acute stress disorder. So I think that there are a number of questions about this new diagnosis that will have to be addressed when the DSM-V committees start to meet in the future.

Slide 8: DSM-IV Diagnostic Criteria for PTSD: Reexperiencing

I'm going to talk about the specifics-about the three symptom clusters that occur within the PTSD diagnosis, and also for Acute Stress Disorder. So, the first cluster, the B cluster, the reexperiencing, persistent reexperiencing symptoms, in which you have to have one of the following, and these symptoms include: recurrent distressing recollections of the event while you're awake; traumatic nightmares while you're asleep; PTSD flashback, acting or feeling as if the event was reoccurring; and the last two symptoms indicate the stimulus-driven aspects of PTSD.

Like no other psychiatric diagnosis, with perhaps the exception of simple phobia, the stimulus response theories of experimental psychology really are at play here, and one of the prevailing theories is that PTSD is a conditioned fear response. The fact that exposure to trauma-related stimuli can evoke either psychological distress or physiological reactivity is an important factor in our research on PTSD. In effect, we can produce PTSD symptoms in the laboratory by exposing people to traumatic cues and measuring them physiologically, looking at their brain imaging, looking at how cerebral blood flow reacts, looking at emotional reactions, and so this has been a very, very important tool for us in terms of understanding the underlying mechanisms and pathophysiology of PTSD.

We also can take advantage of the stimulus-related factors of PTSD in treatment. In fact, prolonged exposure is exactly that. It is an extinction paradigm, in which the effected person with PTSD is exposed repeatedly to trauma-related stimuli within the context of a safe therapeutic environment to extinguish the posttraumatic reactions, the reexperiencing symptoms. So this is very important. So those are the five reexperiencing symptoms.

Slide 9: DSM-IV Diagnostic Criteria for PTSD: Avoidance/Numbing

Moving on to this next slide, the next cluster, the C cluster, really consists of two different components: The avoidance symptoms and the numbing symptoms. And you have to have three of these symptoms to meet the diagnostic criteria. So avoidance of thoughts, feelings, or conversations about the event. People with PTSD, when they start having these thoughts, will try to do something else: turn on the radio or watch television, will make themselves busy so that they don't have to think about these things, and avoiding activities or places. A person who has been in a motor vehicle accident will avoid the site of the accident. A person who has been raped or mugged will avoid that setting. So that's a behavioral response. Inability to recall part of the trauma, kind of a psychogenic amnesia.

And then the last four are really more psychological strategies than behavioral strategies that we see in people with PTSD. They have reduced interest in activities. They keep away from other people. They have psychic numbing, a restricted range of affect, basically turning down the capacity to respond emotionally to anything. Now on the one hand that's adaptive if you're trying to get rid of the fear response, the guilt response, the anger, etc. But it's not adaptive when you are also blotting out the capacity to have loving feelings, etc., which is why marriages and families and personal relationships are a major casualty among [those with] PTSD.

And finally, the sense of a foreshortened future, the belief among PTSD afflicted people that they're not going to live a normal life span, that their days are numbered. So these are the C cluster...seven different symptoms. If you have three of them, then you've met diagnostic criteria.

Slide 10: DSM-IV Diagnostic Criteria for PTSD: Hyperarousal

Then the final cluster is the hyperarousal cluster, and you need two of these. These symptoms look very similar to most other anxiety disorders: difficulty sleeping; irritability; hard to concentrate, although the difficulty concentrating is because your mind is elsewhere, or your mind is on the traumatic stuff; and the exaggerated startle response, which is a physiological response that can be measured in the laboratory. The hypervigilance though is, I think, much more unique a characteristic of PTSD. PTSD is about danger and safety, and people who have PTSD are preoccupied with concerns about personal safety, and they're constantly on guard to make sure that they're not going to find themselves in another traumatic situation, where they're helpless to respond or to protect themselves or their loved ones. So hypervigilance is an important symptom of PTSD.

Slide 11: Validity is Well Established

So I've just finished reviewing the particular diagnostic criterion and then the next slide is that basically we've had 25, 26 years now to look at this diagnosis, and because PTSD was attacked in many quarters when it first came out, there's been a lot of research-a lot of good research-verifying the validity of this diagnosis. And I think that what's also interesting is that although there have been minor revisions to the diagnostic criterion, I've told you about those from the DSM-III to III-R to IV, the major construct, the reexperiencing-avoidance-numbing construct has really withstood the test of time.

Slide 12: PTSD Prevalence in US Adults

On this slide we're getting into epidemiology and this is talking about PTSD prevalence among United States adults. And perhaps the best study was the National Comorbidity Study, which was a large representative sample of over 5,000 adults. It is the benchmark for the prevalence of all mental disorders in the United States. The lifetime prevalence of PTSD is, you know, almost 7%; 6.8%; much higher in women than in men, and that's true for depression and other anxiety disorders. And a current prevalence rate is about half of that, at 3.6%. Again, higher in women than in men.

Slide 13: Prevalence of Trauma and PTSD

We talk about the prevalence of trauma and the prevalence of PTSD, because as I'll show you, all trauma is not equally toxic. As I said earlier, more than 60% of Americans have experienced a traumatic event in their lives. If you go to a country with internal conflict like Algeria, that number comes to about 95%. Almost all Algerian adults have been exposed to at least one traumatic event in their life. And in America more than 25% have experienced more than one traumatic event.

So if we first look at the prevalence of trauma, as you can see, the most prevalent is to have witnessed a traumatic event-not to have been affected yourself. Accidents are next, and way at the lower end in terms of the probability spectrum is rape, which is a relatively rare event. Child abuse is relatively rare as well, as is combat compared to witnessing. But now, look at the prevalence of PTSD, and as you can see, there really is kind of an inverse relationship-that rape is the most toxic traumatic episode. So if you're raped you're much more likely to develop PTSD than if you've witnessed a traumatic event happening to another. So this is something to keep in mind when assessing PTSD, that again, all traumatic events are not equally toxic in the likelihood of causing PTSD.

Slide 14: Combat Exposure in the NCS

On this slide, we turn our attention to the particular trauma of combat exposure, which of course is a major consideration and concern for practitioners who work within the Department of Veterans' Affairs and the Department of Defense, although I must say that many veterans and military retirees are seeking treatment outside of the VA and the DOD in the civilian sector, so it's important for everyone to be mindful of this information.

So if we go back to the National Comorbidity Study, which again was a sample of all Americans-it wasn't just combat veterans, one finds that the lifetime prevalence of PTSD among combat veterans in that sample was very high. It was about 39%, which actually is a little higher than the National Vietnam Veterans Study. And I think what's really important is that if you have PTSD...that combat-related PTSD is much more likely among men. We just don't have enough women in the sample. But for men, combat-related PTSD has higher lifetime prevalence. It has a much greater likelihood of a delayed onset, sometimes for decades, and has

a much greater likelihood of not being amenable to treatment...more treatment refractory. So combat PTSD seems to be particularly toxic.

Slide 15: PTSD Prevalence in Vietnam Veterans

If we look at this next slide, the National Vietnam Veterans' Readjustment Study, which was done in the mid-80s to a representative sample of 3,000 veterans-combat veterans, non-combat era veterans, and civilians, we will find the lifetime prevalence among men was 31%. Among women it was 26%-not quite as high as the 39% of the National Comorbidity Study, but still quite high. And the current prevalence was 15% among men and 8% among women.

Now you may wonder why the prevalence among women is lower here. I've shown you a little while ago that generally, women have a higher prevalence of PTSD. I think that it's because of the uniqueness of the military sample. In Vietnam the women, most of whom were nurses, had many, many more protective factors. They were older. They were better educated. They were officers. So that the general gender rule of thumb did not apply in the Vietnam cohort.

I should add that the early data from the Iraq and Afghanistan cohort again indicates that women and men seem to have the same rates of PTSD and again, remember we're not talking about national samples here. We're talking about women who were self-selected to be in the military and got past basic training, etc. So some of these gender questions are really very, very interesting, and we still have a lot of questions about them.

Slide 16: Prevalence of PTSD from Other Wars

This slide is about PTSD from other wars, and as you can see from the Gulf War, the prevalence is only about 10% in comparison to about 30% in Vietnam. And Afghanistan and Iraq is really a work in progress. The estimates, depending on what kind of criteria you use, vary from...in Afghanistan from 6-11.5%; in Iraq from about 12-20%. But this is a work in progress and we frankly don't know how this is going to look. It really would be a mistake to compare this data with the Gulf War or with the Vietnam data at this point in time. I think we'll have to wait five years, at least, to see how this all falls out.

Slide 17: The Burden of PTSD

This slide is about the burden of PTSD. If you have PTSD, you've got other problems. You have an elevated risk of having other psychiatric problems. There's depression or other anxiety disorders, or substance abuse disorders. If you have PTSD, you have a much higher risk of suicide attempts, greater functional impairment, and reduced quality of life. In fact a study...looking at the National Comorbidity Study data, you know, concluded that PTSD had the greatest impact of all anxiety disorders on economic burden to society.

Slide 18: PTSD and Comorbidity in the NCS

Basically here we have data from the National Comorbidity Study and we're looking at the odds ratio, the risk of having a different psychiatric comorbid disorder, such as Depression, Dysthymia, General Anxiety Disorder, Panic, etc., and we're comparing people with PTSD and

without PTSD. And we're looking at men in the light blue and women in the dark blue. The referents for all these are people with no PTSD.

And as you can see, if you have PTSD, you have almost a six-fold greater likelihood of having depression than if you don't have PTSD, if you're male. If you're a female it's about 3 and a 1/2 times as great. Likewise for drug abuse at the other end of the scale. If you have PTSD, you have a 2-3 times greater likelihood of having drug abuse than if you don't. So in all cases, in every single case-for mood disorders and other anxiety disorders, if you have PTSD you have a much greater likelihood of having a comorbid diagnosis.

Slide 19: PTSD and Functioning in the NCS

We're talking now about functioning. And again, this is data from the National Comorbidity Study. And again, you can see that people with PTSD have problems: a 40% elevated odds of academic failure, 30% elevated odds of teenage parenthood, 60% elevated odds of marital problems, and 150% elevated odds of current unemployment. So those are important implications.

Slide 20: PTSD and Functioning in Veterans

This slide is about PTSD and functioning in veterans. So the last slide was basically about PTSD in general, and now we're talking about PTSD from two different sources. We have the National Comorbidity Study on the left; the National Vietnam Veterans' Study on the right. And you can see that there's a consistency. Veterans with PTSD have greater problems holding a job, in terms of unemployment and being fired; greater problems in terms of marriage, both divorce and separation or spousal abuse; poor health; increased limitations to physical function; and more likely to perpetrate violence. So again, you know, PTSD carries with it a lot of other implications in terms of functional impairment.

Slide 21: Course and Onset of PTSD

This slide is about the course and onset of PTSD, and of course it's variable. Usually it occurs within the first year or two after the trauma, but it can be long-delayed. It can be delayed for many, many years. In the National Comorbidity Study, an episode of PTSD was likely to be three years for people who got treatment and five years for people who didn't get treatment. But remember, that's just a single episode, and one of the things about PTSD is that the risk of having a relapse upon reexposure to a traumatic event is very, very great. So, you have to put these three and five-year durations in context. You can have a sequence of three and five-year episodes, depending on whether or not you had treatment.

And symptom exacerbation is very common in chronic PTSD. New trauma or life events can reactivate these symptoms. So people with PTSD are at great risk for having a long duration of illness. And like other chronic disorders, it may have a series of relapses, and then remissions, and then relapses, and then remissions, and, you know, that's true for other medical problems like hypertension and diabetes, etc.

Slide 22: Longitudinal Course of PTSD

Most people who develop PTSD recover from it, but in the National Comorbidity Study, roughly 15-25% of people who developed PTSD did not recover. Ari Shalev in Israel believes that one of the hallmarks of PTSD is that it's a disorder of chronicity. That basically, it is a disorder in which recovery is complicated.

Part of the problem in interpreting this is that much of this data was obtained before we had treatments that worked, and you'll have other modules which will talk about the psychosocial and the pharmacological treatments. But we now have treatments that work, and so what will be interesting to see in the future is whether we can improve upon this-whether more people will recover from PTSD than have in the past because they've received effective treatment. You'll have to stay tuned to that one.

Slide 23: PTSD Course in Veterans'

The next slide is about the PTSD course in veterans, and this is a very interesting, recent study from Israel; Zehava Solomon and her group. She has been following Israeli veterans of the 1982 war in Lebanon for over 20 years, and what she did was, she assessed PTSD one year, two years, three years and recently, 20 years after their participation in the war-their exposure to the war zone trauma.

And what's important about this slide is, it really is some of the best evidence we have that PTSD can have a delayed onset. That has been a controversial issue in some circles. But what this shows is that 34% of the veterans who had no PTSD one year after the war exhibited it at two years. Thirty-one percent who had no PTSD at three years exhibited it later on, and there were 8.6% of veterans who had not shown PTSD in the first three years who exhibited it 20 years later. So it is clear that, although most PTSD does declare itself relatively early on in the longitudinal course, it may be delayed as much as 20 years in some individuals, and those...combat veterans seem to be particularly susceptible to having delayed-onset PTSD.

Slide 24: Reactivation and Exacerbation

And the next slide is about reactivation and exacerbation. There are lots of things that can reactivate PTSD among people who've had it once: exposure to reminders of the trauma, new traumatic events, a medical illness-- particularly one that makes you feel helpless, bereavement, loss of a loved one, retirement seems to be a major issue, and may be one of the reasons why a lot of older veterans who had coped reasonably well with their PTSD while they were working are exhibiting PTSD later on in life, and other kinds of stressors. So the thing to remember about PTSD is that one is always at risk of having a relapse and that's an important thing to keep in mind in patient care and helping our patients know what to expect from the situations and for some of the decisions they make.

Slide 25: Biological Profile

This slide is about the biological profile. I think some of the biology in PTSD has been truly remarkable and there are a number of different kinds of biological measurements that have been

obtained. Psychophysiological reactivity has been one of the first things that were observed as early as 20 years ago-- that patients with PTSD who are reexposed to traumatic stimuli exhibit a greater increase in a number of physiological parameters such as blood pressure, heart rate, skin conductance, electromyogram, etc.

Neurohormonal profiles among PTSD patients seem to be different. There seems to be a real dysregulation of a number of the key hormonal systems involved in the stress response such as the adrenergic sympathetic nervous system, the classic fight-flight-or freeze system, as well as the gross stress reaction of the hypothalamic-pituitary-adrenal cortical system, manifested by increased cortisol under stress and a decrease perhaps in PTSD.

Patients with PTSD have exhibited abnormal electrocardiographic profiles. An infarction pattern has been shown that seems to be unrelated to other psychiatric problems. And there have been some really exciting observations in terms of structural and functional brain imaging.

Slide 26: The Stress System

The next slide basically provides the context for all of this biological work and it's about the stress system. And the stress system is a remarkable neurobiological/psychobiological system that has evolved through evolution, and it is adopted for preservation of the species-- coping with stressful situations. And the major components, as I just said, are the HPA system, the hypothalamic-pituitary-adrenal cortical system, first described by Hans Selye in the middle of the 20th century. The locus coeruleus norepinephrine system, that's the heightened fight-flight-or freeze reaction, first described by Walter Cannon in the early part of the 20th century, and the immunological system. And I think that I won't have much more to say about this today, but I think that abnormalities in the immunological system may be related to some of the reasons why PTSD is a risk factor for adverse health outcomes.

Slide 27: (no title)

So the next slide is basically a cartoon, a schematic, to show these two systems. On the left you can see the hypothalamus releases CRF, Corticotropin-releasing factor, to the pituitary gland, which releases ACTH, which then releases cortisol and other glucocorticoids from the adrenal cortex, and this is an exquisite negative-feedback system. And on the right you see the locus coeruleus, which has 2/3 of all the adrenergic neurons in the brain and it has upstream connections to all different cortical and subcortical systems, and downstream connections to the sympathetic nervous system.

The amygdala --in the upper left-hand part of the slide--is the part of the brain that processes emotional information, and there's a lot of evidence now that the amygdala in people with PTSD is hyper-reactive, is hyperactive.

The hippocampus, which is the part of the brain that remembers where the traumatic episode took place--it is the place where memories are stored in some respect, is an important part of this system as well.

And finally, in the upper left-hand corner, is the orbitofrontal inhibition of the amygdala. The frontal cortex is the part of the brain that is best-able to rein in the amygdala, and much of our treatments that-cogno-behavioral treatments-we think work on the frontal cortex to rein in the amygdala. But this is the basic stress system: the HPA system and the locus coeruleus-norepinephrine system, and they've been the subject of a great deal of research and have suggested a number of different treatments.

Slide 28: Are there structural brain abnormalities associated with PTSD?

So the next slide is "Are there structural brain abnormalities associated with PTSD?"

Slide 29: Hippocampal Volume in PTSD

And this is a summary of a lot of the research. The next slide is hippocampal volume in PTSD, and what we're showing are the difference between patients with PTSD and patients with controls, in terms of hippocampal volume. And basically, the slide is divided in half. On the left you see three studies done, in which there was no difference in the hippocampal volumes of the patients with and without PTSD. But in the right, there are three studies showing excessive...more hippocampal volume among the PTSD patients. The red bars are the right hippocampus and the blue bars are the left hippocampus.

And this finding really has withstood a great deal of examination. It does appear that people with PTSD do have smaller hippocampi. The question is a "chicken or egg" question, and that is, do they have smaller hippocampi because of their PTSD or is a smaller hippocampus a risk factor for PTSD? And that's a question that's subject to some very, very interesting and important research, and you'll just have to wait and see what we find.

Slide 30: Are there functional abnormalities associated with PTSD?

The next slide asks the question, "Are there functional abnormalities associated with PTSD?"

Slide 31: (no title)

And this next slide basically shows some of the work of cerebral blood flow. Now we're looking at some of the key brain structures here. We're looking at the hippocampus, the amygdala, the orbitofrontal cortex, and the medial prefrontal cortex and anterior cingulate.

As I said earlier, the amygdala seems to be where the major action is, and as you can see in the bottom of the slide, there are at least six studies showing increased blood flow to the amygdala among patients with PTSD when exposed to traumatic cues. There are a couple of negative studies as well. Remember what I said about the medial prefrontal cortex and the anterior cingulate as being the parts of the brain that can rein in the amygdala. And as you can see, as one might have predicted, there is decreased cerebral blood flow to the medial prefrontal cortex, again suggesting that in PTSD, this brain structure has lost its ability to control the amygdala as much as in a person without PTSD.

There's also decreased blood flow to the hippocampus, which may be related to some of the cognitive problems we see in PTSD, maybe related to some of the memory problems. But the bottom line is that people with PTSD do appear to have a difference in their brain function. So much so, that the American Psychiatric Association and World Health Association are now considering for the DSM-V, a new category of disorders that they would call stress-related fear conditions and that would include PTSD, panic disorder, simple phobia, and social phobia. So this is very important data and obviously there's more to come from that.

Slide 32: Increased Blood Flow with Fear Acquisition versus Control in Abuse-Related PTSD

This next slide shows more of the same. And you can see here increased blood flow with fear acquisition in the left amygdala. The yellow indicates higher blood flow than compared to normal subjects.

Slide 33: Decreased Blood Flow During Recall of Emotionally Valenced Words in Abuse-Related PTSD

This next slide shows decreased blood flow in key brain structures, and again, you can see decreased blood flow to the orbitofrontal cortex, decreased blood flow to the hippocampus. So the data are consistent, and what's also interesting is that the brain imaging data are consistent with some of the animal data-exposing animals to stress in terms of some of the neurocircuitry that we've seen. So, this stress-induced fear circuitry, a disorder category, has a lot of evidence for...there is evidence against it as well, but what I've shown you are the reasons why people think that this might be a good way to classify PTSD in the future.

Slide 34: Risk Factors

Next, we turn to the question of risk factors, and when we talk about risk factors for any problem, in this case PTSD, you know, we have to think about three different time phases. One is pretraumatic risk factors: What are the factors that, prior to trauma exposure, might make people more likely to develop PTSD? And then the peritraumatic: what are the things about the traumatic event itself that are risk factor? And finally posttraumatic factors.

Slide 35: Risk Factors: Pretraumatic

So turning first to pretraumatic risk factors, you can see there's quite a few: female gender, adverse childhood experiences, some questions about genetic factors-that's an area of hot research, there's some questions about the serotonin transporter gene, lack of functional social support, prior psychiatric problems, and concurrent stressful life events. So there are lots of pretraumatic risk factors.

Now, although these have shown up in epidemiological research, in point of fact, these are really much less important it turns out than the peritraumatic and the posttraumatic risk factors, so that, if you're female you have maybe a slightly greater likelihood of developing PTSD, but there are much more important things that are going to determine whether or not you develop your PTSD

and those are the peritraumatic and the posttraumatic risk factors. And as I said earlier, the women are doing just as well as the men in Iraq and Afghanistan right now, and they did as well as the men in Somalia as well. We had data on that.

Slide 36: Risk Factors: Peritraumatic

Turning to peritraumatic risk factors, one of the hallmarks of all PTSD research, not just war zone research, but with the children and disaster research, is a dose response curve. That the greater the severity of exposure to the traumatic event, the greater the likelihood you're going to develop PTSD. So magnitude of the stressor itself is a major predictor, and as I said earlier, really does outweigh the pretraumatic risk factors I mentioned earlier.

The more you perceive that your life is in danger, the more you...or a loved one is in danger, the greater fear you feel, the greater risk or, in PTSD terminology, the greater the A2 criterion, the greater the feeling of fear, helplessness and horror, the greater the likelihood you're going to develop PTSD. And animal studies have tried to create what is considered a traumatic stressor in the laboratory and consensus is that if you can create a situation-and you can-that is both unpredictable and uncontrollable, that that really is a risk factor and that is a good way of doing research on PTSD. So the greater the feelings of helplessness, inability to know when the next shoe is going to drop, these are all peritraumatic risk factors that seem to be predicting the subsequent severity of PTSD.

Slide 37: Risk Factors: Posttraumatic

But the final risk factors-set of risk factors appear to be the most important. And among those is social support following the event. Chris Bruin in the UK analyzed all this factor research; pretraumatic, peritraumatic, and posttraumatic, and what he found-what his group found-- was that if you had social support, the likelihood of developing PTSD was going to be greatly diminished. And as you can imagine, if you think about the traditional Vietnam veteran, where they had no social support, they were stigmatized-even picketed against, railed against. You couldn't have created a worse scenario for a posttraumatic situation.

Contrast the current climate in the country at this time, given the Iraq and Afghanistan wars, whatever people's political opinions about the correctness of the war, the support for the veterans seems to be unanimous, and that's a good thing. In fact, there's other studies showing that social support can offset even genetic vulnerabilities, which is a pretraumatic risk factor. And that's where we come in, we therapists, because we're part of the posttraumatic scene too. So the sooner we can get in and treat people, the more likelihood there is that we can perhaps prevent development of PTSD.

Another problem is, as you can imagine given the nature of PTSD, is that if you're not in a safe situation, if you're continually exposed to situations that are stressful or traumatic, that's a posttraumatic factor that's going to increase the risk of PTSD. A good example would be a domestic violence situation, where you're still in the situation and you get battered by your partner and that battering isn't going to stop. In fact, many therapists won't permit ...won't accept people into treatment for cognitive behavioral treatments if they're still in an abusive

situation. That's also true in a war zone. It's also true in a concentration camp. So ongoing stress and ongoing exposure to traumatic cues in particular is a great risk factor for PTSD.

Slide 38: PTSD Treatment Options

So finally, and I'm just going to...just coming attractions of modules to come, is we have treatment that work for PTSD. We have excellent psychosocial treatments, and we have pharmacological treatments as well. And there are now about four or five different practice guidelines for PTSD, and they all recognize the cogno-behavioral treatments, exposure therapy, cognotherapy, cognoprocessing therapy as very, very effective treatments for PTSD. Remission rates up to 50%, which is really something we never had before. EMDR, eye movement desensitization reprocessing, has also been shown to be an effective treatment, although my own opinion is the data are not as strong as for cogno-behavioral treatment, but they still meet the rigorous standards that the different guideline practice groups have found.

Pharmacological treatments have been effective, but frankly not as effective as psychosocial treatments. The gold standards right now are the SSRIs, selective serotonin reuptake inhibitors, but older medications such as tricyclic antidepressants, monoamine oxidase inhibitors, mood stabilizers, also known as anticonvulsant agents, and other antianxiety agents have all been tested.

Slide 39: Sertraline Flexible-Dose PTSD Study

I'm going to show you three slides of some of the treatment research and then I think I'll be finished. The first one is from one of the studies that led to the FDA approval for the SSRI Zoloft, Sertraline, as an approved treatment for PTSD. And what we're looking at is a 12-week clinical trial. The gold bars are the patients who received Sertraline. The blue bars are the patients who received placebo, and as you can see, and what we're measuring is improvement. And as you can see, the patients who received Zoloft, Sertraline, had significantly greater improvement than did those who received placebo. In point of fact, 30% of the Sertraline patients had complete remission from their PTSD, whereas only 15% of the placebo patients did.

Slide 40: Paroxetine Fixed-Dose PTSD Study

This next slide is similar data from another SSRI: Paroxetine or Paxil. And here is a study in which we're comparing two different doses of Paroxetine; 20 mg in orange and 40 mg in green. And we're comparing them to a placebo. Again, it's a 12-week trial and again you can see a significantly greater improvement in the Paroxetine groups than in the placebo groups. What's interesting about this trial is that the 20 mg group did as well, in fact just a tad bit better, than the 40 mg group, although that's not a significant difference. But again, the two slides I've shown you about Zoloft and Paxil are...this is the kind of data that led the US Food and Drug Administration, the FDA, to approve these two medications for PTSD, at this time where there are no other approved medications. And Paxil, like Zoloft, again produces a remission in about 30% of the patients.

Slide 41: Prolonged Exposure (PE) Therapy, Stress Inoculation Training (SIT) and Their Combination for Female Assault Victims with PTSD (9 Sessions)

And a final slide shows a study from Edna Foa and her colleagues with prolonged exposure therapy compared to stress inoculation training, compared to a combination. And in this study, each patient received two treatments a week. So that by week 5 in this slide, they had received all of their treatment. And as you can see, the 3 therapy groups showed much, much better improvement than did the Wait-list group. What you can also see is that even though the treatments stop at week 5, the improvement was sustained for another 6 months. So these are very, very powerful treatments, and you're going to have other talks that are going to go over the very, very rich and exciting data on cognitive-behavioral therapy.

So that's the end of my talk. Hopefully, I've given you a good overview of PTSD historically, in terms of the diagnostic criteria, some of the epidemiology, some of the risk factors, some of the neurobiological findings, and some of the treatment research.

Thank you very much.