E-ISSN: 3068-3726
Journal of Orthopaedic Science and Research

ATHENAEUM SCIENTIFIC PUBLISHERS

Short Communication

Beyond the Frame: Psychological Burden and Emotional Adaptation in Patient Undergoing External Fixation After Trauma

Meghana Nair[1,2], Ekrem M Ayhan[1,2], Bohdanna Zazulak[2], Cara Tomaso[3], Michael J Medvecky[2*]

[1]Frank H. Netter MD School of Medicine, Quinnipiac University, North Haven, CT, USA
[2]Department of Orthopaedics and Rehabilitation, Yale School of Medicine, New Haven, CT, USA
[3]Child Study Center, Department of Pediatrics, Yale School of Medicine, New Haven, CT, USA
***Correspondence author:** Michael J Medvecky, Department of Orthopaedics and Rehabilitation, Yale School of Medicine, New Haven, CT, USA; E-mail: michael.medvecky@yale.edu

Citation: Nair M, et al. Beyond the Frame: Psychological Burden and Emotional Adaptation in Patient Undergoing External Fixation After Trauma. J Ortho Sci Res. 2026;7(1):4.

https://doi.org/10.46889/JOSR.2026.7107

Received Date: 25-12-2025

Accepted Date: 27-01-2026

Published Date: 02-02-2026

Abstract

Background: External fixator devices are an additional treatment option for traumatic injuries to help immobilization of periarticular fractures and the tissue around it.

Purpose: The purpose of this review is to synthesize the literature centered around external fixation devices and the impact that they can have on the mental and psychological well-being of the patient.

Methods: The study aimed to examine the psychological impact of external fixation on patients through survey-based research design. This study assessed factors such as body image, anxiety and depressive symptoms during the post-operative period. Patients who had undergone external fixation for traumatic injuries were asked about their experience pre- and post-operative period to see the impact that external fixation devices can have on a patient's psychological well-being.

Results: Findings showed that psychological distress was greatest in patients undergoing external fixation devices post-traumatic injury. However, findings across studies vary widely regarding the psychological effects on patients, underscoring the need for further research to better understand these outcomes.

Conclusion: This review examined the psychological impact of external fixation following a traumatic injury, emphasizing the emotional challenges faced by patients during recovery.

Existing studies highlight early postoperative distress characterized by anxiety, loss of independence and altered body image. While some evidence suggests that patients gradually adapt to their circumstances overtime, findings across studies vary widely. Future research should continue to explore these factors with greater stratification by frame type and duration to better understand emotional recovery. Addressing these gaps will not strength the evidence base, but also enable orthopedic surgeons to deliver more holistic, patient-centered care that supports both physical healing and psychological well-being.

Keywords: External Fixator Device; Psychological Impact; Patient-Centered Care; Orthopedic Surgery; Traumatic Injury

Introduction

External fixator devices may be used as a treatment option for traumatic injuries due to its helpful nature of both immobilizing the fracture and minimizing additional soft tissue injury [1]. The usage of external fixation devices has since expanded to allow for uses in orthopedic traumatic situations, pediatric orthopedics with limb lengthening devices and even plastic surgery in situations with wanting to preserve the limb from infection and allow for soft tissue repair [2]. With the use of an external fixator device, the type of injury determines the type of frame applied and the procedure is often considered to be comparatively more minimally invasive [2].

Orthopedic surgery is often performed in various clinical situations with many procedures demonstrating significant pain reduction and successful outcomes. However, with many orthopedic traumas, there is a significantly high level of anxiety, depression and PTSD in patients, that can extend for years past initial insult [2,3]. Understanding the impact of these surgeries on patients' mental health and psychological experiences will allow for more comprehensive trauma care and more holistic approach to a patient's care. Mental health and surgical outcomes are an underexplored topic of research, with the importance of the psychological burden of surgery often being underexplored [3]. This commentary attempts to highlight the urgent need to recognize and address the psychological and mental health impact and challenges that traumatic injury patients undergoing external fixation surgery face, as it is often overlooked in the orthopedic recovery process.

Common Themes

Multiple studies have examined the psychological impact of external fixation on patients following traumatic injury, primarily using survey-based methods. Commonly reported issues included post-traumatic injury include body image disturbances, post-traumatic stress, disturbances in daily activity and distress especially during the early stages of post- operation recovery [4, 6-8].

Disturbances in Daily Activity

The study by Patterson, et al., provided early evidence of the association between the visibility of external fixation devices and disturbances in daily functioning. Adolescent participants expressed frustration and embarrassment stemming from their dependence on others for basic self-care activities, such as dressing and toileting. This loss of independence was perceived as a loss of pride, particularly when they are unable to perform routine daily activities that they would normally be able to do themselves. With the physical appearance and bulky appearance of the external fixator device, all the adolescents talked about the lack of control that they felt and even the changes in their mobility, but even their sleep [4]. The impact of sleep probably had to do with the bulky appearance of the external fixation device, but also from the impact that the traumatic injury had on the adolescents, as traumatic injuries can often lead to sleep disturbances and anxiety in adolescents [5]. The patients did notice how as time had gone on, they were able to adjust to life with the device by doing small tasks like using the bathroom unattended or helping with pin care [4].

Disturbances Early in Post-Operative Care

During the early postoperative period following the placement of an external fixator, patients frequently reported a loss of control over their daily activities, accompanied by higher rates of depression and anxiety [4,6]. In a study conducted by Jia, et al., the Hospital Anxiety and Depression Scale (HADS) was given to 96 patients (57 who underwent internal fixation device and 39 who went external fixation device) at multiple points including pre-operation and multiple points during their post-operative recovery period. It was seen that patients with external fixation device demonstrated significantly higher anxiety levels post-operation compared to patients with internal fixation devices. A similar trend was observed in postoperative depression scores, with patients treated using external fixation devices demonstrating higher levels of depressive symptoms compared to those who underwent internal fixation. Compared to the mental health component of the Short-Form-36 (SF-36), patients with external fixation had higher mean scores compared to those with internal fixation devices, showing that psychological distress is seen in patients during the early months of post-fixator [6]. In the Athens Insomnia Scale (AIS), patients with the internal fixation device showed a score of 2.82 ± 0.66 at 7 days post operation compared to the external fixation device showed a score of 11.33 ± 3.14. The external fixation device had the most significant increase in the scores between pre-operation to day 7 post-operation scores [6].

Adaptation to the External Fixation Device

In the immediate postoperative period, patients often struggle with the psychological impact of external fixation. Among adolescents, many initially described feelings of lost independence and frustration at needing assistance from caregivers of healthcare professionals for basic daily activities. In later stages of recovery, the same patients talked about regaining their autonomy by taking a more active role in their recovery process, such as pin cleaning and medication administration [4]. Marsh, et al., found that 43 patients with the external fixation, their mental health scores of the SF-36 seemed to improve to age matched norms by six months. The results from this paper seems to show that patients are able to cope with their injury as time has gone on [7]. However, some studies have also shown that after 12 months after frame removal, the mean 5-level EQ-5D version score was still lower than the normal values of the general Denmark population [8-11]. The variation in these findings suggests that long-term psychological and quality-of-life outcomes differ across studies, with some reporting greater levels of recovery among

patients than others.

Conclusion

Despite the studies currently available, there remains a notable lack of comprehensive research in this area. Previous research has shown that orthopedic surgeries have a negative impact of the psychological well-being of a patient with traumatic injuries. The external fixator device proves to be a bulky device and the bulkiness of the device with the visible appearance can contribute to the impact of the external fixation device. Studies have shown the negative impact of the external fixation, whether that is in sleep, body-image, depression/anxiety, and/or self-esteem changes. However, even with these studies, there lacks the proper research in the field of external fixation devices and psychological impact. The limited amount of research available on this topic has not allowed for stratification based on the frame characteristics such as size and anatomical location. Such stratification could provide valuable insight into how these factors influence the psychological and functional impact of the external fixation device. In addition, these studies did not provide detailed information of pre-existing mental health conditions of the patients, limiting the insight of how pre-existing psychological factors may have influenced the outcomes. Addressing this gap will not only strengthen the evidence base, but also enable orthopedic surgeons to provide more holistic, patient-centered care that acknowledges both the physical and psychological dimensions of recovery.

Conflict of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Funding Statement

This research did not receive any specific grant from funding agencies in the public, commercial or non-profit sectors.

Acknowledgement

We thank Xueying Ren for her assistance with our literature search.

Data Availability Statement

Not applicable.

Ethical Statement

The project did not meet the definition of human subject research under the purview of the IRB according to federal regulations and therefore, was exempt.

Informed Consent Statement

Informed consent was taken for this study.

Authors' Contributions

All authors have contributed significantly to the work, including data acquisition, analysis and interpretation of the findings. All the authors were involved in drafting, revising and reviewing the manuscript. They have approved the final version for publication.

References

1. Erwin ER, Ray KS, Han S. The hidden impact of orthopedic surgeries: Examining the psychological consequences. J Clin Orthop Trauma. 2023;47:102313.
2. Ayers DC, Franklin PD, Ring DC. The role of emotional health in functional outcomes after orthopaedic surgery: Extending the biopsychosocial model to orthopaedics. J Bone Joint Surg Am. 2013;95:e165.
3. Ayhan EM, Nair M, Levitt SJ, Levy BA, Medvecky MJ. Knee-spanning external fixation in the management of knee dislocations and multiligamentous knee injuries: A narrative review. Open Access J Sports Med. 2025;16:131-49.
4. Patterson MM. Adolescent experience with traumatic injury and orthopaedic external fixation: Forever changed. Orthop Nurs. 2010;29:183-92.
5. Rusch MD, Gould LJ, Dzwierzynski WW, Larson DL. Psychological impact of traumatic injuries: What the surgeon can do. Plast Reconstr Surg. 2002;109(1):18-24.

6. Jia Q, Peng Z, Huang A, Jiang S, Zhao W, Xie Z, et al. Is fracture management merely a physical process? Exploring the psychological effects of internal and external fixation. J Orthop Surg. 2024;19:231.
7. Marsh JL, McKinley T, Dirschl D, Pick A, Haft G, Anderson DD, et al. The sequential recovery of health status after tibial plafond fractures. J Orthop Trauma. 2010;24:499-504.
8. Elsoe R, Larsen P, Petruskevicius J, Kold S. Complex tibial fractures are associated with lower social classes and predict early exit from employment and worse patient-reported quality of life. Strategies Trauma Limb Reconstr. 2018;13:25-33.
9. Bhandari M, Busse JW, Hanson BP, Leece P, Ayeni OR, Schemitsch EH. Psychological distress and quality of life after orthopedic trauma: An observational study. Can J Surg. 2008;51(1):15-22.
10. Fragomen AT, Rozbruch SR. The mechanics of external fixation. HSS J. 2007;3:13-29.
11. Nair MV, Ayhan EM, Zazulak B, Tomaso C, Medvecky MJ. Psychological impact of external fixator devices on patients with traumatic injury: A scoping review. Trauma Care. 2025;5(4):28.

About the journal

Journal of Orthopaedic Science and Research is an international, peer-reviewed, open-access journal published by Athenaeum Scientific Publishers. The journal publishes original research articles, case reports, editorials, reviews, and commentaries relevant to its scope. It aims to disseminate high-quality scholarly work that contributes to research, clinical practice, and academic knowledge in the field.

All submissions are evaluated through a structured peer-review process in accordance with established editorial and ethical standards. Manuscripts are submitted and processed through the journal's online submission system.

Manuscript submission: https://athenaeumpub.com/submit-manuscript/