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Musculoskeletal Injuries in Recreational Athletes as a Diagnostic Challenge in Acute Pain Syndromes – A Narrative Review

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ABSTRACT

Background. Musculoskeletal injuries are a common consequence of recreational physical activity. In some cases, they may present as acute pain syndromes with a non-specific clinical presentation that can mimic symptoms of internal diseases.

Objective. The aim of this study was to present the most common musculoskeletal injuries occurring in recreational athletes and to discuss their relevance in the differential diagnosis of acute pain syndromes.

Methods. A narrative review of the literature was conducted using the PubMed, Scopus, and Google Scholar databases. Publications addressing musculoskeletal injuries in physically active individuals and their clinical presentation as acute pain were analyzed.

Results. The analyzed data indicate that injuries involving the lumbar region, abdominal wall, groin, and pelvis represent some of the most frequent causes of acute pain among recreational athletes. The clinical manifestations of these injuries may resemble renal colic, acute abdominal conditions, or inguinal pathologies, which can pose significant diagnostic challenges in clinical practice.

Conclusions. The analyzed data indicate that injuries involving the lumbar region, abdominal wall, groin, and pelvic area are among the most common causes of acute pain in recreational athletes. The symptoms of these injuries may clinically resemble renal colic, acute abdominal conditions, or groin pathologies, which may lead to diagnostic difficulties.

Keywords: musculoskeletal injuries, recreational athletes, acute pain syndromes, differential diagnosis, sports medicine, acute pain; clinical practice

1. Introduction

Physical activity is widely recommended as one of the key components of a healthy lifestyle, providing numerous benefits in the prevention of chronic diseases, improvement of physical fitness, and enhancement of psychological well-being [1–3]. In recent years, a significant increase has been observed in the number of individuals engaging in regular recreational physical activity, including resistance training, running, fitness classes, and team sports. This trend affects a broad age spectrum and includes individuals without prior athletic training.

Alongside the increasing popularity of physical activity, the incidence of exercise-related injuries has also risen, particularly those affecting the musculoskeletal system [4,5]. Musculoskeletal injuries represent one of the most common causes of pain among physically active individuals and constitute an important reason for consultations in primary care settings and emergency departments [6,7]. In contrast to professional athletes, individuals engaging in recreational sports typically do not benefit from regular coaching or medical supervision, which may contribute to both overuse injuries and delayed recognition of musculoskeletal damage [8].

Many musculoskeletal injuries in recreational athletes are overuse-related and result from a sudden increase in training intensity, inadequate recovery, insufficient warm-up, or improper exercise technique [9,10]. These injuries most commonly involve the lumbar region, abdominal wall muscles, groin, and pelvic area, and may lead to the development of acute pain symptoms [11].

A particular diagnostic challenge arises in situations where musculoskeletal injuries present as acute pain syndromes with a clinical picture suggestive of internal diseases. Pain localized to the lumbar region may resemble renal colic, lower abdominal pain may raise suspicion of acute abdominal conditions, while groin pain is often mistaken for hernia-related or urological pathologies [12–14]. Such overlap in clinical presentation may lead to diagnostic difficulties, especially in acute care settings, where clinical decisions are frequently made under time pressure [15].

This issue is of particular importance in the practice of primary care physicians and emergency medicine physicians, who are most often the first to assess patients presenting with acute pain [16]. Incorporating information regarding recent physical activity into the medical history, along with familiarity with the clinical presentation of the most common sports-related injuries, may play an important role in improving diagnostic accuracy [17].

Considering musculoskeletal injuries in the differential diagnosis of acute pain syndromes in recreational athletes may contribute to improved diagnostic accuracy, a reduction in unnecessary diagnostic testing, and enhanced patient safety. More accurate initial clinical assessment has also been identified as one of the factors promoting more rational use of healthcare resources, as supported by the literature addressing the issue of medical overuse [18].

2. Material and Methods

This study is a narrative review of the literature. An initial analysis of available publications was conducted using the PubMed, Scopus, and Google Scholar databases. The search included studies addressing musculoskeletal injuries in recreational athletes, acute pain syndromes, and issues related to differential diagnosis in clinical practice.

W procesie wyszukiwania zastosowano kombinacje następujących słów kluczowych w języku angielskim: *musculoskeletal injuries*, *recreational athletes*, *acute pain*, *differential diagnosis*, *sports medicine*, *overuse injuries*, *lumbar pain*, *groin pain*, *abdominal wall injuries* oraz *clinical practice*. Wyszukiwanie uzupełniono o analizę piśmiennictwa cytowanego w wybranych artykułach w celu identyfikacji dodatkowych publikacji istotnych dla omawianej tematyki.

Studies published primarily between 2010 and 2025 were included in the review. In the case of key publications addressing the epidemiology of sports-related injuries and the fundamentals of differential diagnosis of acute pain, earlier studies of established scientific value were also considered. The analyzed sources comprised observational studies, review articles, clinical studies, as well as educational and practice-oriented publications relevant to everyday clinical practice.

Inclusion criteria comprised publications involving adult individuals engaging in recreational physical activity that described musculoskeletal injuries leading to acute pain symptoms, particularly affecting the lumbar region, abdominal wall, groin, and pelvic area. Studies analyzing the clinical presentation of these injuries, their mechanisms of development, and potential diagnostic challenges resulting from symptom similarity to internal diseases were included.

Publications focusing exclusively on professional athletes, pediatric populations, or surgical treatment without reference to the diagnostic process were excluded from the analysis. Single case reports were included only when they provided clinically relevant information regarding atypical symptom presentation or differential diagnostic considerations.

Due to the narrative nature of the review, no formal assessment of the risk of bias or quantitative analysis was performed. The authors aimed to provide a structured and concise overview of the current body of knowledge, with particular emphasis on its practical relevance to everyday clinical practice.

3. Results

3.1. Lumbar region injuries

Lumbar region injuries are among the most common causes of acute pain in recreational athletes [19,20]. Such symptoms are frequently reported by individuals engaging in resistance training, running, team sports, as well as activities involving repetitive flexion, rotation, or axial loading of the spine [21,22]. The clinical presentation may vary, ranging from gradually increasing pain to pain of sudden onset occurring during or immediately after physical exertion.

The most commonly described conditions include overuse injuries of the paraspinal muscles, strains of the quadratus lumborum muscle, back extensor muscle strains, and functional disorders of the facet joints [23,24]. The clinical manifestations of these injuries typically include localized tenderness, increased muscle tension, and limitation of range of motion. In some cases, pain may radiate to the hip, groin, or lower abdominal regions, which may complicate accurate clinical assessment [25].

In the initial phase of symptom presentation, such a clinical picture may suggest internal conditions, including renal colic or other pathologies of the urinary tract. However, further clinical evaluation should focus on distinguishing features. Pain of musculoskeletal origin typically demonstrates a relationship with spinal movement, body position, and palpation, whereas pain associated with renal colic is characteristically independent of movement, often colicky in nature, and does not resolve with rest [26,27]. The absence of systemic symptoms and a negative history for urinary tract disorders further support a musculoskeletal origin of the symptoms [28].

3.2. Abdominal wall muscle injuries

Abdominal wall muscle injuries represent an important, though often underrecognized, cause of acute pain syndromes in recreational athletes [29]. These injuries most commonly involve the rectus abdominis and oblique muscles and are associated with sudden trunk rotational movements, intense eccentric muscle activity, resistance exercises, or insufficient adaptation to training loads [30].

Clinical symptoms include pain localized to the lower or lateral regions of the abdomen, which intensifies during muscle contraction, coughing, sneezing, or the performance of specific movements [31]. In some cases, these symptoms may be interpreted as manifestations of an acute abdominal condition, particularly when the pain is unilateral or of sudden onset [32].

The literature emphasizes that abdominal wall muscle injuries are frequently overlooked during the initial differential diagnosis of acute pain, which may result in unnecessary imaging studies and hospital admissions [33]. A thorough medical history focusing on the mechanism of injury and the relationship between symptoms and muscle tension plays a key role in establishing an accurate diagnosis [34].

3.3. Groin and pelvic injuries

Pain in the groin and pelvic region is a common complaint among physically active individuals and represents one of the greater diagnostic challenges in clinical practice [35]. In recreational athletes, the most frequently described conditions include overuse injuries of the hip adductor muscles, enthesopathies involving the pubic symphysis, and functional disorders of the hip joint [36,37].

Symptoms may include pain radiating to the lower abdomen, thigh, or perineal region, which intensifies during walking, running, changes in direction, or weight-bearing on the lower limb [38]. Such localization and characteristics of pain may suggest hernia-related pathologies, urological, or gynecological conditions, frequently leading to diagnostic difficulties [39].

Studies emphasize that a detailed medical history incorporating the type and intensity of physical activity, as well as analysis of the mechanism underlying symptom onset, is essential for appropriate direction of further diagnostic evaluation [40]. Attention is also drawn to the frequent coexistence of multiple overload-related factors, which may contribute to the complex clinical presentation of groin and pelvic pain in recreational athletes [41].

Table 1. Musculoskeletal injuries and corresponding internal diseases in differential diagnosis of acute pain.

Pain location	Common musculoskeletal injury	Internal disease potentially mimicked	Key differentiating features
Lumbar region	Paraspinal muscle strain, quadratus lumborum injury	Renal colic	Pain related to movement and palpation; relief in certain positions
Lower abdomen	Rectus abdominis or oblique muscle strain	Acute abdominal pathology	Pain increases with abdominal muscle contraction or coughing
Groin region	Adductor muscle strain, pubic enthesopathy	Inguinal hernia	No cough impulse; pain related to physical load
Pelvic region	Pelvic overuse injury, symphysis pubis stress	Urological or gynecological pathology	Symptoms associated with activity; absence of visceral signs

Table 2. Common recreational sports activities and associated musculoskeletal injuries.

Recreational activity	Typical musculoskeletal injuries	Common pain location
Resistance training / gym workouts	Paraspinal muscle strain, abdominal wall overload	Lumbar region, lower abdomen
Long-distance running	Adductor overuse injury, hip flexor strain	Groin, pelvis
High-intensity functional training	Pelvic overuse injury, symphysis pubis stress	Pelvic region
Team sports	Adductor strain, hip-related groin pain	Groin region
Fitness and aerobic classes	Abdominal muscle strain, lumbar overload	Abdomen, lower back

4. Discussion

The presented findings confirm that musculoskeletal injuries constitute a significant cause of acute pain syndromes in recreational athletes and may pose a diagnostic challenge in everyday clinical practice. The literature has repeatedly emphasized that individuals engaging in recreational physical activity represent a heterogeneous patient population in whom the clinical presentation of pain is often non-specific and difficult to interpret unequivocally [42,43].

Lumbar region injuries are of particular clinical relevance, as in the early phase they may suggest internal conditions, including pathologies of the urinary system.

As demonstrated in the analyzed publications, accurate assessment of pain characteristics, its relationship to movement, and the presence of accompanying symptoms plays a key role in differential diagnosis [26,27]. In contrast to renal colic, musculoskeletal pain typically shows variability in intensity depending on body position and physical activity, which may serve as an important diagnostic clue.

Abdominal wall muscle injuries, although relatively frequently described in the sports medicine literature, remain underrecognized entities in everyday clinical practice [29,33]. Their clinical presentation may mimic acute abdominal conditions, leading to extended diagnostic imaging. Numerous authors emphasize that consideration of the injury mechanism and the relationship between pain and muscle contraction may substantially facilitate accurate patient assessment [31,34].

Similar diagnostic difficulties apply to groin and pelvic pain, which is often characterized by a complex and multifactorial etiology [35,36]. In this patient group, the overlap of symptoms originating from the musculoskeletal system and internal organs may result in delayed identification of the underlying cause. The literature emphasizes the importance of comprehensive clinical assessment that takes into account both the patient's physical activity and potential overload-related factors [38–40].

Table 3. Clinical features helpful in differentiating musculoskeletal and internal causes of acute pain.

Clinical feature	**Musculoskeletal origin**	**Internal (visceral) origin**
Relation to movement	Pain related to movement or position	Pain usually independent of movement
Palpation	Local tenderness often present	Usually no localized tenderness

Effect of rest	Symptoms may improve at rest	Pain often persists despite rest
Muscle contraction	Pain increases with active contraction	No significant change
Systemic symptoms	Usually absent	May be present
Pain character	Localized, mechanical	Colicky, visceral

An important issue highlighted in the analyzed publications is the risk of diagnostic overuse in patients presenting with acute pain and an ambiguous clinical picture. It has been demonstrated that failure to consider musculoskeletal injuries in the differential diagnosis may lead to unnecessary imaging studies and hospital admissions without a significant impact on subsequent therapeutic management [17,33]. At the same time, authors emphasize that accurate initial clinical assessment may contribute to more rational use of available healthcare resources [18,42].

The findings of this review also highlight the importance of a detailed physical activity history in the diagnostic process. Information regarding the type of training, its intensity, and the timing of pain onset may provide valuable clues allowing appropriate direction of further diagnostic evaluation [16,41]. This issue is of particular relevance in the practice of primary care and emergency medicine physicians, who are often the first to assess patients presenting with acute pain.

It should be emphasized that the aim of this study is not to diminish the importance of organ-related diagnostics in acute pain syndromes, but rather to draw attention to the need for parallel consideration of musculoskeletal causes, particularly in physically active individuals. Such an approach is consistent with current trends promoting diagnostic strategies based on thorough clinical assessment and rational selection of additional diagnostic tests [18,42].

5. Conclusions

Musculoskeletal injuries constitute a common cause of acute pain syndromes in recreational athletes and may present in a manner suggestive of internal organ diseases. This particularly applies to pain localized to the lumbar region, abdomen, groin, and pelvic area, where the clinical presentation is often non-specific and difficult to interpret unequivocally.

The present literature review indicates that incorporating musculoskeletal injuries into the differential diagnosis of acute pain syndromes in physically active individuals may enhance diagnostic accuracy and reduce unnecessary diagnostic investigations. In this context, particular importance should be attributed to a comprehensive medical history addressing the type and intensity of physical activity, as well as careful analysis of the relationship between pain, movement, and muscle tension.

The findings of this study underscore the importance of a holistic approach to patients presenting with acute pain, particularly in primary care and emergency medicine settings. Parallel consideration of musculoskeletal and organ-related causes is essential for ensuring patient safety and for the rational use of available healthcare resources.

6. Limitations

This study has the form of a narrative review, which is associated with certain methodological limitations. This type of review does not include a formal assessment of the risk of bias or quantitative analysis, and the selection of the literature may to some extent reflect the authors' subjective judgment. Moreover, the applied methodology does not allow for the formulation of definitive cause-and-effect conclusions.

The available literature on musculoskeletal injuries in recreational athletes is characterized by considerable heterogeneity with regard to injury definitions, characteristics of the studied populations, and applied diagnostic methods. This heterogeneity hampers direct comparison of individual study results and limits the generalizability of the findings.

Należy również podkreślić, że znaczna część analizowanych publikacji odnosi się do It should also be noted that a substantial proportion of the analyzed publications focus on selected types of physical activity or involve relatively small study populations. Therefore, the presented conclusions should be interpreted with caution, and further research—particularly prospective studies encompassing various forms of recreational activity—is needed to expand knowledge in this area.

7. Disclosure

The authors declare no conflicts of interest related to the publication of this manuscript.

8. Author Contributions

Conceptualization: Sabina Ściążko-Gancarczyk, Maciej Gancarczyk

Methodology: Sabina Ściążko-Gancarczyk, Kinga Marciniak

Software: Not applicable

Validation: Sabina Ściążko-Gancarczyk, Maciej Gancarczyk, Kinga Marciniak, Jagoda Węgrzyn, Małgorzata Maliszewska

Formal analysis: Sabina Ściążko-Gancarczyk

Investigation: Małgorzata Maliszewska, Jagoda Węgrzyn

Resources: Jagoda Węgrzyn

Data curation: Not applicable (narrative review)

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Supervision: Kinga Marciniak

Project administration: Maciej Gancarczyk

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Informed Consent Statement

Not applicable. This study does not involve human participants.

Data Availability Statement

No new data were created in this study.

Data sharing is not applicable to this article.

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Conflicts of Interest

The authors declare no conflict of interest.

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