



# Posttraumatic Stress Disorder: An Unseen Trouble in Orthopaedic Trauma

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## **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

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## **ABSTRACT**

Traumatic incidents experienced by orthopedic trauma patients represent life-changing events not only in time lost due to hospitalization, surgery, or rehabilitation, but also in the loss of ability to function and work. Posttraumatic stress disorder (PTSD) is a mental illness that can occur after a traumatic or life-threatening event. The orthopedic surgeon is often the only physician managing these patients after their injury, representing the sole opportunity to recognize the psychiatric sequelae of trauma exposure that are highly pertinent to the patient's functional outcome. Orthopedic surgeons are not specifically trained to identify PTSD in their patients and are therefore unlikely to treat it. The focus of attention of orthopedic surgeons is on the physical injury and tissue damage, and recognizing psychiatric illness such as PTSD is often difficult. Hence, this review article aims to highlight this concealed issue and have a strong consideration in trauma patients.

*Keywords: Orthopaedics; trauma; posttraumatic stress disorder.*

## **1. INTRODUCTION**

Posttraumatic stress disorder (PTSD) is a mental illness that can occur after a traumatic or life-threatening event [1]. Post-traumatic stress

disorder (PTSD) has evolved as a diagnosis both in name and in its description of signs and symptoms [2,3]. PTSD is often described among soldiers who have experienced severe emotional or physical stress during combat but is

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also recognized among the civilian trauma population [2,3]. Its first formal diagnostic criteria came in the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III; American Psychiatric Association, 1980), which detailed characteristic psychiatric symptoms following exposure to a traumatic event [4]. In 1678, Norwegian physicians called this constellation of symptoms nostalgia. PTSD has also been called neurasthenia, combat exhaustion, gross stress reaction, irritable heart syndrome, shell shock, and stress response syndrome [4]. A diagnosis of PTSD is made when: (a) the individual has experienced, either directly or indirectly, an event involving serious injury or a threat to the physical integrity of the individual or another person; (b) the distress substantially impairs social, occupational, or other areas of functioning and (c) the symptoms have lasted for longer than 1 month. The lifetime prevalence of PTSD in the general population is estimated to range from 1% to 14% [5]. This psychiatric disorder was well documented in World War II and Vietnam combat forces. However, recent studies have noted a highly variable rate (2%–51%) of psychological distress among non-combat adult orthopedic trauma patients [5,6,7,8]. Furthermore, clinically relevant depression was found in 45% of patients with orthopaedic trauma and was strongly correlated with global disability [9]. Various risk factors for PTSD have also been reported, including female sex, intense or long-lasting trauma, low level of education, trauma earlier in life and previous mental illness [3,10,11,12,13,14].

Traumatic incidents experienced by orthopedic trauma patients represent life-changing events not only in time lost due to hospitalization, surgery, or rehabilitation, but also in the loss of ability to function and work. Orthopedic trauma patients commonly have injuries in multiple organ systems, including the brain, abdomen, and genitourinary tract, often leading to chronic pain, sexual dysfunction, disability and psychological distress. There is a wide range of emotional reactions to traumatic events and pain and people vary in their ability to cope with these events. Those who struggle to cope may have unrecognized symptoms of PTSD. PTSD is a diagnosis in evolution partly because it is a relatively new disorder and also because of the complexity of the components of the diagnosis. Psychological distress, including PTSD, is being increasingly recognized in these patients and efforts to improve the diagnosis, treatment and

even prevention of psychopathology in these patients are ongoing [4].

## 2. EXTENT OF THE PROBLEM

Orthopedic surgeons are not specifically trained to identify PTSD in their patients and are therefore unlikely to treat it. The focus of attention of orthopedic surgeons is on the physical injury and tissue damage, and recognizing psychiatric illness such as PTSD is often difficult. The focus on the visual (or palpable) is apparent even in the early descriptions of traumatized populations. Biologic explanations for this psychological condition have been proposed. Understanding the chemical processes and brain functions involved in the development of PTSD can help to elucidate treatment options and possibly even help prevent the disorder. Yehuda et al. [15] suggested that PTSD represents an aberrant physiologic response to stress or trauma that is rooted in “disruptions in the normal cascade of the fear response and its resolution.” These researchers found lower cortisol levels and a higher heart rate both in the emergency room and 1 week later among patients who eventually developed PTSD [15]. Highly stressful events precipitate the release of cortisol and epinephrine, which act to heighten arousal and prepare for action in a “fight-or-flight response.” Alterations in HPA axis functioning are thought to be central in the pathology of PTSD. Positron emission tomography (PET) scans, functional MRI, and single photon emission CT scans have been used to identify active or hypoactive areas of the brain in patients with PTSD, confirming that the amygdala is involved in emotional memory in the development of PTSD.

PTSD symptoms and psychological distress have been found to be quite prevalent among orthopedic trauma patients, as illustrated in a brief review of the literature summarized in various studies. Michaels et al. [16] studied 100 trauma patients and found 42% patients had elevated symptoms of PTSD at 6 months. Another study by Feinstein and Dolan [17] with 48 patients having lower limb long bone fractures found 14% patients positive for PTSD at 6 months. Starr et al. [18] studied 580 orthopaedic trauma patients and found that as large as 51% patients screened positive for PTSD. Similarly, another study by NSCOT Zatzick et al. [19] studied 2707 surgical trauma patients and 21% were screened to be positive

for PTSD. These studies all used self-reported symptom measures which are known to overestimate PTSD prevalence; studies are needed with full diagnostic assessment methods to provide more definitive prevalence estimates.

Pediatric trauma patients represent a separate category of trauma patients who have been studied separately from adult trauma patients because their PTSD prevalence and risk factors may differ from those in adults. The studies to date of orthopedic trauma patients with PTSD have all investigated PTSD in early post-trauma time frames. Delayed-onset PTSD in orthopedic patients has not yet been studied. The duration of PTSD may vary, but it generally tends to follow a chronic course in most orthopedic trauma studies. The occurrence of these disorders has often not been well appreciated in orthopedic practice, and consequently the orthopedist's ability to detect psychiatric illness in patients has historically been lacking [20].

### 3. IMPACT OF THE PROBLEM

PTSD is not only surprisingly prevalent in orthopedic trauma patients, but it is also associated with functional disability and significant medical and mental health care utilization that has not been well recognized in the orthopedic treatment literature. Common orthopedic outcome measures include ability to return to work and perform activities of daily living (ADL) and pain scores. These orthopedic outcome measures do not directly measure psychological distress, but these outcome measures are adversely affected in patients with PTSD. Not only is the prevalence of PTSD in orthopedic trauma patients higher than previously recognized, but also the impact of this disorder on functional outcomes is substantial. Psychiatric illness such as major depression and PTSD have been found to correlate strongly with health-related quality of life in trauma patients, [21] even more than injury severity, presence of chronic medical conditions, age, or history of alcohol abuse [19]. PTSD in orthopedic trauma patients has been demonstrated to be one of the most predictive variables of functional outcome following orthopedic injury. In the National Study on the Costs and Outcomes of Trauma (NSCOT) by Zatzick et al. [19] PTSD was prospectively found to be associated with a 3.2 times higher odds of not returning to work. PTSD was also associated with functional impairment 12 months post trauma in ability to eat, bathe, toilet, grocery shop, prepare meals and pay bills.

PTSD and pain problems often co-occur, as demonstrated by a study of musculoskeletal pain complaints in association with PTSD however, Treatment of PTSD has not been demonstrated to improve pain in orthopedic patients [22]. A patient's emotional state is important in the interpretation of his or her own outcome. For example, a patient involved in a motor vehicle collision, who has nightmares about the accident and a phobia of traveling, may not perceive his or her outcome as good, even if the fractures unite in an anatomic position with functional soft tissue healing.

### 4. ADDRESSING THE PROBLEM

Psychiatric problems among orthopedic trauma patients are well established in this population. Predictors of disability such as mechanism of injury, gender, injury severity, socio-demographic status, social support, and psychological sequelae have also been reported [23,24,25]. Clinically relevant psychological impairments such as anxiety, depression and post-traumatic stress disorder have been reported especially within the first year after injury when they have a prevalence of 30% to 60%. The importance of psychological outcomes, particularly posttraumatic stress disorder (PTSD), has been highlighted in many series [26,27]. It is described as an anxiety disorder that can develop after exposure to a terrifying event or ordeal in which grave physical harm occurred or was threatened.

Addressing PTSD can be accomplished through efforts directed toward prevention and treatment. A long-standing approach to prevention of post-traumatic psychological problems among trauma survivors is the practice of psychological debriefing. Identifying patients at risk for PTSD can aid the development of early prevention strategies. Risk factors for PTSD in traumatized populations include trauma severity and intensity of exposure, female gender, low socioeconomic status, lack of social support, and pre-existing psychopathology including polysubstance abuse [28,29,30]. Higher Injury Severity Scores (ISS) in orthopedic trauma patients have not reliably been found to correlate with the eventual development of PTSD, but rather patients with early post injury emotional distress and greater physical pain have been found to be susceptible to PTSD symptoms [19]. Identifying patients at risk for PTSD and diagnosis of the disorder are important aspects of the management of orthopedic patients with PTSD. A clinical tool for identification of psychiatric problems in

orthopedic trauma patients is how much patients agree with the statement, “The emotional problems caused by the injury have been more difficult than the physical problems.”

Although the literature on the treatment of orthopedic trauma patients with PTSD is scant, the more general psychiatric literature contains many treatment options for PTSD. Selective serotonin reuptake inhibitors (SSRI) medications such as paroxetine and sertraline, which are FDA approved for the indication of PTSD, have been shown to reduce PTSD symptoms in patients suffering from PTSD [31,32]. Psychotherapy with cognitive behavioral therapy, exposure therapy, and supportive therapy has been shown to significantly reduce PTSD symptom levels [33,34,35]. Exposure therapy is a method of desensitizing patients to aspects of the traumatic event in a controlled fashion. Cognitive behavioral therapy helps patients to develop more adaptive responses to fear and thoughts of previous traumatic events. These treatment strategies are administered overtime by a mental health professional. Other medications used to augment the treatment of certain PTSD symptoms include prazosin to treat post-traumatic nightmares, [36]  $\alpha$ -2 agonists,  $\alpha$ -1 antagonists, anticonvulsants, and lithium in the augmentation of the treatment of PTSD. There have also been studies investigating pharmacologic prevention of PTSD in the immediate post injury period to prevent or dampen the physiologic cascade of events leading to PTSD, using medications such as beta-blockers, SSRIs, benzodiazepines and corticosteroids to provide “inoculation” or “molecular debriefing” with varying degrees of success [37-39].

## 5. CONCLUSION

Posttraumatic stress disorder has been found to be significantly prevalent in orthopedic trauma patients. The orthopedic surgeon is often the only physician managing these patients after their injury, representing the sole opportunity to recognize the psychiatric sequel of trauma exposure that are highly pertinent to the patient’s functional outcome. Hence, identifying patients at risk for PTSD and diagnosis of the disorder are important aspects of the management of orthopedic patients with PTSD. This process can begin with the application of symptom-screening questionnaires and appropriate referral to a mental health professional is an important

intervention in the care of patients suspected or screened positive for PTSD.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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