Association of Pain after Trauma with Long-term Functional and Mental Health Outcomes

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Abstract

**Background:** Chronic pain after trauma is associated with serious clinical, social, and economic burden. Due to limitations in trauma registry data and previous studies, the current prevalence of chronic pain after trauma is unknown, and little is known about the association of pain with other long-term outcomes. We sought to describe the long-term burden of self-reported pain after injury, and determine its association with positive screen for posttraumatic stress disorder (PTSD), functional status, and return to work.

**Methods:** Trauma survivors with moderate or severe injuries and one completed follow-up interview at either 6- or 12-months post-injury were identified from the Functional Outcomes and Recovery after Trauma Emergencies (FORTE) project. Multivariable logistic regression models clustered by facility and adjusting for confounders were used to obtain the odds of positive PTSD screening, not returning to work, and functional limitation at 6- and 12-months after injury, in trauma patients who reported to have pain on a daily basis compared to those who did not.

**Results:** We completed interviews on 650 patients (43% of eligible patients). Half of patients (50%) reported experiencing pain daily, and 23% reported taking pain medications daily between 6- and 12-months post-injury. Compared to patients without pain, patients with pain were more likely to screen positive for PTSD (OR: 5.12 [2.97-8.85]), have functional limitations for at least one daily activity (OR: 2.42 [1.38-4.26]), and not return to work (OR: 1.86 [1.02-3.39]).

**Conclusions:** There is a significant amount of self-reported chronic pain after trauma, which is in turn associated with positive screen for PTSD, functional limitations, and delayed return to work. New metrics for measuring successful care of the trauma patient are needed that span beyond mortality, and it is important we shift our focus beyond the trauma center and towards improving the long-term morbidity of trauma survivors.
Keywords: Pain, PTSD, functional outcomes, return to work, trauma

Level of Evidence: Level III - Therapeutic/Care Management
Background

Chronic pain is a leading cause of disability in the United States (US), and one of the most frequently cited reasons for physician visits.\(^1\) The prevalence of chronic pain in the US is substantial, with nearly 100 million Americans suffering from chronic pain conditions.\(^2\) Survivors of trauma are at increased risk of developing chronic pain after acute treatment of their injuries, which is defined as any pain lasting more than 12 weeks. According to the National Study on Costs and Outcomes of Trauma (NSCOT) conducted in 2001-2002, the prevalence of chronic pain was estimated to be 63% at 12-months after a major injury.\(^3\) And there are economic consequences as well, with posttraumatic chronic pain responsible for between 20-40% of all causes of chronic pain, the national cost of which is $560-635 billion per year.\(^1,4\)

Despite the estimated high prevalence of chronic pain after traumatic injury, there are two major limitations in the current evidence-base regarding post-trauma chronic pain. The first limitation is that nearly all research relies on evidence derived from patient samples that include only specific subsets of trauma patients, such as Traumatic Brain Injury (TBI) patients, or orthopedic trauma patients.\(^5-11\) This is partially due to the paucity of data surrounding the long-term recovery process of trauma patients.\(^12\) Therefore, evidence on posttraumatic chronic pain often excludes important sub-populations of trauma patients, such as victims of torso injuries, falls, and polytrauma. The most recent comprehensive evaluation of pain after trauma for patients of all injury types was the NSCOT, conducted nearly 15 years ago.\(^3,13\) Due to great advances in trauma medicine over the last decade, it is important to see whether there have been changes in pain prevalence after trauma, as well as whether differences exist by injury type in long-term pain burden.
A second limitation in the post-trauma pain literature is that outcomes have generally been studied in isolation, with few studies examining the association of posttraumatic chronic pain with other long-term impacts of injury, such as physical functioning and mental health. Among orthopedic and TBI patients injured in motor-vehicle crashes, it has been postulated that posttraumatic chronic pain may play a large role in functional impairment and delayed return to work, however little is known about the impact of pain on functional impairment in other groups of trauma patients. Additionally, it has been hypothesized that pain after trauma is associated with psychiatric conditions such as posttraumatic stress disorder (PTSD) and high levels of anxiety and depression. The relationship between chronic pain and psychiatric conditions has implications for pain management, as evidence supports that patients with psychiatric conditions such as depression or PTSD are more likely to receive prescriptions for long-term opioids, which may lead to chronic dependence and abuse. Furthermore, it is well known that inadequately controlled chronic pain is a pathway to opioid misuse and the development of opioid use disorders. It is important we gain an understanding of the comorbidity of pain, mental health, and physical functioning after trauma, as their intersection has implications for potential multi-level interventions.

In this study, we sought to describe the burden of self-reported pain at 6- and 12-months post-injury among trauma patients with any injury type, and determine the association of pain with important long-term Patient Centered Outcomes (PCOs) such as positive screen for PTSD, functional status, and return to work. We hypothesized that self-reported pain is independently associated with poor mental and physical long-term outcomes after trauma, regardless of injury type.
Methods

Data Source and Setting

The National Academies of Medicine recently called for the collection of long-term PCOs to assess trauma care quality in a way that better reflects patients’ post-injury experience. The Functional Outcomes and Recovery after Trauma Emergencies (FORTE) project accomplishes this through a multi-center collaboration among three Boston level 1 trauma centers, which have begun to routinely collect long-term functional and PCO measures after moderate or severe trauma admissions, and incorporate these data into trauma registries. This PCOs dataset uniquely enables us to examine long-term pain outcomes after injury. Data collection began at one study site in December 2015, and two additional study sites were added in June 2016. Patients were given the option to provide data via telephone, paper or emailed questionnaires. Linkage of these patient-reported data with institutional trauma registry data provided demographic and clinical information from the index hospitalization. The FORTE project data have been described in detail previously.

Study Population

In this pilot study, we included patients identified from the FORTE project who had at least moderate injury (Injury Severity Score [ISS] ≥9) and completed one follow-up interview at either 6- or 12-months post-injury. We excluded those who had caregivers complete the interview, as this abbreviated data collection procedure did not collect information on pain or PTSD screening.

Assessment of Pain

Self-reported pain was assessed at 6- or 12-months after injury using two validated instruments: The Trauma Quality of Life (TQoL) and the Short-Form 12 version 2 (SF-12). The TQoL is a trauma-specific quality of life instrument developed using trauma patients’ and
caregivers’ psychosocial experience as a foundation. Three questions were extracted from the physical well-being domain of the TQoL to evaluate pain: “I have pain on a daily basis,” “I take pain medications daily,” and “Pain limits what I am able to do.” The physical well-being domain of the TQoL has shown to have strong inter-item reliability (Cronbach’s α score >0.7) and significant correlation with the SF-36 version 2 physical component score, a well validated and standardized measure of general health-related quality of life. Self-reported pain was defined as a positive answer to any of the TQoL pain questions.

The SF-12 is a well-recognized and validated instrument used to assess general health-related quality of life. The Bodily Pain subscale of the SF-12 questionnaire was used to measure the degree of pain interference with normal work: “During the past four weeks, how much did pain interfere with your normal work including both work outside the home and housework?”. Participants respond on a 1 to 5 scale, where 1 means not at all and 5 means extremely. SF-12 scores are represented as t-scores with a population mean of 50 and a standard deviation of 10, in which 0 represents the lowest level of health and 100 the highest.

Posttraumatic Stress Disorder

Screening of PTSD was assessed at 6- or 12-month post-injury with the Breslau 7-item questionnaire. This instrument was derived from the modified National Institute of Mental Health Diagnostic Interview Schedule and the World Health Organization (WHO) Composite International Diagnostic Interview, version 2.1. The Breslau 7-item scale has 80% sensitivity and 97% specificity for a DSM-IV PTSD diagnosis when 4 out of 7 answers are positive. To describe management of PTSD, we extracted the percentage of patients reporting PTSD treatment at the time of data collection, the percentage who were referred for PTSD treatment, and the percentage who refused referral.
Functional Outcomes and Work Status

Functional outcomes were evaluated using the functional engagement domain of the TQoL and the physical functioning subscale score of the SF-12. The functional engagement domain of the TQoL contains questions on the need for assistance with eight daily activities: driving, walking upstairs, walking on flat surfaces, dressing, showering, eating, going to the bathroom, and cooking. In order to assess patients’ baseline functional status, an additional question asking if the physical limitation was present before the injury was introduced when patients answered positively.

Two questionnaire items were used to assess return to work. Patients were asked whether they were working or not the month prior to the injury and at the time of the interview. As is typical of employment analyses, only individuals working before injury were included in the return to work analyses.  

Statistical Analysis

Six and twelve months interviews were analyzed combined since previous analyses in this population have shown that outcomes do not differ significantly from the 6- to the 12-months’ time points. Patient demographics, clinical characteristics, and outcomes of interest were described and compared between patients who reported pain and those who did not using non-parametric tests (Wilcoxon rank sum) or parametric tests (t-tests) for continuous variables, and Chi-square tests or Fisher’s exact tests for categorical variables as appropriate. We used multivariate logistic regression models to assess for independent associations between self-reported pain and PTSD screening, functional outcomes, and return to work at 6- or 12-months after injury. Regression models were clustered by trauma center using bootstrapping methods with 300 repetitions and adjusted for scientifically relevant demographic and clinical characteristics used in previous studies: age, sex, race, education level, injury mechanism, ISS,
pre-injury major psychiatric illness (National Trauma Data Standard definition), number of pre-
injury co-morbidities, mechanical ventilation, intensive care unit admission, hospital length of
stay, and drug use. Logistic regression models of not returning to work included only the
subsample of patients who were working prior to injury. Sub-set analyses by mechanism of
injury and injury location were performed assessing associations between self-reported pain and
each of the study primary outcomes. Sensitivity analysis by time of follow-up (6- and 12-months
after injury) was performed.

Interviews with missing data were excluded, consistent with a complete case analysis
approach. Two-sided \( p \)-values of <0.05 were used to determine statistical significance. Data
analyses were performed using the statistical software STATA version 14.0 (StataCorp, TX,
USA).

Results

Among 844 participants included in the FORTE project, 650 (344 and 306 interviewed at
6- and 12-months after injury, respectively) were included in the present analysis. One-hundred
forty-nine caregiver interviews and 45 incomplete interviews were excluded (Figure 1).
Participants’ demographic and clinical information is described in Table 1. Half of patients
(325/650) reported having pain on a daily basis, 23% (151/650) were taking pain medications
daily, and 46% (302/650) reported that pain limited the things they were able to do. SF-12 bodily
pain sub-scale score was consistent with these results with a mean of 44.9 (SD 13.4). TQoL and
SF-12 bodily pain sub-scale results were significantly negatively correlated (coefficient: -0.60 p:
<0.001).
Time of follow-up did not have an impact on the prevalence of pain in this patient population. Prevalence of daily pain was 50% at both 6- and 12-months after injury time-points. The prevalence of pain among patients with head injuries was 42% (105/249), 56% (231/414) in orthopedic injuries, 55% (111/201) in torso injuries, 60% (127/213) in road traffic injuries, 46% (159/348) in falls, and 55% (43/78) in polytrauma.

Compared to patients without pain, patients with self-reported daily pain at 6- or 12-months after injury were more likely to be younger, have a baseline major psychiatric illness, higher length of stay, extremity injuries, be discharged to rehabilitation, and less likely to have head injuries (Table 1). Further, patients with a trauma-related readmission (64% vs. 47%, p: 0.002) and who screened positive for drug use confirmed by test on arrival (67% vs. 49%, p: 0.018) were more likely to report pain in the long-term. No differences were found in the prevalence of chronic pain among patients with (52%) versus no (49%) in-hospital complications (p: 0.582), nor among patients with positive screening (48%) versus negative screening (50%) for alcohol use on arrival (p: 0.656). Baseline alcoholism was also not associated with a higher prevalence of chronic pain after trauma (p: 0.856).

A total of 23% of patients screened positive for PTSD. Among patients who screened positive for PTSD, 53% were referred to appropriate clinical services, 21% were already receiving treatment, counseling or had already been referred, and 26% refused the referral. Additionally, 31% of participants reported having a physical limitation directly attributed to trauma for at least one daily activity, and 41% of patients previously working had not returned to work. As with the pain assessment, SF-12 physical functioning sub-scale scores were consistent with TQoL results: 42.7 (SD 12.6).
All the studied long-term outcomes were significantly associated with self-reported chronic pain after trauma. Patients with pain were more likely to screen positive for PTSD, have functional limitations for at least one daily activity, and not return to work in both unadjusted analysis (Figure 2) and after adjusting for confounders (all \( p<0.001 \)) (Table 2). Figure 3 illustrates the association of pain with physical functioning by PTSD screening. Subset analysis by injury location (head, torso, and extremities) and mechanism of injury (falls and road traffic injuries) showed similar results on PTSD screening and functional status. However, no differences were found between patients with and without pain in functional status in TBI and road traffic injury subsets (Table 3).

Sensitivity analysis by interview time (6- and 12-months after injury) showed similar findings regarding self-reported pain, PTSD screening, functional limitation, and return to work prevalence (see Table, Supplemental Digital Content 1, http://links.lww.com/TA/B188). Furthermore, similar results were also found in both 6- and 12-months after injury cohorts when looking at the associations between self-reported pain, PTSD screening, functional limitation, and return to work in both unadjusted and adjusted analyses (Table 2).

**Discussion**

In this pilot study of trauma survivors using a PCOs data registry from three major northeast trauma centers, we found half of participants reported living with daily pain at 6 or 12-months after injury. Further, after controlling for potential confounders, trauma patients reporting pain were more likely to screened positive for PTSD, have diminished functional status, and not return to work compared to those without pain.

These findings are consistent with and extend those from prior reports.\(^{14,33-35}\) Conducted 15 years ago, the NSCOT reported nearly 20% of trauma patients screen positive for PTSD, 45% have not yet returned to work, and 63% have continued pain.\(^3,14\) Despite the increasing use of
opioids in the U.S since this report, there has been no substantial change in the amount of chronic pain reported by trauma survivors.

The association of patient-reported pain with higher odds of positive PTSD screening (OR 5.21) is consistent with other studies documenting similar psychological sequelae of TBI, extremity injuries, and road traffic injuries. Our results extend these findings by suggesting the impact of pain on psychological morbidity is not limited to these specific subsets of trauma patients, as positive PTSD screening was found at 6- or 12-months post-injury among patients with different types of injury and injury body location, including traumatic torso injuries and falls. Furthermore, we found that patients with chronic pain were more likely to be younger and have a previous major psychiatric illness, which can help explain this association. Psychological distress and functional loss are known contributors to emotional dimensions of pain, which are often under-diagnosed and refractory to pharmacologic treatment. Accordingly, among participants who reported symptoms of PTSD at 6 or 12-months post-injury, treatment for PTSD was reported by only 17% and 29%, respectively. Given that nearly a quarter of patients in this study screened positive for PTSD, it is important that providers recognize the increased risk of mental health issues faced by trauma survivors.

This study’s finding of the association of self-reported pain with other markers of morbidity is also consistent with the literature surrounding orthopedic trauma and TBI patients, demonstrating pain as a predictor of physical disability and delayed return to work. Despite not being statistically significant in the 6-month cohort (due to the high variability of this cohort’s data), pain and functional limitations were associated in the overall trauma population. However, we found conflicting findings with previous literature when looking specifically at TBI patients. For this subset of patients, we did not find an association between pain and functional limitation for daily activities. This conflicting result may be due to the exclusion of
mild to moderate brain injuries in previous studies, and the use of a different instrument to gauge functional limitation. In our study, we used a trauma-specific quality of life measure to assess change in functional outcomes directly attributed to the trauma, excluding the possibility of having patients with functional impairment at baseline or due to other conditions. This study also found an association between pain and functional limitation in patients with torso injuries or falls as mechanism of injury. These results expand upon the body of literature surrounding the association of pain and functional limitation to injury types and mechanisms that have not been studied previously.

These results also demonstrate that there is an urgent need for post-discharge interventions to improve pain and other associated sequelae. Interventions aimed at connecting trauma survivors with resources may be an effective way to reduce long-term psychological or functional burden, and have shown to be successful in the past. For example, a randomized stepped care intervention by Zatzick and colleagues\textsuperscript{38} found that screening trauma survivors for PTSD and early intervention was associated with significant improvement in physical function.

This study is not without limitations. First, as inherent to cross-sectional analyses, we cannot make any causal inference between self-reported pain and the studied outcomes. This includes an inability to rule out that pain may be acting as a mediator between psychological and physical outcomes. Second, this study only captures patients at 6- or 12-months post injury. Longitudinal and longer follow-up is needed to further characterize the recovery trajectories of trauma patients related to mental health, functional recovery, and pain symptoms. Third, the FORTE study has reported response rates of 43%, with non-participants being comparatively younger.\textsuperscript{28} This age-related potential response bias was unintentionally compensated for on this study after excluding caregiver interviews, which are from significantly older patients. Lastly,
the observed results may be affected by secondary gain which was not completely addressed in the models and is associated with worse outcomes.

The findings of this study suggest trauma patients exhibit a high burden of long-term chronic pain, which is in turn associated with positive PTSD screening, functional limitations, and delayed return to work. This substantial burden of long-term suffering is a clear indication that the impact of trauma goes beyond the isolated incident of acute injury, and interventions are needed to improve the long-term physical and mental health outcomes of trauma patients. New metrics for measuring successful care of the trauma patient are needed that span beyond mortality, and it is important we shift our focus beyond the trauma center and towards improving the long-term morbidity of trauma survivors.

Author contribution
JPHE, MA, CW, and SSAR performed the data collection. All the authors participate in the study design, data analyses, and manuscript drafting.
References


8. Williamson OD, Epi GD, Gabbe BJ, Physio B, Cameron PA, Edwards ER, Richardson MD; Victorian Orthopaedic Trauma Outcome Registry Project Group. Predictors of moderate or


Figure Legends

Figure 1: Legend: Study flow diagram

Figure 2: Title: Pain and PCOs after Trauma
Legend: Percentage of patients with pain on a daily basis after injury by PTSD screening, functional status, and work status. Functional limitation: patients with physical limitation for at least one daily activity.

Figure 3: Title: Associations between pain and SF-12 Physical Functioning subscale by PTSD screening.
Legend: SF-12 Physical Functioning Subscale Score is represented as t-score with a population mean of 50 and a standard deviation of 10, in which 0 represents the lowest level of health and 100 the highest.
Figure 1

2,045 eligible trauma patients

1,201 patients lost to follow-up or declined to participate

844 patients followed-up

Excluded patients
- 149 caregiver interviews
- 45 incomplete interviews

650 patients included

344 patients interviewed at 6 months after injury

306 patients interviewed at 12 months after injury
Figure 2
Figure 3
## Table 1: Participants Clinical and Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Pain (n=325)</th>
<th>No pain (n=325)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age years, mean (SD)</td>
<td>53 (19.2)</td>
<td>56 (21.9)</td>
<td>0.048</td>
</tr>
<tr>
<td>Sex, male</td>
<td>56%</td>
<td>59%</td>
<td>0.383</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td>0.789</td>
</tr>
<tr>
<td>White</td>
<td>74%</td>
<td>77%</td>
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</tr>
<tr>
<td>Black or African American</td>
<td>17%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>9%</td>
<td>8%</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td>0.112</td>
</tr>
<tr>
<td>Some high school</td>
<td>12%</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>High school graduate or GED</td>
<td>37%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>College or professional school</td>
<td>34%</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>Advanced degree</td>
<td>16%</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>Insurance*</td>
<td></td>
<td></td>
<td>0.116</td>
</tr>
<tr>
<td>Private</td>
<td>55%</td>
<td>49%</td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>45%</td>
<td>51%</td>
<td></td>
</tr>
<tr>
<td>Injury cause</td>
<td></td>
<td></td>
<td>0.020</td>
</tr>
<tr>
<td>Falls</td>
<td>49%</td>
<td>58%</td>
<td></td>
</tr>
<tr>
<td>Road traffic injuries</td>
<td>39%</td>
<td>27%</td>
<td></td>
</tr>
<tr>
<td>Blunt assault</td>
<td>2%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Penetrating</td>
<td>5%</td>
<td>6%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>5%</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Injury Severity Score, mean (SD)</td>
<td>14.4 (7.4)</td>
<td>14.3 (7.3)</td>
<td>0.839</td>
</tr>
<tr>
<td>Head injuries (AIS≥2)</td>
<td>32%</td>
<td>44%</td>
<td>0.002</td>
</tr>
<tr>
<td>Torso injuries (AIS≥2)</td>
<td>34%</td>
<td>28%</td>
<td>0.075</td>
</tr>
<tr>
<td>Extremities injuries (AIS≥2)</td>
<td>71%</td>
<td>56%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Polytrauma (AIS≥3 at least two regions)</td>
<td>13%</td>
<td>11%</td>
<td>0.334</td>
</tr>
<tr>
<td>Major psychiatric illness</td>
<td>21%</td>
<td>12%</td>
<td>0.005</td>
</tr>
<tr>
<td>ICU admission</td>
<td>35%</td>
<td>37%</td>
<td>0.625</td>
</tr>
<tr>
<td>Ventilator</td>
<td>14%</td>
<td>11%</td>
<td>0.280</td>
</tr>
<tr>
<td>Length of stay (days), median (IQR)</td>
<td>5 (3-8)</td>
<td>4 (2-6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Any orthopedic surgical procedure</td>
<td>59%</td>
<td>40%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Any in-hospital complication</td>
<td>25%</td>
<td>23%</td>
<td>0.582</td>
</tr>
<tr>
<td>Trauma-related readmission</td>
<td>19%</td>
<td>11%</td>
<td>0.002</td>
</tr>
<tr>
<td>Discharge disposition</td>
<td></td>
<td></td>
<td>0.002</td>
</tr>
<tr>
<td>Home</td>
<td>27%</td>
<td>41%</td>
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<tr>
<td>Home with health services</td>
<td>20%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td>Rehabilitation facility</td>
<td>42%</td>
<td>33%</td>
<td></td>
</tr>
<tr>
<td>Nursing home/Skilled nursing facility</td>
<td>9%</td>
<td>9%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2%</td>
<td>2%</td>
<td></td>
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*Missing data in 16% of patients*
<table>
<thead>
<tr>
<th></th>
<th>Overall cohort</th>
<th>6-months</th>
<th>12-months</th>
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<tbody>
<tr>
<td></td>
<td>Odds ratio [95% Confidence interval]</td>
<td>Odds ratio [95% Confidence interval]</td>
<td>Odds ratio [95% Confidence interval]</td>
</tr>
<tr>
<td>Functional limitation**</td>
<td>2.42 [1.38-4.26]$^b$</td>
<td>2.80 [0.87-9.01]</td>
<td>2.12 [1.59-2.83]</td>
</tr>
<tr>
<td>Have not return to work</td>
<td>1.87 [1.27-2.75]$^c$</td>
<td>2.32 [1.23-4.38]</td>
<td>2.02 [1.50-2.72]</td>
</tr>
</tbody>
</table>

Ref: Patient who didn’t report to have pain daily. H-L GOF: Hosmer-Lemeshow goodness of fit test
*Positive screening according to Breslau scale; **Physical limitation for one or more daily activities
$^a$ ROC curve: 0.83, H-L GOF: $p$ 0.154; $^b$ ROC curve: 0.75, H-L GOF: $p$ 0.412; $^c$ ROC curve: 0.76, H-L GOF: $p$ 0.339.
Table 3. Adjusted associations between pain and long-term patient centered outcomes by injury body location and mechanism

<table>
<thead>
<tr>
<th>Pain at 6- or 12-months post-injury</th>
<th>Posttraumatic stress disorder*</th>
<th>Functional limitation**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traumatic brain injuries†</td>
<td>3.67 [3.20-4.20]</td>
<td>1.07 [0.92-1.24]</td>
</tr>
<tr>
<td>Traumatic extremity injuries‡</td>
<td>3.29 [2.54-4.27]</td>
<td>2.50 [1.17-5.26]</td>
</tr>
<tr>
<td>Traumatic torso injuries†</td>
<td>4.27 [2.42-7.57]</td>
<td>1.78 [1.43-2.22]</td>
</tr>
<tr>
<td>Road traffic injuries</td>
<td>5.58 [3.47-8.99]</td>
<td>1.85 [0.78-4.40]</td>
</tr>
<tr>
<td>Fall injuries</td>
<td>4.14 [2.49-6.86]</td>
<td>2.35 [1.22-4.50]</td>
</tr>
</tbody>
</table>

Ref: Patient who didn’t reported to have daily pain
*Positive screening according to Breslau scale; **Physical limitation for one or more daily activities
†: Head Abbreviated Injury Scale (AIS) ≥2; ‡: extremities AIS ≥2; T: abdomen or thorax AIS ≥2