Position Statement

Psychosocial Factors Associated with Patient Outcomes in Adult Orthopaedic Trauma

This Position Statement was developed as an educational tool based upon the opinion of the authors. It is not the product of an up-to-date systematic review. Readers are encouraged to consider the information presented and reach their own conclusions.

The American Academy of Orthopaedic Surgeons (AAOS) recognizes the influence of psychosocial factors on outcomes in adults following orthopaedic trauma. It is recommended that several factors be incorporated into the assessment and management of patients with these injuries. Future research on orthopaedic trauma outcomes should systematically evaluate the role of psychosocial factors.

Current evidence regarding mental and social health influences on recovery from injury consists largely of correlations and associations with a few preliminary studies of treatment interventions. As documented in this report, there is consistent, compelling, and increasing evidence that mental and social health are associated with symptom intensity and magnitude of limitations after adult orthopedic trauma injuries.

There is reasonable evidence to consider key psychosocial factors in assessment and treatment planning. There appears to be low risk of harm in evaluating psychosocial factors. Evidence for how best to screen patients and evaluate these factors and their effects is limited and requires further study.

Assessing and addressing these psychosocial factors while planning treatment of trauma patients is consistent with recommendations of the American College of Surgeons for best practice in trauma centers.[1] Psychosocial factors to be considered are delineated, below. This topic was also addressed in a now-sunsetted AAOS Clinical Practice Guideline, published studies referenced herein are cited along with the quality of evidence as determined in the prior systematic review (Keizer 2022)[2].

Pre-Morbid Psychiatric Conditions

Multiple studies have examined the relationship between pre-morbid psychiatric conditions and negative patient outcomes in adult orthopaedic trauma. In these studies, pre-morbid psychiatric conditions included either a specific condition, including post-traumatic stress disorder (PTSD), or the presence of any psychiatric medical comorbidity. In a 2007 study by Zatzick[3], pre-injury

psychiatric diagnoses (including alcohol/substance use and depression) were accounted for in the statistical analysis. Despite adjustment, post-injury PTSD and depression remained independently associated with higher odds of impairment in daily activities, poorer physical and mental health, and reduced productivity. While the quality of evidence was rated as low, the findings highlight important associations between psychiatric conditions and post-injury outcomes. In another low-quality study by Shields (2015)[4], the presence of any pre-injury psychiatric history was associated with lower odds of having a satisfactory Physical Components Summary Score and Mental Components Summary Score as measured by the SF-12 questionnaire. Additionally, the study found that any pre-morbid psychiatric history was associated with lower odds of a satisfactory Simple Shoulder Test. However, the association between pre-injury psychiatric diagnosis and satisfactory Disabilities of the Arm, Shoulder, and Hand (DASH) score was not significant. One low quality study examined pre-injury psychiatric diagnosis in a military population of 772 individuals and found the presence of a pre-injury psychiatric diagnosis is associated with higher odds of developing PTSD as well as higher odds of substance abuse (Melcer, 2013)[5].

Interaction of the Psychological State with Trauma

Trauma itself may lead to or exacerbate psychological conditions. Examples of psychological states that can interact with trauma and negatively affect outcomes are discussed below with supporting evidence.

Anxiety

Studies which indicate anxiety is a factor associated with worsened biopsychosocial outcomes in orthopaedic trauma are few, with just one recent high quality retrospective observational study of 601 patients (Castillo, 2013)[6] indicating that increased anxiety at six and twelve-months post-injury is associated with increased anxiety and pain at 18 and 24 months. Additional low-quality studies (Bosma, 2004, O'Toole, 2008)[7,8] also support this association. Research studies have used the Brief Symptom Inventory (BSI) Anxiety Scale and the Hospital Anxiety and Depression Scale (HADS) to screen and diagnose anxiety, respectively.

Depression

One high quality study (Castillo, 2013)[6] found that increased depression at 6 months leads to increased depression at 12 months, and increased depression at 12 months leads to increased depression at 24 months. Increased scores on the Brief Symptom Inventory (BSI) Depression Scale are associated with decreased functional outcomes (Wegener, 2011)[9]. Two moderate quality studies (Bosma, 2004, Papadakaki, 2017)[7,10] suggested depressive symptoms at baseline with the Center for Epidemiologic Studies Depression Scale (CES – D) greater than or equal to 16 are associated with higher odds of depression at 6 months and with post-treatment depression at 1 year; both studies showed associated negative patient outcomes. Two moderate quality

studies (O'Toole, 2008, Hou, 2013)[8, 11] suggested higher Brief Symptom Rating Scale (BSRS-5) scores are associated with lower EQ-5D Quality of Life (QOL) and decreased odds of satisfaction; both were associated with negative patient outcomes. Also, two moderate quality studies (Nota, 2015, Rivara, 2008) [12,13] found depression measured by CES - D and depression before injury was found to be significantly associated with inferior patient outcomes in bivariate analysis. Five low quality studies (Zatzick, 2007, Wegner, 2011, Schweininger, 2015; Zatzick, 2008, Archer, 2015)[3,9,14,15,16] found depression by a variety of measures is associated with negative patient outcomes. We did not identify any studies that found depression to be associated with positive outcomes.

Post-Traumatic Stress Disorder

Three low quality (Scweininger, 2015, Zatrzick, 2008, Liedl, 2010)[14,15,17] and one moderate qualitystudies (Papadakaki, 2017)[10] found a significant association between PTSD and negative patient outcomes including pain, function, anxiety, depression, mental health, and return to activity/work. One study (Schweininger, 2015)[14] showed a significant relationship of PTSD 3 months after the traumatic injury with negative outcomes 12 months after injury. Only one moderate quality study (Nota, 2015)[12] of 130 patients found a significant relationship between PTSD and patient outcomes in bivariate analyses, and we did not identify any studies showing an association of PTSD with positive outcomes.

Low Resilience (i.e. Limited Self-Efficacy, Less Effective Coping Strategies)

Two moderate (Hou, 2013, Schnyder, 2001b)[11,18] and four low quality (Ni, 2013, Soberg, 2010 and 2012, Tuncay, 2015)[19-22] studies found certain coping strategies were associated with positive patient outcomes (including quality of life, functional ability, PTSD, mental health, and varying degrees of post-traumatic growth). Six moderate quality (Bosma, 2004, Walsh, 2016, MacKenzie, 2006, Rusch, 2003, Schnyder, 2001b, Schnyder, 2003)[7,23-27] and ten low quality (Archer, 2015,Hou, 2008, Vranceanu, 2014, Clay, 2010, Steven, 2010, MacKenzie, 2004 and 2005, Bosse, 2002, Castillo, 2011, Bot, 2011)[16,28-36] studies showed significant associations between negative patient outcomes and negative cognitive perspectives (catastrophic thinking, low self-efficacy, low resilience, etc.). One study (Hou, 2013,)[37] found significant associations at the bivariate level between self-efficacy and patient outcomes. We did not identify any studies that associated negative cognitive perspectives with positive patient outcomes.

Worker's compensation

The extant literature consistently demonstrates that workers' compensation (WC) designation is associated with markedly inferior clinical outcomes, with relative risk rates two to three times greater when compared to patients without workers compensation designations (De Moraes et al., 2012; Fujihara, 2017).[38, 39] This association extends across multiple outcome domains, as evidenced by a 2015 systematic review revealing moderate quality evidence for a robust

relationship between active compensation claims and diminished physical function, alongside strong quality evidence linking workers' compensation status to inferior psychological outcomes (Murgatroyd, 2015).[40] Furthermore, workers' compensation status emerges as a particularly salient predictor of delayed functional recovery, with a 2020 systematic review of biopsychosocial prognostic factors identifying WC status as a strong predictor of failure to return to work beyond six months post-injury following acute orthopedic trauma (Duong, 2022).[41] These convergent findings underscore the necessity of considering WC status as a prognostic variable in clinical decision-making and outcomes prediction models.

Lower Education Level

One high quality (Hou, 2012)[42], six moderate quality (Bosma, 2004, Holtslag, 2007, Kugelman, 2018, MacDermid, 2002, MacKenzie, 2004/2006)[7,32,44-47], and nine low quality (Archer, 2015, Soberg, 2007/2012, Clay, 2010, MacKenzie, 1998/2005, Bosse, 2002, Castillo, 2011, Pezzin, 2000,)[16,20,21,30,33-35,48,49] studies found a significant association between higher education levels and improved patient outcomes. Outcomes included pain, quality of life, return to activity/work, mental health, function, anxiety, and overall Sickness Impact Profile (SIP) score. However, five moderate quality (O'Toole, 2008, Papadakaki, 2017,Hou, 2013, Nota, 2015, Walsh, 2010)[8,10,11,12,50] and six low quality (Hou, 2008, Andrew, 2008/2012, Ouellet, 2009, Ponsford, 2008, Soberg, 2011)[28,51-55] studies found no significant relationship between education level and patient outcome. We were unable to identify studies that associated lower education levels with positive outcomes.

Less Social Support

One high quality study (Hou, 2012)[42] compared return to work outcomes in married versus single, divorced, or widowed patients. Return to work time was found to be slower in single, divorced, or widowed patients and average or faster in married patients. One moderate strength study (Papadakaki, 2017)[10] found that divorced and widowed patients had higher odds of depression compared to single patients at six months.

Two low-quality studies (Bosse, 2002, Castillo, 2011)[34,35] demonstrated an association of lower overall SIP scores with higher social support scores. Additionally, a low quality study (Soberg, 2012)[21] found that better SF-36 questionnaire scores at the five-year mark for those with higher levels of societal participation; another study (Ouellet, 2009)[53] found that greater social support decreases the risk of poor mental health in trauma patients. Compared to patients with low social functioning, those with higher social functioning took less time off from work after traumatic injury according to one low-quality study (Clay, 2010)[30], and another study (Soberg, 2012)[21] found that higher social functioning is associated with a higher probability of return to work.

Other Considerations:

The following additional factors may be associated with greater biopsychosocial symptom intensity, a greater magnitude of limitations, and/or a diminished health related quality of life:

- Low income
- Lack of employment
- Pre-injury exposure to combat related circumstances

Two moderate quality studies (MacKenzie, 2004, Kugelman, 2018)[32,45] and three low quality studies (Soberg, 2012, MacKenzie, 2006, Ouellet, 2009,)[21,47,53] failed to demonstrate a significant relationship between employment type (blue collar vs white collar), employment status (employed vs unemployed), or income at or below poverty level with physical or mental health symptoms after injury.

One low quality study (Bosse, 2002)[34] suggested that income at/below poverty level predicted poorer outcome based upon SIP scores. Another low-quality study (Hebert, 2006)[57] demonstrated that pre-injury income of >$75,000 was associated with higher likelihood of return to work.

In military and veteran populations, one low quality study (Gunawardena, 2007)[58] demonstrated that war/combat exposures (i.e., being shot at, being threatened with arms, or witnessing war-related violence) predicted greater psychological distress after physical trauma.

Conclusion

Psychosocial factors represent important determinants of recovery following adult orthopaedic trauma. The available evidence, though often observational and variable in quality, consistently demonstrates associations between mental health, adaptive coping strategies, social support, educational attainment, workers' compensation status, and patient outcomes. These findings reinforce the importance of considering psychosocial elements as part of comprehensive, patient-centered care.

While further high quality research is needed to establish best practices for screening and intervention, the low risk of harm and potential for improved outcomes supports the integration of psychosocial assessment into routine clinical evaluation and treatment planning. Acknowledging these factors aligns with broader trauma care recommendations and offers a means to enhance recovery and functional outcomes in orthopaedic trauma patients.

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