JMALS

Journal of Medical and Life Science

https://jmals.journals.ekb.eg/

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Review article:

Early Physical Therapy and EMS Interventions in Emergency Departments for Acute Musculoskeletal Injuries: Impact on Recovery Time and Hospital Throughput

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DOI:10.21608/jmals.2025.445207

Abstract:

Background: Acute musculoskeletal (MSK) injuries, including strains, sprains, and fractures, account for 20–30% of emergency department (ED) visits, contributing to overcrowding and prolonged hospital stays. Traditional management relies on delayed outpatient physical therapy (PT) and pharmacologic interventions, which may lead to chronic pain and increased healthcare costs. Emerging evidence suggests that early PT and optimized emergency medical services (EMS) protocols can enhance recovery and reduce ED congestion.

Aim: This study evaluates the impact of early PT and EMS interventions on recovery time, hospital throughput, and patient outcomes in acute MSK injuries. **Methods:** A review of clinical studies, retrospective analyses, and prospective trials was conducted, focusing on early PT in EDs and pre-hospital EMS interventions. Key outcomes included pain reduction, functional recovery, ED length of stay (LOS), and healthcare costs. **Results:** Early PT significantly reduced pain (median score: 1 vs. 4 in delayed PT) and disability (9% vs. 33.4%). It also decreased ED revisits, opioid use, and costs ($3,806 vs. $8,689 per patient). EMS interventions, including early immobilization and triage, improved hospital throughput but lacked robust standalone evidence.

Conclusion: Integrating early PT and EMS protocols in EDs enhances recovery, reduces costs, and optimizes resource use. Barriers include staffing shortages and inconsistent implementation. Future research should focus on randomized trials and cost-effectiveness analyses.

Keywords: Early physical therapy, EMS, musculoskeletal injuries, emergency department, recovery time, hospital throughput.

Introduction:

Acute musculoskeletal (MSK) injuries—including strains, sprains, contusions, and fractures—constitute a considerable share of presentations in emergency departments (EDs) across global healthcare systems. These injuries frequently result from physical trauma and accidents and contribute significantly to hospital caseloads. As the incidence of MSK injuries continues to rise alongside overall hospital admissions, the need for more efficient

Received: May 6, 2025. Accepted: July 10, 2025. Published: July 29, 2025

management strategies becomes increasingly critical. Among emerging approaches, early initiation of physical therapy (PT) and timely interventions by emergency medical services (EMS) are gaining attention as methods to support faster recovery and improve operational efficiency within EDs. Recent studies indicate that these strategies may reduce the duration of symptoms, lower revisit rates, and shorten hospital stays. The body of evidence surrounding early PT and EMS in the ED setting highlights their potential to transform traditional care pathways. These interventions are aimed at improving functional outcomes by addressing pain, mobility, and return-to-activity goals sooner in the care process. The literature reveals growing interest in integrating physical therapists directly into emergency departments to initiate care immediately after diagnosis. Similarly, enhanced EMS protocols that include early musculoskeletal assessment and management appear to streamline care before the patient even arrives at the hospital. Together, these models challenge the conventional reliance on delayed outpatient referrals and pharmacologic symptom control, suggesting that active, immediate care can yield better results. Musculoskeletal complaints account for a large proportion of ED visits. Estimates indicate that between 20% and 30% of patients presenting to emergency departments do so with MSK-related issues. These cases place substantial pressure on clinical resources and frequently contribute to extended throughput times. The impact is especially pronounced in health systems serving older populations or where access to primary care and orthopedic specialists is limited. In these contexts, patients often seek care directly from the ED due to long referral wait times or geographic constraints, leading to a high volume of non-surgical MSK cases managed in acute settings [1,2].

Traditionally, the management of MSK injuries in EDs follows a physician-centered approach. Patients are typically assessed, stabilized, and discharged with analgesics and instructions to pursue outpatient physical therapy at a later stage. However, this model has been increasingly questioned for its inefficiencies. The delay in initiating rehabilitative care is associated with several negative outcomes, including prolonged disability, persistent pain, and increased use of ED services for follow-up visits. Furthermore, heavy reliance on pharmacologic management—particularly opioids and nonsteroidal anti-inflammatory drugs—raises concerns about adverse effects, dependency, and overall costs. Recent evaluations of early PT in the ED suggest that prompt rehabilitation engagement can reduce the time to functional recovery and enhance patient satisfaction. Studies also report a decrease in ED revisit rates and lower overall health expenditures when care is initiated promptly. Similarly, EMS personnel trained in early MSK assessment can help triage patients more effectively, potentially avoiding unnecessary ED visits or reducing in-hospital processing time upon arrival. As these interventions gain wider support, they represent a strategic opportunity to relieve ED congestion while delivering higher-value care to patients with MSK injuries. In summary, the growing burden of acute MSK injuries on emergency services calls for an evidence-based reconfiguration of care models. Integrating early PT and EMS responses offers a pathway to mitigate inefficiencies, improve patient outcomes, and support sustainable healthcare delivery [2,3].

Methodology

This study employed a systematic review of existing literature to evaluate the impact of early physical therapy (PT) and emergency medical services (EMS) interventions on acute musculoskeletal (MSK) injury management in emergency departments (EDs).

Data Sources: Peer-reviewed articles from PubMed, EMBASE, and Cochrane Library were analyzed, focusing on studies published between 2010–2023. Keywords included "early physical therapy," "EMS," "musculoskeletal injuries," and "ED throughput."

Study Selection: Inclusion criteria encompassed clinical trials, retrospective cohort studies, and systematic reviews examining early PT or EMS interventions for acute MSK injuries. Excluded were non-English studies, non-ED settings, and non-acute injury management.

Data Extraction: Key variables included:

- **Patient Outcomes:** Pain scores (e.g., visual analog scale), functional recovery (disability percentages), and ED revisit rates.
- **Operational Metrics:** Length of stay (LOS), time to discharge, and hospital throughput.
- **Economic Impact:** Healthcare costs, imaging use, and opioid prescriptions.

Analysis: A narrative synthesis was conducted due to heterogeneity in study designs. Findings were categorized into:

1. **Early PT Interventions:** Studies compared immediate PT with delayed referral, demonstrating superior pain and functional outcomes.
2. **EMS Protocols:** Evidence on pre-hospital immobilization, analgesia, and triage efficiency was evaluated, though high-quality controlled studies were limited.

Limitations: Variability in PT/EMS implementation across institutions and a lack of randomized trials restricted generalizability. Publication bias may have influenced results.

Ethical Considerations: Only de-identified, aggregated data from published studies were used, ensuring compliance with ethical guidelines.

Rationale for Early Physical Therapy Intervention

Theoretical Foundations

The integration of physical therapy (PT) at an early stage of musculoskeletal (MSK) injury management in emergency departments is supported by well-established theoretical and clinical principles. Physical therapists possess specialized expertise in evaluating MSK conditions, applying differential diagnostic techniques, and designing rehabilitation protocols rooted in current scientific evidence. Their involvement at the acute stage of care introduces a paradigm shift from passive to active intervention, which offers multiple physiological and functional benefits. Initiating PT interventions promptly following the onset of an acute MSK injury helps modulate the body's inflammatory response. Early therapeutic engagement can interrupt the typical progression of inflammation that often leads to edema, increased pain sensitivity, and secondary complications. By doing so, PT intervention supports pain reduction and reduces the likelihood of injury becoming chronic. This approach aligns with findings from clinical studies that suggest early movement and structured rehabilitation, when guided by skilled professionals, can influence recovery trajectories positively and efficiently. Moreover, functional mobilization soon after injury, under the supervision of a physical therapist, plays a critical role in preventing the harmful effects of immobility. Disuse atrophy—a common outcome of prolonged rest—can impair joint stability and muscular integrity, delaying return to function. Early PT-guided mobility helps stimulate tissue repair processes, promotes circulation, and maintains muscle function, thereby accelerating the healing process. Additionally, patients who receive PT early are more likely to understand and commit to their recovery plan, as the interaction fosters improved self-efficacy and adherence. These behavioral components are essential in achieving favorable long-term outcomes and reducing dependence on recurrent healthcare services [2,3].

Incorporating physical therapy within the initial phase of emergency care also brings operational advantages. One of the critical system-level benefits includes the reduction of unnecessary imaging. When physical therapists conduct targeted MSK assessments, they often identify cases that do not

require radiographic confirmation, particularly when clinical indicators are clear. This contributes to more efficient resource use and reduces patient exposure to radiation. Furthermore, early PT involvement may reduce the frequency and duration of opioid prescriptions, as non-pharmacologic pain management strategies—such as manual therapy, exercise, and education—offer effective alternatives to medication. In light of increasing concern over opioid misuse, this shift holds significant public health implications. Another operational benefit relates to the optimization of referral patterns. Rather than defaulting to orthopedic or specialist consultations, which may involve long waiting periods and limited availability, PTs can often manage straightforward MSK conditions directly within the ED or guide patients to appropriate follow-up care. This eliminates redundant steps in the care pathway and improves patient flow through the emergency system. Overall, the rationale for introducing early PT intervention into emergency care for MSK injuries is supported by both theoretical models and practical outcomes. This approach targets not only the physical dimensions of injury recovery but also systemic efficiency, patient engagement, and long-term functionality. As such, it represents a valuable strategy within modern, multidisciplinary emergency care models [3,4].

Types of Early PT Interventions in the ED

Early implementation of physical therapy interventions in emergency departments encompasses a range of targeted strategies designed to address both the immediate and longer-term needs of patients with acute musculoskeletal injuries. These interventions are selected based on the patient's clinical presentation and are tailored to optimize early recovery, reduce symptom severity, and prevent functional decline. One of the most immediate and effective forms of early intervention involves structured patient education. Physical therapists engage directly with patients to explain the nature of their injury, expected healing timelines, and evidence-based self-management strategies. This educational component addresses common misconceptions, helps reduce fear-avoidant behaviors, and empowers patients to take an active role in their recovery. Studies have shown that such early communication can improve patient satisfaction and reduce unnecessary return visits to the emergency department. In parallel with education, physical therapists conduct functional assessments to identify the extent of impairment and initiate individualized exercise programs. These exercises are designed to restore joint mobility, improve muscular control, and maintain functional independence. Early initiation of movement not only supports tissue healing but also minimizes the risk of complications such as joint stiffness or muscle wasting, which are common when rest is prolonged [5].

Another key component of early intervention is the provision of movement guidance. This may include gait training to correct altered biomechanics following injury or instruction on safe ways to perform daily activities. In cases where ambulation is compromised, therapists may recommend and fit assistive devices such as crutches, walkers, or braces. Such support not only improves patient safety but also enhances mobility during the critical initial recovery phase. Additionally, physical therapists employ a range of therapeutic modalities aimed at alleviating pain and inflammation. These may include manual therapy techniques to address joint or soft tissue dysfunction, cryotherapy to control swelling and pain, and taping methods to support injured structures. When combined with patient education and therapeutic exercise, these modalities contribute to a multimodal approach that enhances clinical outcomes. Altogether, the diversity of early PT interventions in the emergency setting reflects a holistic and evidence-informed strategy to manage acute musculoskeletal conditions. By addressing the biological, functional, and behavioral dimensions of injury from the onset, early PT contributes significantly to improving recovery trajectories and reducing the burden on emergency services [5,6].

Evidence for Early PT Impact: Recovery Time and Patient Outcomes

There is consistent and growing evidence supporting the integration of early physical therapy within emergency department settings as an effective strategy for improving clinical outcomes in patients presenting with acute musculoskeletal injuries. Research findings demonstrate that early physical therapy significantly contributes to reducing both pain intensity and levels of disability, facilitating faster and more complete recovery. A key example is provided by a retrospective observational study conducted by Kamel et al. (2017), which evaluated the impact of early physical therapy intervention initiated in the emergency department. The study compared outcomes between patients who received immediate PT assessment and management and those referred later to outpatient physical therapy. At 34 days post-injury, patients in the early intervention group showed markedly better outcomes. Specifically, the median pain score reported by this group was 1, compared to 4 among those with delayed referral. In terms of functional limitation, the early PT group demonstrated only 9% disability, a substantial improvement compared to 33.4% in the control group. These differences highlight the potential of early PT to accelerate recovery and minimize long-term impairment. Further support for the value of early PT is found in prospective studies that have examined similar outcomes. These investigations have consistently reported more rapid improvements in pain and function among patients who receive physical therapy during their initial ED visit. Patients in early PT groups not only experienced quicker reductions in pain but also expressed higher satisfaction with their care, citing better understanding of their injury, greater confidence in managing symptoms, and shorter recovery times. Together, these findings suggest that early PT intervention contributes significantly to a more efficient recovery process. By addressing pain and disability early, physical therapy limits the progression to chronic symptoms and reduces the overall burden on healthcare systems. Integrating PT within emergency workflows, therefore, offers both clinical and operational benefits, making it a viable and effective approach for enhancing patient outcomes in acute musculoskeletal injury management [1,2,7,8].

Decreased Healthcare Utilization and Costs

Implementing early physical therapy interventions following emergency department visits has demonstrated substantial effects in reducing overall healthcare utilization and associated costs. Timely engagement with physical therapy has been linked to fewer downstream interventions that typically contribute to rising medical expenses in musculoskeletal care. For instance, patients presenting with low back pain who received early PT were significantly less likely to undergo subsequent lumbar spine surgeries or be subjected to advanced imaging procedures. Additionally, this group showed lower rates of opioid prescriptions and fewer return visits to the ED over a one-year follow-up period. The financial implications of these outcomes are notable, with average costs totaling $3,806 for those receiving early PT, compared to $8,689 for patients referred to therapy at a later stage. This nearly 56% cost reduction underscores the economic value of early intervention in the acute management of musculoskeletal disorders. These cost savings are largely attributed to the prevention of avoidable healthcare events. Early PT not only reduces unnecessary admissions and diagnostic procedures but also enhances patient readiness for discharge. The quicker implementation of recovery protocols can limit the development of chronic pain syndromes, which are often resource-intensive and associated with long-term disability. The early introduction of movement strategies and patient education helps to mitigate complications, reduce dependency on pharmacological treatments, and avoid extended medical follow-up, thereby optimizing healthcare expenditure across multiple domains [3,9].

Shortened Length of Stay and Improved Throughput

Early PT intervention within the emergency department also contributes significantly to improving hospital throughput by reducing patient length of stay. Evidence indicates that integrating physical therapists as primary contact providers for musculoskeletal complaints enables more rapid patient assessment and decision-making. Taylor et al. documented that patients managed through direct PT contact experienced significantly shorter stays in the ED when compared with those routed through traditional, physician-led pathways that involve delayed secondary referrals to therapy. The reduction in time spent in the emergency setting not only improves the patient experience but also allows ED resources to be reallocated more efficiently. Systematic reviews have reinforced these findings by evaluating the impact of advanced musculoskeletal physiotherapists operating in the ED environment. These reviews consistently report that PT-led management achieves faster and equally safe discharge outcomes when compared to standard medical or nursing care. Importantly, this accelerated patient flow does not lead to increased rates of readmission or adverse events, indicating that the quality and safety of care are maintained. By streamlining patient disposition and reducing congestion, early PT contributes to a more effective and sustainable emergency care model, particularly as demand for services continues to grow [2,10].

Enhanced Patient Satisfaction and Safety

Early initiation of physical therapy within emergency department settings has been associated with increased patient satisfaction and improved perceptions of care quality. Patients receiving timely PT often report feeling more engaged in their treatment, as therapists typically emphasize communication, education, and shared decision-making. This collaborative approach not only strengthens the patient-provider relationship but also contributes to a clearer understanding of the injury, expected recovery trajectory, and appropriate self-management strategies. Research indicates that early PT interventions lead to reduced anxiety levels among patients, likely due to the reassurance provided through structured education and hands-on care. Patients gain confidence in their recovery plan and feel more involved in the rehabilitation process. This active participation tends to increase adherence to recommended exercises and post-discharge protocols, further supporting recovery outcomes. Another benefit of early PT is the observed decline in the prescription of analgesics, particularly opioids. With emphasis placed on non-pharmacological pain management techniques—such as manual therapy, movement guidance, and therapeutic modalities—patients often experience meaningful pain relief without heavy reliance on medications. This reduction in pharmacotherapy not only minimizes the risk of side effects and dependency but also aligns with broader public health strategies aimed at curbing opioid overuse. Importantly, the integration of PT in early stages of care does not compromise patient safety. Studies report no increased incidence of adverse events or mismanagement when physical therapists serve as frontline providers for musculoskeletal conditions in the ED. On the contrary, the inclusion of PT supports more accurate triage, focused treatment plans, and timely referrals when needed. This model enhances care delivery, improves clinical outcomes, and contributes to a safer, more responsive healthcare environment [1,2].

EMS Interventions for Acute Musculoskeletal Injuries in the ED

Understanding EMS Interventions

Emergency medical services serve a foundational role in the early care of musculoskeletal injuries, especially during the critical pre-hospital and initial hospital phases. Their function extends beyond transportation, encompassing a range of clinical tasks aimed at stabilizing patients and preventing further injury before arrival at the emergency department. Among the most essential EMS actions is the rapid immobilization and stabilization of fractures and serious soft tissue damage. This is

critical to minimize movement-induced complications, protect neurovascular structures, and reduce pain levels before definitive treatment. In addition to mechanical stabilization, EMS personnel are trained to administer appropriate and timely analgesia to alleviate acute discomfort during transit. Pain control improves patient comfort and allows for safer handling and transfer, particularly in complex injury scenarios involving multiple trauma sites. EMS teams often employ standardized pain scales to guide the use of analgesics, which can include non-opioid and opioid agents depending on protocol and clinical presentation [11,12].

Effective triage represents another central EMS responsibility. By assessing the mechanism of injury, severity, and potential complications at the scene, EMS can relay critical information to ED staff to ensure proper allocation of resources and reduce time to intervention. This communication is especially vital in high-volume emergency systems, where early identification of high-risk cases supports prioritization and treatment flow. EMS professionals also contribute to the early recognition of potentially limb- or life-threatening conditions such as compartment syndrome or vascular injury. These complications require urgent surgical assessment and intervention, and EMS teams equipped with the knowledge to identify warning signs—such as escalating pain, pallor, paresthesia, or absent distal pulses—can facilitate expedited care upon ED arrival. The role of EMS in musculoskeletal injury management is increasingly supported by structured training programs and clinical guidelines that emphasize evidence-based practices. Their interventions not only influence immediate patient outcomes but also affect the efficiency and readiness of the emergency department. Early, informed EMS action reduces the likelihood of deterioration, improves triage accuracy, and supports faster transitions to definitive treatment, making EMS a critical extension of ED care in acute MSK injury contexts [12,13].

The Efficacy of EMS in Acute MSK Injury Management

Despite the critical involvement of EMS in the acute care continuum, the available literature offers limited direct evidence evaluating the impact of EMS-specific interventions on recovery times for isolated musculoskeletal injuries within emergency department settings. Most existing research concentrates on broader trauma or pre-hospital systems without isolating the effects of EMS protocols in MSK injury scenarios. Nonetheless, several clinically relevant patterns have emerged that highlight the potential value of early EMS engagement. Timely and accurate triage by EMS has been associated with reductions in delays to definitive care. By identifying injury severity, prioritizing transport decisions, and communicating effectively with emergency departments before arrival, EMS can streamline patient flow and enhance readiness for intervention. Although indirect, this efficiency contributes to more rapid clinical assessments, quicker initiation of pain management or imaging, and faster transition to rehabilitation planning, which may support shorter overall recovery timelines. For critically injured or polytrauma patients, emerging evidence suggests that neuromuscular electrical stimulation (NMES) or electrical muscle stimulation (EMS) used by EMS teams may provide additional benefit. These adjuncts, applied in early care phases, have been linked to decreased muscle atrophy, preservation of joint mobility, and improved long-term outcomes in select trauma populations. However, the applicability of these findings to isolated MSK injuries treated in standard ED settings remains uncertain. Current studies show heterogeneity in methodology, intervention timing, and outcome measures, limiting the strength of conclusions that can be drawn. Overall, while early EMS interventions are essential for patient stabilization and hospital throughput, there is a clear gap in focused research evaluating their isolated impact on recovery metrics in musculoskeletal injury care.

High-quality, controlled studies are needed to clarify these effects and optimize EMS protocols for this patient population [11-14].

Limitations and Challenges in EMS-PT Integration

Integrating EMS with early physical therapy in emergency departments for musculoskeletal injury care presents several operational and structural challenges. One of the primary barriers is the variability in training standards and clinical competencies across EMS providers and ED professionals. This heterogeneity leads to inconsistent assessment, triage, and intervention practices for MSK injuries, which undermines efforts to establish a uniform model of early care. As a result, the delivery of appropriate and timely PT referrals or rehabilitation planning from the point of EMS contact becomes highly dependent on individual providers or local protocols, limiting scalability. Another significant limitation lies in the scarcity of empirical data that directly correlate EMS-initiated interventions with quantifiable outcomes such as hospital throughput, discharge timelines, or patient functional recovery. While indirect associations exist—such as the role of prompt triage in reducing delays, there remains a lack of rigorous, controlled studies that isolate EMS contributions in the broader care continuum. Without this evidence, developing evidence-based integration frameworks or justifying resource allocation becomes difficult. Finally, the absence of standardized communication pathways and shared clinical protocols between EMS units and in-hospital physical therapists further complicates coordinated care. Effective interdisciplinary collaboration requires consensus on when and how patients should transition from EMS management to PT engagement. However, many institutions lack structured mechanisms for this handoff, which can delay early rehabilitation efforts and dilute the benefits of both EMS and PT interventions. Establishing integrated clinical pathways and fostering routine collaboration between EMS and rehabilitation teams is essential to close this gap and improve outcomes [13,15].

Mechanisms Underpinning Impact on Hospital Throughput

Early physical therapy and EMS interventions influence hospital throughput by activating multiple operational and clinical mechanisms. One core element is rapid patient disposition. When physical therapists and EMS personnel conduct early evaluations and initiate appropriate management, this often results in quicker discharge decisions. The reduction in delays means patients who do not require further hospital care can leave the ED sooner, which alleviates overcrowding and minimizes repeat visits for unresolved symptoms. Another mechanism is the more effective use of available resources. Early interventions reduce dependence on diagnostic imaging, extensive pharmacologic therapy, and specialist consultations. For example, PTs can provide manual assessments that rule out fractures or joint instability, which in many cases eliminates the need for X-rays or orthopedic referrals. Similarly, PT-led strategies that involve early mobilization and pain self-management reduce the demand for opioid medications and limit adverse events related to their use. These efficiencies collectively reduce costs and free ED staff for other critical tasks. Early intervention also curbs the progression from acute injury to chronic dysfunction. MSK injuries that are left unaddressed or managed inadequately may evolve into long-term pain syndromes, requiring repeated medical consultations and ongoing treatment. Timely initiation of targeted rehabilitation lowers this risk by promoting early tissue recovery, restoring function, and encouraging patient adherence to recovery protocols. Preventing chronicity thus directly reduces future ED visits and lowers cumulative healthcare utilization [3,9,10].

Implementation Barriers and Considerations

Despite the clinical promise of early PT and EMS intervention, widespread adoption faces multiple challenges. One significant constraint is the shortage

of physical therapists trained specifically for acute care or emergency settings. Many institutions cannot staff PTs during all operational hours or embed them within fast-paced ED teams. Furthermore, there is an inconsistency among ED and EMS professionals regarding the appropriate scope of PT practice in acute care. In many environments, the PT's role is still perceived as part of post-acute rehabilitation, rather than a front-line provider in emergency injury care. This limits referral frequency and delays care initiation. Institutional resistance to workflow changes also acts as a barrier. Integrating PT and EMS protocols into ED operations requires updates to electronic health records, triage systems, and staffing models. Many hospitals struggle with these modifications due to limited administrative support or financial constraints. Additionally, the absence of standardized training and unified clinical guidelines for EMS-PT integration creates variability in service delivery. Without clearly defined protocols, outcomes become inconsistent, and program evaluation remains difficult. Reliable monitoring frameworks are also lacking, which impedes efforts to track progress and identify best practices [2,4,16].

Future Research Directions

Although current evidence supports early PT and EMS approaches, critical research gaps remain. High-quality, large-scale randomized controlled trials are necessary to move beyond observational findings and confirm causal links between early intervention and improved patient or system outcomes. These studies should evaluate how early care affects long-term recovery, return to function, and hospital readmissions. Further investigation is also needed into what specific elements of early intervention protocols are most effective. Comparative studies examining PT-led models versus nurse or physician-driven approaches would help clarify professional roles and guide optimal resource deployment in EDs. Economic analysis is another priority. To justify broader implementation, future work must demonstrate not only clinical value but cost-effectiveness. Studies must identify the patient profiles most likely to benefit from early intervention and establish ideal timing thresholds that maximize results without increasing unnecessary interventions. Early physical therapy and EMS interventions offer multiple pathways to improve acute MSK injury care in emergency departments. They can reduce pain, accelerate recovery, conserve resources, and enhance patient satisfaction. However, their integration requires overcoming workforce limitations, systemic inertia, and gaps in evidence. Continued research and standardization are critical for making these models part of routine emergency care [13].

Conclusion:

The integration of early physical therapy (PT) and optimized emergency medical services (EMS) protocols presents a transformative approach to managing acute musculoskeletal (MSK) injuries in emergency departments (EDs). Current evidence demonstrates that early PT interventions significantly improve patient outcomes by reducing pain, accelerating functional recovery, and decreasing reliance on opioids. Patients receiving immediate PT report lower disability rates (9% vs. 33.4%) and reduced healthcare costs ($3,806 vs. $8,689), highlighting the economic and clinical benefits of this model. EMS contributions, though less extensively studied, play a critical role in initial stabilization and triage, facilitating faster ED throughput. However, the lack of standardized protocols and empirical data limits the broader adoption of EMS-driven MSK care. Challenges such as staffing shortages, inconsistent training, and resistance to workflow changes hinder implementation. Despite these barriers, the combined model of early PT and EMS interventions offers a viable solution to ED overcrowding and inefficient MSK management. Future efforts should prioritize randomized controlled trials to establish causal relationships, refine intervention timing, and assess long-term recovery impacts. Additionally, cost-benefit analyses and standardized training programs are essential to support widespread

adoption. In conclusion, early PT and EMS interventions represent a high-value, patient-centered strategy for acute MSK injuries. By addressing current limitations and expanding evidence-based practices, healthcare systems can enhance recovery trajectories, reduce costs, and improve overall ED efficiency.

Conflict of interest: NIL

Funding: NIL

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العلاج الطبيعي المبكر وتدخلات خدمات الطوارئ الطبية في أقسام الطوارئ لإصابات الجهاز العضلي الهيكلي الحادة: الأثر على وقت التعافي وانسيابية المستشفى

الملخص:

الخلفية: تشكل إصابات الجهاز العضلي الهيكلي الحادة، بما في ذلك التمزقات والالتواءات والكسور، ما نسبته 20–30٪ من زيارات أقسام الطوارئ، مما يسهم في الازدحام والإقامة الطويلة بالمستشفيات. غالبًا ما يعتمد التدبير التقليدي على تأخير الإحالة للعلاج الطبيعي والعلاج الدوائي، مما قد يؤدي إلى تطور الألم المزمن وزيادة التكاليف الصحية. تشير الأدلة الناشئة إلى أن التدخل المبكر للعلاج الطبيعي وتحسين بروتوكولات خدمات الطوارئ الطبية قد يعزز الشفاء ويقلل الازدحام في الطوارئ.

الهدف: تقييم أثر التدخل المبكر للعلاج الطبيعي وخدمات الطوارئ الطبية على وقت التعافي، وانسيابية الخدمة داخل المستشفى، ونتائج المرضى في حالات الإصابات العضلية الهيكلية الحادة.

المنهجية: أجريت مراجعة للدراسات السريرية والتحليلات الاستعادية والتجارب المستقبلية، مع التركيز على العلاج الطبيعي المبكر في أقسام الطوارئ وتدخلات خدمات الطوارئ الطبية قبل الوصول إلى المستشفى. وشملت النتائج الرئيسية: تخفيف الألم، وتحسن الوظيفة الحركية، وتقليل مدة البقاء في قسم الطوارئ، وتكاليف الرعاية الصحية.

النتائج: قلل العلاج الطبيعي المبكر الألم بشكل ملحوظ (الوسيط: 1 مقابل 4 في حالات العلاج المتأخر)، والإعاقة (9٪ مقابل 33.4٪). كما أدى إلى تقليل زيارات الطوارئ المتكررة، واستخدام الأفيونات، والتكاليف ($3,806 مقابل $8,689 لكل مريض). ساهمت تدخلات خدمات الطوارئ، مثل التثبيت المبكر والفرز السريع، في تحسين انسيابية المستشفى، رغم محدودية الأدلة المنفردة الداعمة لها.

الاستنتاج: يسهم دمج العلاج الطبيعي المبكر وبروتوكولات خدمات الطوارئ في أقسام الطوارئ في تعزيز التعافي، وخفض التكاليف، وتحسين استخدام الموارد. وتشمل التحديات نقص الكوادر وعدم الاتساق في التطبيق. ويجب أن تركز الأبحاث المستقبلية على التجارب العشوائية وتحليلات الفعالية من حيث التكلفة.

الكلمات المفتاحية: العلاج الطبيعي المبكر، خدمات الطوارئ الطبية، إصابات الجهاز العضلي الهيكلي، قسم الطوارئ، وقت التعافي، انسيابية المستشفى.