Selection and Implementation of a Screening and Referral Process for Acute Stress Disorder and Post-Traumatic Stress Disorder in Orthopedic Trauma Patients

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Objectives: In 2022 the American College of Surgeons (ACS) Best Practice Guidelines (BPG) placed a greater emphasis on the implementation of a screening and referral process for patients at high risk for the development of psychological sequelae after trauma. Our center selected and implemented a verified predictive tool to screen for Acute Stress Disorder (ASD) and Post-Traumatic Stress Disorder (PTSD). The aim of this study is to evaluate the implementation of this protocol among orthopedic trauma patients to better understand the psychological burden carried by this patient population and to highlight the importance of incorporating mental health screening into orthopedic trauma care.

Design: Retrospective case series

Methods: Orthopedic trauma patients aged 8 and above who presented to a level 2 trauma center were screened utilizing the Peritraumatic Distress Inventory (PDI), in accordance to Trauma Quality Improvement Program (TQIP) guidelines. Chi-square (2×2 table) and likelihood ratio (2×3 table) tests were performed to compare the orthopedic groups on the proportions of screenings and risk stratifications. Scores were stratified into low (0–14), moderate (15–22), and high-risk (>22) categories using published PDI thresholds, triggering an educational handout, an added social-work referral, or an automatic psychiatry consult, respectively.

Results: 3,052 trauma patients aged 8 and older were included over 14-month period. 710 patients had orthopedic injuries. Point value correlation with risk potential was the same for all ages. 407 (57%) of patients were screened, with 326 (80%) scoring 0–14 (low risk), 45 (11%) scoring 15–22 (moderate risk), and 34 (8%) scoring >22 (high risk). Spearman analyses showed significant associations between age and hospital LOS ($\rho = 0.16$, $p < 0.001$), ISS and LOS ($\rho = 0.40$, $p < 0.001$), age and risk score ($\rho = -0.20$, $p < 0.001$), and LOS and risk score ($\rho = 0.17$, $p < 0.001$). No significant correlations were observed between ISS and age ($\rho \approx 0$, $p = 0.98$) or between ISS and risk score ($\rho = 0.04$, $p = 0.07$).

Conclusions: Implementation of a risk-stratifying screening and referral process illuminates the prevalence of ASD/PTSD predictors in orthopedic trauma patients. Identifying patients in need of intervention can help optimize post-injury psychological and physiological outcomes and reduce the financial burden on hospitals.

Level of Evidence: Level III

Key Words: Post-traumatic stress disorder, PTSD, Acute Stress Disorder (ASD), Orthopedic Trauma

INTRODUCTION

Approximately 2.6 million people in the United States sustain injuries requiring care at a designated trauma hospital.[1] Several studies and systematic reviews have explored the connection between emergency department (ED) encounters and the subsequent development of acute stress disorder (ASD) and post-traumatic stress disorder (PTSD) in trauma patients. Current literature suggests that a staggering 21% of trauma survivors will develop PTSD within the first-year post-injury,[2] and recent studies in children have shown that 23% of pediatric patients admitted for traumatic injury met criteria for PTSD when interviewed one month after hospitalization.[3] Literature highlighting the incidence of ASD prompts similar concern, with recent findings of the development of ASD in 7–28% of adult trauma patients, and 14.2–27% in pediatric trauma patients.[4] Emerging evidence suggests orthopedic trauma patients, who often experience abrupt loss of mobility, surgery, prolonged hospitalization, and chronic pain, may also be at elevated risk for ASD and PTSD, yet remain under-screened in clinical practice. Early screening tools such as the PCL-5 and Posttraumatic Adjustment Scale (PAS) have proven feasible for use in ED settings and show promise in identifying patients at risk for long-term psychological consequences.[5–7]

While ASD and PTSD have been broadly studied in general trauma populations, their prevalence and presentation among orthopedic trauma patients remains underexplored. Given that orthopedic injuries

often result from high-energy mechanisms and are associated with prolonged recovery, hospitalization, and potential long-term disability, this population may be particularly vulnerable to psychological distress.

A recent article published in the Journal of the American College of Surgeons (JACS) measured the frequency of PTSD screening at individual facilities. After contacting Level I and II US trauma centers and soliciting a response regarding the incidence of routine screening for PTSD, findings suggested that only 28% of responding centers routinely did so.[5] Juxtaposing the high incidence of psychological harm from PTSD and ASD with the small percentage of centers that actively screen for these conditions underscores the need for a more robust mental health care regimen in trauma patients. If underassessed, and thus undertreated, these disorders increase the likelihood that patients will experience reduced quality of life, chronic disease, and social and functional deficits.[1] In response to this disparity, and to sharpen the focus on patient-reported mental health outcomes, the American College of Surgeons (ACS) 2022 Best Practices Guidelines (BPG) placed greater emphasis on the implementation of a screening and referral process for patients at high risk for development of psychological sequelae after trauma.[1,6]

In preparation for our site review and to improve patient care, our center selected and implemented a verified predictive tool to screen for ASD and PTSD. The aim of this study was to collect and analyze data illustrating the percentage of orthopedic trauma patients at our level II trauma center who are screened for injury-related psychological disorder in the first fourteen months after implementation, and furthermore, the subset who require intervention based on their risk classification. By collecting and evaluating data associated with the broadening of our center's mental health provisions, we have identified an opportunity for a screening and referral process to improve post-injury quality of life for future trauma patients. We seek to better understand the psychological burden carried by this patient population and to highlight the importance of incorporating mental health screening into orthopedic trauma care.

METHODS

In accordance with American College of Surgeons (ACS) standards, a multidisciplinary team implemented a PTSD/ASD screening protocol over a 14-month period, incorporating EMR integration, staff education, and evidence-based tools. The Peritraumatic Distress Inventory (PDI) and PDI-C were selected based on Trauma Quality Improvement Program (TQIP) guidelines to screen trauma patients aged 8 and older within 30 days of injury (Table 1). Scores were stratified into low (0–14), moderate (15–22), and high-risk (>22) categories based on previously published PDI thresholds used in trauma populations[20–23] and aligned with TQIP guidance.[24] Low-risk patients received an educational handout on common stress reactions; moderate-risk patients received the handout plus a social-work referral; and high-risk patients received the handout and an automatic psychiatry consult request. Trauma patients were also stratified by whether an orthopedics consult was needed. A custom EPIC program automated scoring and referral prompts. A compliance goal of 80% was selected, and compliance monitoring was conducted via EPIC dashboards, in-person rounding, and provider documentation.

Following IRB exemption, this single-center retrospective review was conducted for trauma admissions between March 25, 2024 and May 31, 2025. Inclusion required patients aged ≥8 meeting NTDB criteria. Exclusions included medical instability, altered mental status, or refusal.

Table 1: Peritraumatic Distress Inventory questionnaire utilized.

Screening Question(s)	Not True at All	Slightly True	Somewhat True	Very True	Extremely True
I felt helpless to do more	0	1	2	3	4
I felt sadness and grief	0	1	2	3	4
I felt frustrated or angry that I could not do more	0	1	2	3	4
I felt afraid for my own safety	0	1	2	3	4
I felt guilt that more was not done	0	1	2	3	4
I felt ashamed of my emotional reactions	0	1	2	3	4
I felt worried about the safety of others	0	1	2	3	4
I had the feeling I was about to loose control of my emotions	0	1	2	3	4
I had difficulty controlling my bowel and bladder	0	1	2	3	4
I was horrified by what I saw	0	1	2	3	4
I had physical reactions like sweating, shaking, and my heart pounding	0	1	2	3	4
I felt I might pass out	0	1	2	3	4
I thought I might die	0	1	2	3	4

Despite protocol efforts, 30% of adults and 46% of children were not screened. The study aimed to evaluate screening feasibility and quantify moderate-to-high PTSD risk prevalence in orthopedic trauma patients.

Data were analyzed by our project statistician. Frequency and percentage statistics were used to describe the prevalence of screenings in patients with and without orthopedic injuries and by risk stratification. Chi-square (2×2 table) and likelihood ratio (2×3 table) tests were performed to compare the orthopedic groups on the proportions of screenings and risk stratifications. Statistical significance was assumed at a two-sided alpha value of 0.05, and all analyses were performed using SPSS Version 29 (Armonk, NY: IBM Corp.).

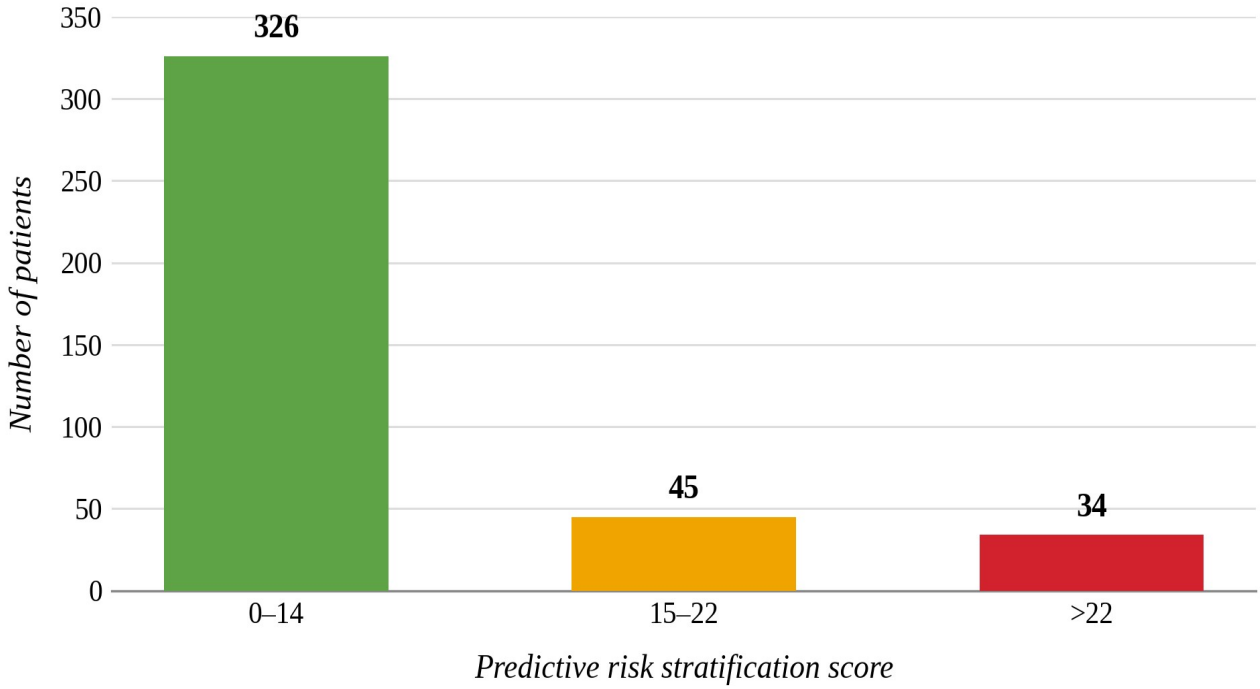
RESULTS

3,052 trauma patients aged eight and older were admitted to our facility between March 25, 2024, and May 31, 2025. 710 (23%) had orthopedic injuries. Point value correlation with risk potential was the same regardless of age, and all mechanisms of traumatic injury were included. Of the 710 patients with orthopedic injuries, 407 (57.3%) were screened. 326 (80.6%) patients received a score of 0–14 (low risk), 45 (11%) scored between 15 and 22 (moderate risk), and 34 (8.4%) scored >22 (high risk) (Figure 1). Significant positive correlation was found between age and hospital length of stay (LOS), $rs = 0.16$, $p < 0.001$; injury severity score (ISS) and hospital LOS, $rs = 0.40$, $p < 0.001$; hospital LOS and risk stratification scores, $rs = 0.17$, $p < 0.001$, and significant negative correlation between age and risk stratification scores, $rs = -0.20$, $p < 0.001$. No correlation was found between ISS and age, $rs = -0.001$, $p = 0.98$, or between ISS and risk stratification score, $rs = 0.04$, $p = 0.07$. These data indicate that of the admitted orthopedic trauma patients who received the screening, 19.4% displayed moderate to high predictive risk for ASD and/or PTSD based upon psychological and emotional responses to their traumatic event and required inpatient consultation and referral.

DISCUSSION

Our findings confirm that approximately one in five screened orthopedic trauma patients scored in the moderate- or high-risk range for ASD/PTSD, consistent with prior reports in musculoskeletal trauma populations.[11–14,25–27] While musculoskeletal injuries are typically approached through the lens of anatomical repair and physical rehabilitation, the psychological toll can be equally significant and longer lasting. The assumption that orthopedic injuries are purely physical misses an essential component of patient care: the mental health impact.

Figure 1: Screened orthopedic trauma patients stratified into low-, moderate-, and high-risk categories for ASD and/or PTSD.



ASD and PTSD are a well-documented consequence of physical trauma, with prevalence estimates ranging from 13% to 26% within the first year following injury, depending on the patient population and the time of assessment.[4,6] Previously identified risk factors include younger age, female gender, minority status, lower socioeconomic background, prior exposure to interpersonal violence, and specific mechanisms such as assaults and high-energy injuries.[2] Furthermore, the patient's perceived threat during the ED encounter—especially feelings of helplessness—has been independently associated with the onset of ASD and PTSD symptoms.[3]

Unlike some prior studies, we did not find a significant relationship between ISS and PTSD/ASD risk score in our cohort ($r_s = 0.04$, $p = 0.07$). This differs from Lowe et al., who found that higher-energy trauma was associated with greater PTSD risk. A possible explanation is that ISS may not fully reflect how threatening or distressing the injury felt to the patient. Pain, loss of mobility, functional limitations, prior trauma, and social support may also play a larger role than ISS alone. This suggests that screening should not rely only on objective injury severity when identifying orthopedic trauma patients at risk for psychological sequelae.

Importantly, this issue is not limited to polytrauma or penetrating trauma patients alone. Emerging evidence suggests orthopedic trauma patients, who often experience abrupt loss of mobility, surgery, prolonged hospitalization, and chronic pain, may also be at elevated risk for ASD and PTSD, yet remain under-screened in clinical practice. Early screening tools such as the PCL-5 and PAS have proven feasible for use in ED settings and show promise in identifying patients at risk for long-term psychological consequences.[1,5,7] The American College of Surgeons Committee on Trauma supports ASD and PTSD screening in injured patients, though standardized protocols remain under development.[1] Screening is likely to become a mandatory component of the trauma site verification process. Moreover, cognitive behavioral therapy (CBT)

is recognized as an effective intervention, and predictive algorithms using demographic and clinical variables at presentation may enhance risk stratification.[8–10]

Prior studies have estimated that between 20–30% of patients who suffer orthopedic trauma meet criteria for PTSD. LaRose and colleagues found that even up to three years post-injury, 20.5% of patients continued to screen positive for PTSD symptoms, a rate far higher than that seen in the general population. Their work also identified important clinical risk factors, such as delayed surgical intervention and smoking history, suggesting that psychological outcomes may be closely tied to the medical course.[11] This aligns with findings from Muscatelli and colleagues, who conducted a meta-analysis showing a pooled PTSD prevalence of 26.6% following acute orthopedic trauma; they also noted a significant burden of depression in this population, emphasizing the need to screen for multiple forms of psychological distress, not just PTSD.[12] Wang and colleagues reached a similar conclusion in their meta-analysis, reporting a PTSD incidence of 29% in patients with traumatic fractures, with higher pain levels, injury severity, and location influencing risk.[13]

It is particularly notable how consistently these trends appear across different patient populations. Starr and colleagues found that more than half of orthopedic trauma patients met diagnostic criteria for PTSD, and that patients often reported emotional challenges as more difficult than the physical recovery itself.[14] Similarly, Lee and colleagues found that multiple injuries, fractures to the lower extremity, and increased pain scores significantly increased the odds of developing PTSD in a cohort of young male trauma survivors.[15]

Our findings are consistent with the growing recognition within the orthopedic community that musculoskeletal trauma is not a purely physical experience. Kang et al. argue for a broader, more integrated model of care—one that includes resilience training, mindfulness, and social support to complement surgical recovery.[16] Vincent et al. go further, emphasizing that over half of orthopedic trauma survivors experience long-term psychological distress, which can persist for years if left unaddressed. They also highlight the importance of early screening and connecting patients to support networks and rehabilitation specialists trained in trauma recovery.[17]

Our data and current literature support a strong case for incorporating PTSD screening into standard orthopedic trauma protocols. Identifying patients at risk early, particularly those with multiple injuries, high pain scores, or delayed recoveries, may allow us to intervene before symptoms worsen. Doing so could potentially improve compliance with physical therapy, reduce opioid dependence, and lead to more complete functional recoveries.

Additionally, early psychiatric intervention in this population has been shown to reduce both length of stay and overall cost of care. For example, early psychiatric consultation at a Level I trauma center was associated with a 2.9-day reduction in hospital stay and an average savings of $7,525 per patient.[18] Similarly, longitudinal analyses of trauma patients who received targeted mental health interventions demonstrated significant reductions in emergency department visits and inpatient utilization over a five-year period, with clear economic benefit.[19] These findings suggest that early recognition and treatment of trauma-related psychiatric conditions not only improve patient outcomes but also reduce the financial burden on hospitals, decreasing the need for institutions to allocate additional providers and resources for prolonged or preventable complications.

As orthopedic surgeons, we are often focused on objective healing—fracture union, range of motion, gait mechanics—but healing cannot be measured solely on radiographs or goniometers. If we fail to acknowledge

the psychological injuries that accompany physical trauma, we miss a vital opportunity to treat the whole patient.

Limitations

This study has several limitations. Data collection was heavily reliant on bedside staff compliance; some patients admitted in the study time frame were not assessed for appropriateness of administration and ultimately did not receive the screening, which could result in selection bias, and screening capture was therefore incomplete (57.3% of orthopedic trauma patients). The PDI is a risk-screening tool rather than a diagnostic instrument, and we lack data on subsequent formal diagnoses or treatment completion; data on actual completion of psychiatry consults or patient follow-through were not available from the hospital system at the time of this review. Temporal trends in screening compliance over the 14-month period were not analyzed. Finally, as a single-center retrospective series, generalizability is limited.

CONCLUSION

Implementation of a risk-stratifying screening and referral process illuminates the prevalence of ASD/PTSD predictors in trauma patients. Identifying patients in need of intervention can help optimize post-injury psychological and physiological outcomes.

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