

# Kendrick Extrication Device and Mechanical Restraint: An Innovative Proposal for Its Application in Psychiatric Emergencies

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## Abstract

**Introduction:** Mechanical restraint is an exceptional intervention used in patients with severe psychomotor agitation and high-risk behaviors when less restrictive measures have failed. However, conventional thoracic restraint systems lack standardization and may be associated with respiratory complications, mechanical injuries, and medicolegal concerns. The Kendrick Extrication Device (KED), widely used for the extrication and immobilization of trauma patients, possesses structural characteristics that could make it a complementary alternative for trunk stabilization during mechanical restraint. **Objective:** To evaluate, through a critical review of the available literature and an analysis of the device's structural characteristics, the feasibility of using the Kendrick Extrication Device as a complementary tool for mechanical restraint in patients with severe psychomotor agitation, while examining its potential benefits, limitations, risks, and clinical, operational, and medicolegal implications. **Materials and Methods:** A critical narrative review of the scientific literature was conducted, focusing on the KED, prehospital immobilization, mechanical restraint, patient safety, respiratory complications, positional asphyxia, hyperactive delirium, and agitation associated with substance use. In addition, a comparative analysis of the biomechanical and operational characteristics of the KED and conventional thoracic restraint systems was performed. **Results:** The analysis identified potential structural and procedural advantages of the KED derived from its standardized design and application technique. The reviewed literature reported no neurological deficits attributable to its use, although reductions in certain pulmonary function parameters were described. No clinical studies validating its use as a mechanical restraint device in psy-

chiatric patients or formal recommendations supporting this indication in international guidelines were identified. **Conclusions:** The Kendrick Extrication Device may represent a complementary alternative for trunk stabilization in selected prehospital emergency settings. Nevertheless, the absence of specific clinical evidence, potential respiratory limitations, and medicolegal considerations currently preclude recommending its routine use. Prospective clinical studies are needed to establish its safety, effectiveness, and evidence-based indications.

## Keywords

Mechanical Restraint, Kendrick Extrication Device, Psychomotor Agitation, Psychiatric Emergencies, Prehospital Emergency Care, Patient Safety

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## 1. Introduction

Mechanical restraint is an exceptional medical intervention intended to temporarily restrict the movement, or part of the movement, of patients who pose an immediate risk to themselves, others, or healthcare personnel when less restrictive interventions have failed or proved insufficient. Its use is common in emergency departments, psychiatric units, prehospital emergency medical services, and other acute care settings where severe psychomotor agitation, violent behavior, or certain confusional states represent an imminent threat to safety. Nevertheless, current evidence indicates that all forms of physical restraint are associated with potential medical, psychological, ethical, and medicolegal complications. Consequently, their application should be guided by strict criteria regarding indication, proportionality, continuous monitoring, and thorough documentation within the patient's medical record.

The most relevant complications include musculoskeletal injuries, compressive neuropathies, respiratory impairment, cardiovascular events, and, in rare cases, fatalities related to positional asphyxia or physiological deterioration occurring during episodes of extreme agitation [1] [2]. These risks become particularly significant in patients experiencing substance-induced intoxication, hyperactive delirium, or severe psychomotor agitation, in whom increased metabolic demand and cardiorespiratory compromise may substantially increase vulnerability to any form of physical immobilization [3].

Although several restraint devices have been specifically designed and validated for immobilizing the extremities, thoracic restraint systems currently used in many healthcare institutions remain highly heterogeneous regarding materials, dimensions, and methods of application. Conventional chest restraint devices ("vest restraints") exemplify this variability, frequently lacking formal validation of their technical specifications. Furthermore, adverse events related to device displacement, inadequate thoracic compression, and restraint-associated injuries have been reported.

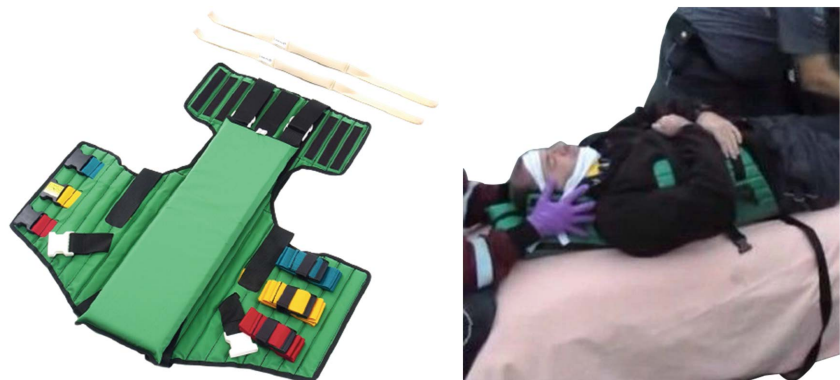
The Kendrick Extrication Device (KED) is a well-established immobilization device widely used in prehospital emergency medicine for the semi-rigid stabilization and extrication of trauma patients. Its standardized structural design, uniform distribution of fixation points, and well-established application technique suggest that it could represent a complementary option for trunk stabilization during mechanical restraint [4]-[10]. However, its use in patients with severe psychomotor agitation has not been scientifically validated, and the available evidence remains scarce. Therefore, a critical appraisal of its potential advantages, limitations, and patient safety considerations is warranted before considering its incorporation into psychiatric emergency and prehospital care protocols, as well as before designing clinical research aimed at evaluating, validating, and quantitatively assessing its potential role in this setting.

## 2. Objective

The aim of this study was to evaluate, through a critical review of the available literature and an analysis of the structural characteristics of the device, the feasibility of using the Kendrick Extrication Device (KED) as a complementary tool for mechanical restraint in patients presenting with severe psychomotor agitation and high-risk behaviors. In addition, the study sought to examine its potential benefits, limitations, associated risks, patient safety considerations, and its operational and medicolegal implications, particularly in psychiatric emergency settings and prehospital management of patients with substance-induced intoxication.

## 3. Materials & Methods

A critical narrative review of the available scientific literature was conducted focusing on the Kendrick Extrication Device (KED) (**Figure 1**), prehospital immobilization devices, and mechanical restraint strategies used in patients with severe psychomotor agitation. Publications addressing patient safety, respiratory complications associated with physical restraint systems, positional asphyxia, hyperactive delirium, substance-induced agitation, and medicolegal issues related to the use of coercive measures in mental health care were also reviewed.



**Figure 1.** Kendrick Extrication Device (KED) and application technique.

The literature search was conducted using the electronic databases PubMed/MEDLINE, Scopus, Google Scholar, and the Cochrane Library. This search was complemented by a review of the manufacturer's technical documentation for the Kendrick Extrication Device (KED), clinical practice guidelines, and consensus statements issued by emergency medicine and psychiatric emergency societies. The following search terms were used individually and in combination with Boolean operators: *Kendrick Extrication Device*, *mechanical restraint*, *psychiatric emergency*, *psychomotor agitation*, *severe agitation*, *hyperactive delirium*, *excited delirium*, *positional asphyxia*, *patient safety*, *prehospital care*, *substance intoxication*, and *ketamine*. Publications published between 1988 and 2025 were prioritized, while earlier landmark publications were included when they provided foundational information regarding the KED or mechanical restraint practices.

Articles were eligible for inclusion if they consisted of original studies, systematic or narrative reviews, expert consensus statements, clinical practice guidelines, or institutional technical documents addressing the use of the KED, mechanical restraint, patient safety, severe psychomotor agitation, hyperactive delirium, or prehospital emergency care. Duplicate publications, studies lacking full-text availability, reports with limited methodological quality when higher-level evidence was available, and publications not directly related to the objectives of this review were excluded.

Subsequently, a descriptive analysis of the structural, biomechanical, and operational characteristics of the Kendrick Extrication Device was performed using the available technical documentation, manufacturer's instructions for use, and specialized literature. The identified findings were compared with the advantages and limitations reported for conventional thoracic restraint systems currently employed in psychiatric emergency settings.

A total of 25 references were included and classified into four thematic categories: 1) studies on the Kendrick Extrication Device (KED) and prehospital immobilization; 2) studies addressing mechanical restraint, patient safety, and restraint-related adverse events; 3) clinical practice guidelines, expert consensus statements, and evidence-based recommendations on psychiatric emergencies and the management of acute agitation; and 4) publications focusing on hyperactive delirium, stimulant intoxication, positional asphyxia, and pharmacological management of severe agitation.

The available evidence was synthesized using a critical narrative approach to identify the potential advantages, limitations, patient safety considerations, operational implications, and future research priorities regarding the use of the KED as an adjunctive device for trunk stabilization during mechanical restraint.

The analysis considered patient safety, operational applicability, prevention of restraint-related adverse events, potential utility in prehospital emergency care, and the ethical and medicolegal implications of its possible incorporation into emergency care protocols.

## 4. Results

From a patient safety perspective, the literature consistently identifies mechanical restraint as one of the major challenges in the management of psychiatric emergencies. Although these interventions are often unavoidable in situations involving imminent risk, they are associated with potentially serious complications, particularly musculoskeletal injuries, respiratory compromise, cardiovascular events, and adverse outcomes related to prolonged immobilization.

Thoracoabdominal restraint systems used to complement limb restraints exhibit considerable heterogeneity in their structural characteristics and methods of application. Among these, conventional chest restraint devices (“vest restraints”) lack universal standardization regarding materials, dimensions, and fastening mechanisms. Reports have described adverse events associated with device displacement, inadequate thoracic compression, and their potential contribution to ventilatory restriction and positional asphyxia.

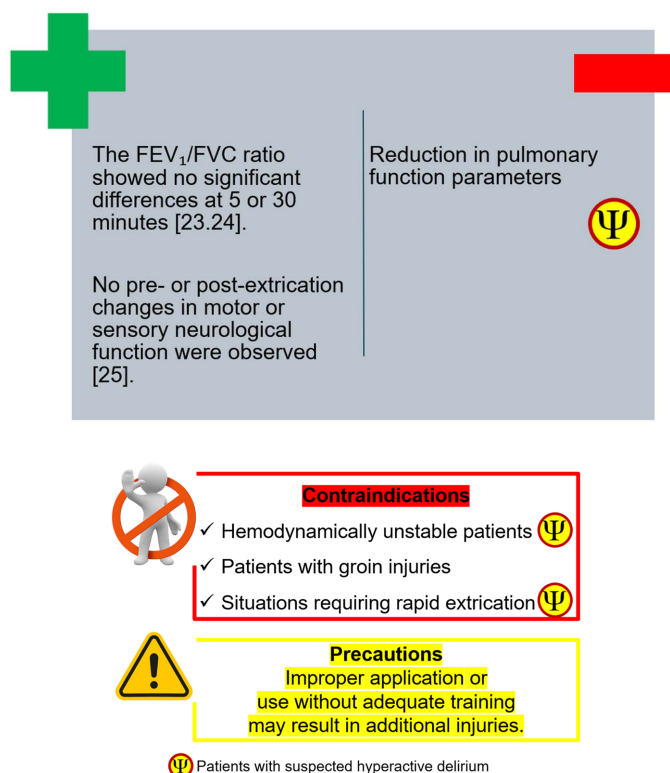
The available literature describes the Kendrick Extrication Device (KED) as a semi-rigid immobilization device specifically designed to stabilize the head, neck, and trunk during the extrication of trauma patients. Its standardized application technique and widespread use among prehospital emergency medical services represent important operational advantages. The studies reviewed did not report neurological motor or sensory deficits attributable to its use and demonstrated only minimal changes in the FEV1/FVC ratio. Nevertheless, reductions in certain pulmonary function parameters were observed and should be carefully considered when contemplating its use in patients with acute psychiatric disorders.

No clinical studies evaluating the use of the KED as a mechanical restraint device in patients with severe psychomotor agitation or acute psychiatric illness were identified. Likewise, neither the manufacturer’s instructions for use nor international emergency medicine or psychiatric emergency guidelines currently recommend this indication. However, a prehospital protocol proposed by the Chilean Emergency Medical Service (SAMU) describes its use as an alternative method for trunk stabilization in agitated patients, although this practice has not yet been validated through prospective or comparative clinical studies.

Overall, the available evidence suggests that the KED possesses potential structural and operational advantages over conventional thoracic restraint systems. However, the lack of condition-specific clinical evidence precludes definitive conclusions regarding its effectiveness and safety in patients with severe psychomotor agitation, whether or not associated with psychoactive substance use. Furthermore, considering the pathophysiology of acute psychiatric conditions complicated by stimulant intoxication—particularly cocaine use—and the substantial risk of hyperactive delirium with potentially fatal physiological deterioration, the use of the KED in this specific clinical scenario should be regarded as contraindicated until robust clinical evidence demonstrates its safety (**Figure 2**) [23]-[25].

## 5. Discussion

Mechanical restraint remains one of the most complex and controversial



**Figure 2.** Comparative analysis of the advantages and disadvantages of the Kendrick Extrication Device (KED).

interventions in emergency medicine, particularly in psychiatric emergency care and the prehospital setting. Although current international recommendations continue to emphasize that its use should be restricted to exceptional situations involving an imminent risk of harm to the patient or others after less restrictive interventions have failed, everyday clinical practice demonstrates that it remains an indispensable tool in cases of severe psychomotor agitation, violent behavior, psychoactive substance intoxication, and hyperactive delirium. Contemporary practice increasingly recognizes that minimizing the harm associated with coercive interventions has become a major objective of quality improvement and patient safety programs in emergency medicine and mental health care. This approach is consistent with international consensus recommendations in emergency psychiatry, which state that mechanical restraint should be used only as a measure of last resort within a management algorithm that prioritizes verbal de-escalation, environmental interventions, and early pharmacological sedation [11]-[13].

The proposal presented by our research group is innovative in that it explores the potential role of the Kendrick Extrication Device (KED), originally designed for spinal immobilization during the extrication of trauma patients, as an adjunctive device for mechanical restraint. This concept arises from a well-recognized clinical challenge: the lack of standardization among thoracic restraint systems currently used in psychiatric patients requiring trunk stabilization. Unlike conventional chest restraint devices (“vest restraints”), which are frequently manu-

factured using different materials, dimensions, and fastening mechanisms according to institutional practices, the KED offers a standardized structural design, certified materials, and a well-established application protocol. From a safety engineering perspective, such standardization could theoretically promote a more homogeneous distribution of restraining forces while reducing device displacement during episodes of severe agitation. Several quality improvement programs have demonstrated that the implementation of standardized protocols, simulation-based training, and systematic review of mechanical restraint episodes reduces both the frequency and duration of coercive interventions, while also decreasing the incidence of associated adverse events [12]-[14].

Published studies have demonstrated that the use of the KED does not produce significant changes in the FEV1/FVC ratio during the first minutes following application, findings consistent with those reported by Ay *et al.* and Carnicer *et al.* in healthy volunteers. Likewise, no motor or sensory neurological deficits attributable to the device have been reported, reflecting the extensive experience accumulated in trauma care. Nevertheless, these same studies documented reductions in selected pulmonary function parameters, particularly those related to thoracic expansion. This finding represents the principal concern regarding the potential application of the KED in patients experiencing acute psychiatric disorders.

The clinical relevance of this limitation becomes even greater in patients with extreme agitation associated with stimulant intoxication. Hyperactive delirium has been characterized by intense sympathetic activation, hyperthermia, metabolic acidosis, increased oxygen consumption, excessive catecholamine release, and a high risk of sudden cardiorespiratory collapse. These patients frequently exhibit prolonged physical struggle, progressive metabolic exhaustion, and severe physiological deterioration, all of which may precipitate life-threatening complications even in the absence of mechanical restraint. Accordingly, several authors have emphasized that mortality in these clinical scenarios is multifactorial and cannot be attributed solely to physical restraint, but rather to the complex interaction among metabolic, toxicological, cardiovascular, and respiratory factors [3] [15]-[17].

For this reason, contemporary emergency medicine has shifted its focus from physical control alone toward the achievement of rapid, safe, and physiologically protective sedation [17]-[19]. Within this framework, the potential role of the KED should not be viewed as a substitute for pharmacological sedation but rather as a standardized adjunct within a multimodal approach to the management of severe agitation. Current evidence suggests that prolonged physical restraint alone may increase the risk of adverse events, whereas the combination of verbal de-escalation techniques, early pharmacological sedation, continuous physiological monitoring, and the least restrictive mechanical restraint necessary represents a safer and more evidence-based strategy. The Project BETA recommendations consider early pharmacological sedation to be the treatment of choice when verbal de-escalation is ineffective, reserving mechanical restraint primarily to facilitate the safe

administration of pharmacological treatment and to minimize the immediate risk to both patients and healthcare personnel [20].

From a practical perspective, even if future studies were to demonstrate the safety and effectiveness of the Kendrick Extrication Device (KED) for this indication, its use should be restricted to carefully selected patients and implemented only within previously established institutional protocols. Its potential application should be limited to patients with severe psychomotor agitation requiring trunk stabilization as an adjunct to conventional mechanical restraint, provided there is no suspicion of hyperactive delirium, hyperthermia, respiratory insufficiency, hemodynamic instability, thoracic trauma, or any other condition contraindicating its use. Furthermore, the device should be applied exclusively by personnel trained in both KED application and mechanical restraint techniques, as well as in the management of acute agitation. Continuous monitoring of physiological parameters (including respiratory rate, oxygen saturation, heart rate, blood pressure, body temperature, and level of consciousness) should be considered mandatory throughout the procedure, in accordance with the institutional mechanical restraint protocol currently implemented by the Buenos Aires City Government. Likewise, immediate access to pharmacological sedation, advanced airway management, and resuscitation resources should be available whenever this strategy is employed, recognizing that the KED should never replace pharmacological interventions or definitive treatment of the underlying clinical condition.

Another important consideration is the risk of positional asphyxia. For decades, this phenomenon has been a major concern in both clinical practice and medico-legal investigations. Although experimental physiological studies have yielded variable findings, there is broad agreement that certain restraint positions, particularly when combined with obesity, stimulant intoxication, intense physical exertion, or external thoracic compression, may contribute to respiratory compromise. Consequently, any restraint device capable of restricting chest wall expansion should be used with particular caution in patients with markedly increased metabolic demand. A theoretical advantage of the KED lies in its ability to stabilize the trunk while avoiding restraint positions traditionally considered to carry a higher risk of respiratory impairment. However, this hypothesis remains unproven and should be evaluated through well-designed randomized controlled clinical trials comparing the KED with existing thoracic restraint systems.

Patient safety constitutes another fundamental dimension of this analysis. Recent evidence indicates that reducing the use and adverse consequences of coercive interventions depends not only on technical improvements but also on organizational factors. Continuous professional training, standardized protocols, simulation-based education, and systematic auditing of adverse events are essential components of modern quality improvement programs [21] [22]. From this perspective, one of the principal potential advantages of the KED is the availability of a standardized application procedure already familiar to most emergency medical personnel.

The medicolegal implications of any restrictive intervention must also be carefully considered. Mechanical restraint involves important ethical, legal, and regulatory responsibilities. Comprehensive documentation of the clinical indication, alternative interventions attempted, duration of restraint, physiological monitoring, and patient outcomes is essential to ensure clinical accountability and legal traceability. Technological innovation in healthcare does not reduce professional responsibility; rather, it reinforces the need to generate robust scientific evidence supporting any new application of existing medical devices.

Finally, several methodological limitations of the present study should be acknowledged. First, this work represents a critical narrative review and a conceptual proposal rather than an experimental or clinical investigation. Second, the available evidence regarding the KED originates almost exclusively from trauma and surgical settings, thereby limiting the external validity of extrapolating these findings to psychiatric emergencies. Third, most of the published studies were conducted in healthy volunteers or patient populations with physiological characteristics substantially different from those encountered in individuals with acute psychiatric agitation. Finally, the absence of controlled clinical trials precludes establishing causal relationships or making evidence-based recommendations for clinical practice.

Accordingly, the findings presented herein should be regarded as hypothesis-generating and intended to stimulate future research. Prospective multicenter studies are required to evaluate respiratory, cardiovascular, metabolic, and operational safety outcomes while directly comparing the KED with conventional mechanical restraint systems in psychiatric patients. Only condition-specific clinical evidence will determine whether the theoretical biomechanical advantages of the KED can be translated into meaningful clinical benefits for patients with severe psychomotor agitation, substance intoxication, or hyperactive delirium managed in emergency departments and prehospital emergency medical services.

## 6. Conclusions

The structural, biomechanical, and procedural characteristics of the Kendrick Extrication Device (KED) support its consideration as a potential adjunct to conventional mechanical restraint techniques, particularly for trunk stabilization in emergency and prehospital care settings. Its standardized design, uniform distribution of fixation points, and widespread familiarity among emergency medical personnel represent theoretical advantages that may enhance operational safety and address some of the limitations associated with traditional thoracic restraint systems.

Nevertheless, the currently available scientific evidence is insufficient to support the routine incorporation of the KED into the management of patients with severe psychomotor agitation or acute psychiatric disorders, particularly when psychoactive substance intoxication is present. The absence of condition-specific clinical studies requires that any extrapolation of findings from trauma and surgical settings to psychiatric emergencies be interpreted with considerable caution.

Careful consideration must also be given to the contraindications and inherent limitations of the device, especially those related to respiratory function. This precaution is particularly relevant in patients presenting with hyperthermia, suspected hyperactive delirium, or severe stimulant intoxication, conditions in which increased metabolic demand and any reduction in thoracic expansion may further increase the risk of adverse cardiorespiratory events (**Figure 2**).

Future implementation of the KED for this indication should therefore be preceded by rigorous clinical validation and supported by standardized institutional protocols, appropriate staff training, and continuous physiological monitoring. Finally, well-designed prospective comparative studies are required to determine its effectiveness, safety profile, complication rates, and impact on clinically relevant outcomes. Such evidence will be essential to establish evidence-based recommendations regarding the potential role of the Kendrick Extrication Device as an adjunctive tool for trunk stabilization in mechanically restrained patients with severe psychomotor agitation managed in emergency departments and prehospital emergency medical services.

### Author Contributions

Conceptualization, Martín Mazzoglio & Nabar, Rubén D. Algieri, Diego Slipak;  
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Data curation, Martín Mazzoglio & Nabar, Diego Slipak, Agustín Algieri;  
Writing—original draft preparation, Martín Mazzoglio & Nabar, Diego Slipak;  
Writing—review and editing, Rubén D. Algieri, Diego Slipak, Soledad Ferrante;  
Visualization, Diego Slipak, Soledad Ferrante, Carolina Brofman, Agustín Algieri;  
Supervision, Rubén D. Algieri, Diego Slipak;  
Project administration, Martín Mazzoglio & Nabar, Diego Slipak, Agustín Algieri;  
Funding acquisition, Martín Mazzoglio & Nabar, Diego Slipak.  
All authors have read and agreed to the published version of the manuscript.

### Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

### References

- [1] Baandrup, L. and Kruse, M. (2024) Investigating the Association of Mechanical Restraint with Somatic Harmful Outcomes: National Register-Based Study. *BJPsych Open*, **10**, e205. <https://doi.org/10.1192/bjo.2024.799>

- [2] Whiting, D., Lewis, A., Khan, K., Alder, E., Gookey, G. and Tully, J. (2025) Mechanical Restraint in Inpatient Psychiatric Settings: A Systematic Review of International Prevalence, Associations, Outcomes, and Reduction Strategies. *European Psychiatry*, **68**, e57. <https://doi.org/10.1192/j.eurpsy.2025.2453>
- [3] Takeuchi, A., Ahern, T.L. and Henderson, S.O. (2011) Excited Delirium. *Western Journal of Emergency Medicine*, **12**, 77-83. <https://escholarship.org/content/qt8n55r1kj/qt8n55r1kj.pdf>
- [4] Ay, D., Aktas, C., Yesilyurt, S., Sarikaya, S., Cetin, A. and Ozdogan, E.S. (2011) Respiratory Effects of Spinal Immobilization Devices on Pulmonary Function in Healthy Volunteer Individuals. *Turkish Journal of Trauma and Emergency Surgery*, **17**, 103-107. <https://doi.org/10.5505/tjtes.2011.53333>
- [5] Fernández-Costa, D., Gómez-Salgado, J., Fagundo-Rivera, J., Martín-Pereira, J., Prieto-Callejero, B. and García-Iglesias, J. (2020) Alternatives to the Use of Mechanical Restraints in the Management of Agitation or Aggressions of Psychiatric Patients: A Scoping Review. *Journal of Clinical Medicine*, **9**, Article 2791. <https://doi.org/10.3390/jcm9092791>
- [6] Jadgal, N., Mofrad, M.N., Jamsahar, M. and Nasiri, M. (2020) The Clinical Skills of Emergency Medical Service (EMS) Personnel Regarding Spinal Immobilization of Trauma Victims: A Cross Sectional Study. *Archives of Academic Emergency Medicine*, **9**, e3.
- [7] Karbi, O.A., Caspari, D.A. and Tator, C.H. (1988) Extrication, Immobilization and Radiologic Investigation of Patients with Cervical Spine Injuries. *CMAJ: Canadian Medical Association Journal*, **139**, 617-621.
- [8] Reynard, F.A., Flaris, A.N., Simms, E.R., Rouvière, O., Roy, P., Prat, N.J., *et al.* (2016) Kendrick's Extrication Device and Unstable Pelvic Fractures: Should a Trochanteric Belt Be Added? a Cadaveric Study. *Injury*, **47**, 711-716. <https://doi.org/10.1016/j.injury.2016.01.028>
- [9] Wagner, C. and Mazurek, P. (2006) Current Practice in Pediatric Immobilization—An Editorial. *Air Medical Journal*, **25**, 144-148. <https://doi.org/10.1016/j.amj.2006.05.001>
- [10] Zardo, C. and Carta, A. (2023) Is the Immobilization of a Traumatized Patient Still the Best Practice? A Literature Review. *Acta Colombiana de Cuidado Intensivo*, **23**, 293-298. <https://doi.org/10.1016/j.acci.2023.03.002>
- [11] Richmond, J.S., Berlin, J.S., Fishkind, A.B., Holloman, G.H., Zeller, S.L., Wilson, M.P., *et al.* (2012) Verbal De-Escalation of the Agitated Patient: Consensus Statement of the American Association for Emergency Psychiatry Project BETA De-Escalation Workgroup. *Western Journal of Emergency Medicine*, **13**, 17-25. <https://doi.org/10.5811/westjem.2011.9.6864>
- [12] Knox, D.K. and Holloman, G.H. (2012) Use and Avoidance of Seclusion and Restraint: Consensus Statement of the American Association for Emergency Psychiatry Project BETA Seclusion and Restraint Workgroup. *Western Journal of Emergency Medicine*, **13**, 35-40. <https://doi.org/10.5811/westjem.2011.9.6867>
- [13] Garriga, M., Pacchiarotti, I., Kasper, S., Zeller, S.L., Allen, M.H., Vázquez, G., *et al.* (2016) Assessment and Management of Agitation in Psychiatry: Expert Consensus. *The World Journal of Biological Psychiatry*, **17**, 86-128. <https://doi.org/10.3109/15622975.2015.1132007>
- [14] Price, O. and Baker, J. (2012) Key Components of De-Escalation Techniques: A Thematic Synthesis. *International Journal of Mental Health Nursing*, **21**, 310-319. <https://doi.org/10.1111/j.1447-0349.2011.00793.x>

- [15] Vilke, G.M., DeBard, M.L., Chan, T.C., Ho, J.D., Dawes, D.M., Hall, C., *et al.* (2012) Excited Delirium Syndrome (ExDs): Defining Based on a Review of the Literature. *The Journal of Emergency Medicine*, **43**, 897-905.  
<https://doi.org/10.1016/j.jemermed.2011.02.017>
- [16] American College of Emergency Physicians (2023) ACEP Reaffirms Positions on Hyperactive Delirium.  
<https://www.acep.org/news/acep-newsroom-articles/aceps-position-on-hyperactive-delirium>
- [17] Thiessen, M.E.W., Godwin, S.A., Hatten, B.W., Whittle, J.A., Haukoos, J.S., Diercks, D.B., *et al.* (2024) Clinical Policy: Critical Issues in the Evaluation and Management of Adult Out-of-Hospital or Emergency Department Patients Presenting with Severe Agitation. *Annals of Emergency Medicine*, **83**, e1-e30.  
<https://doi.org/10.1016/j.annemergmed.2023.09.010>
- [18] Peter, C., Suhas, S., Gowda, G.S., Ghadigaonkar, D., Muliya, K.P. and Reddi, V.S.K. (2025) Systematic Review of Parenteral Ketamine for Managing Acute Agitation in Emergency Settings. *Asian Journal of Psychiatry*, **103**, Article ID: 104344.  
<https://doi.org/10.1016/j.ajp.2024.104344>
- [19] American Academy of Emergency Medicine (2024) Should Ketamine Be Used to Sedate Agitated Patients? <https://www.aaem.org/>
- [20] Wilson, M.P., Pepper, D., Currier, G.W., Holloman, G.H. and Feifel, D. (2012) The Psychopharmacology of Agitation: Consensus Statement of the American Association for Emergency Psychiatry Project BETA Psychopharmacology Workgroup. *Western Journal of Emergency Medicine*, **13**, 26-34.  
<https://doi.org/10.5811/westjem.2011.9.6866>
- [21] Güngör, E.S., Poyraz, E., Melenkiş, B.N.G., Gökçe, M.E. and Durmaz, O. (2024) Physical Restraint Practices at the Emergency Department of a Mental Health Hospital. *Psychiatry and Clinical Psychopharmacology*, **34**, 38-42.  
<https://doi.org/10.5152/pcp.2024.23768>
- [22] Curry, A., Malas, N., Mroczkowski, M., Hong, V., Nordstrom, K. and Terrell, C. (2023) Updates in the Assessment and Management of Agitation. *Focus*, **21**, 35-45.  
<https://doi.org/10.1176/appi.focus.20220064>
- [23] Brown, N. (2015) Should the Kendrick Extrication Device Have a Place in Pre-Hospital Care? *Journal of Paramedic Practice*, **7**, 300-304.  
<https://doi.org/10.12968/jpar.2015.7.6.300>
- [24] Carnicer, M.R., Rodríguez, L.J., de Oro, N.V., Pérez, A.B.G., Alonso, N.P. and Ríos, M.P. (2018) Differences in Lung Function after the Use of 2 Extrication Systems: A Randomized Crossover Trial. *Emergencias*, **30**, 115-118.  
<https://europepmc.org/article/med/29547234>
- [25] Misasi, A., Ward, J.G., Dong, F., Ablah, E., Maurer, C. and Haan, J.M. (2018) Pre-hospital Extrication Techniques: Neurological Outcomes Associated with the Rapid Extrication Method and the Kendrick Extrication Device. *The American Surgeon*, **84**, 248-253. <https://doi.org/10.1177/000313481808400233>