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Musculoskeletal injuries profile of patients applying to a sports medicine outpatient clinic

Merve Demir Benli

Section of Sports Medicine, Atatürk Education and Research Hospital, Konak, Izmir, Turkey

ORCID ID of the author(s)

MDB: 0000-0001-9065-593X

Corresponding Author
Merve Demir Benli
Section of Sports Medicine, Atatürk Education and Research Hospital, Hatay Additional Service Building, Murat Reis Neighbors, İnönü Street, No: 102– 35280, Konak, Izmir, Turkey
E-mail: mdbenli@gmail.com
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Abstract

Background/Aim: Sports injuries represent a significant public health concern, and their prevalence is on the rise due to the growing global population and increased participation in amateur and professional sports. Epidemiological studies on sports injuries are crucial in identifying priority areas for injury prevention efforts. While there is a wealth of research on musculoskeletal injuries specific to various sports, there is a scarcity of epidemiological studies focusing on patients seeking care at sports medicine outpatient clinics. This study aims to define and categorize the diagnoses of patients presenting to a sports medicine outpatient clinic for musculoskeletal injuries.

Methods: This retrospective cohort study included all patient visits for musculoskeletal injuries at the sports medicine outpatient clinic between 1 July 2022 and 30 June 2023. Patients with complaints other than musculoskeletal injuries and those lacking sufficient data (diagnosis or injury type) in the data recording system were excluded. Data recorded for each participant included age, sex, symptoms, injured body region, and injury type. Diagnoses were categorized using the Orchard Sports Injury and Illness Classification System (OSIICS) v.13. Descriptive analyses provided a detailed overview of reported injuries, including counts and proportions within specific injury categories. Categorical variables are presented as 'n' and (%), while continuous variables are expressed as medians with interquartile ranges (IQRs).

Results: Data from 1,203 patients (395 females and 808 males) were analyzed, with a mean age of 24 (2.2) years. A total of 1393 injuries were documented, with the knee being the most commonly injured body region (n=398, 30.7%). Among the OSIICS v.13 injury categories, muscle/tendon injuries constituted 33.7% (n=466) of all injuries, followed by cartilage/synovium/bursa injuries (n=432, 31.2%).

Conclusion: This study revealed that the knee was the most frequently injured body region among patients seeking care at the sports medicine clinic for musculoskeletal injuries. Muscle/tendon injuries were the predominant type of injury observed.

Keywords: athletic injuries, classification, injuries, musculoskeletal system, sports medicine

Introduction

Sports injuries represent a significant public health concern, with the global population's steady growth contributing to a continuous rise in amateur and professional sports participation [1,2]. While data on elite, professional, or college-level athletes are readily available, information about other levels of play remains limited. Detailed data, especially for individuals engaging in sports at the community level, are scarce. Additionally, the incidence of comorbidities and musculoskeletal injuries stemming from sedentary lifestyles has been on the rise, resulting in an increased demand for healthcare services [3].

The International Federation of Sports Medicine (FIMS) has defined sports medicine as a discipline that investigates the impact of exercise, training, sports, and sedentary lifestyles on healthy and unwell individuals. This field encompasses prevention, diagnosis, treatment, and rehabilitation across all age groups and genders, focusing on those engaged in physical activity. Sports medicine is a multidisciplinary field, blending theory and practice to generate research that benefits individuals [4]. Following the European Federation of Sports Medicine Associations' definition, sports medicine encompasses the diagnosis, treatment, prevention, and rehabilitation of injuries and health issues resulting from engagement in physical exercise and activities, spanning all levels of participation. It also strives to promote the adoption of an active lifestyle among the general public [5].

The Centers for Disease Control and Prevention (CDC) defines musculoskeletal injuries as injuries that impact the soft tissues, including muscles, tendons, nerves, joints, and cartilage. These injuries can result from sudden events or sustained repetitive motions, external forces, improper postures, or exposure to vibrations [6].

Numerous studies have explored musculoskeletal injuries associated with various sports; however, there is a notable scarcity of epidemiological investigations focusing on patients seeking care at sports medicine outpatient clinics [7-12]. This study's primary objective is to delineate and categorize the diagnoses of individuals who sought treatment at sports medicine outpatient clinics for musculoskeletal injuries.

Materials and methods

This is a retrospective cohort study. The sample size was determined by the number of patients who sought treatment at the sports medicine outpatient clinic for musculoskeletal injuries during the study period. The study population encompassed all patient presentations for musculoskeletal injuries at the sports medicine outpatient clinic from 1 July 2022 to 30 June 2023. The records of 1,203 patients who met the inclusion criteria were examined. The study protocol received approval from the Atatürk Education and Research Hospital Ethics Committee (Approval no.: 0371, approval date: August 18, 2023), and the study adhered to the guidelines outlined in the Declaration of Helsinki, 2013.

This record-based study analyzed all patient presentations in the clinic's online data recording system. It specifically focused on patients who sought treatment at the sports medicine clinic for musculoskeletal injuries. Patients with complaints unrelated to musculoskeletal injuries and those lacking sufficient data (diagnosis and injury type) in the data recording system were excluded from the study.

The study collected patients' age, sex, symptoms, injured body region, and injury type. To prevent duplication, patients with multiple diagnoses simultaneously or those seeking treatment at different times for a previous diagnosis were considered single patients. Each diagnosis was documented separately, and the total number of diagnoses was manually calculated.

Musculoskeletal injuries were defined according to the CDC definition [6]. These injuries were further classified using the Orchard Sports Injury and Illness Classification System (OSIICS) v.13 [13]. This system categorizes injuries based on the injured body region, tissue type, and pathology type. The injury data were meticulously assigned to the most relevant cell within the matrix. Raw numbers for each injury type were calculated and expressed as a percentage of the total injuries.

Statistical analysis

The data were initially organized within a Microsoft Excel spreadsheet (Microsoft Corporation, Redmond, WA, USA). Subsequently, the researchers meticulously reviewed the data for accuracy and conducted a manual cleaning process to remove duplicate entries and records that did not meet the eligibility criteria. Following this data preparation phase, the dataset was imported into SPSS v.21 (IBM, Armonk, NY, USA).

Descriptive analyses were carried out to provide a comprehensive overview of the reported injuries. These analyses included counts and proportions of injuries categorized by specific criteria. Categorical variables are presented as "n" and the corresponding percentage within parentheses (%), while continuous variables are represented as medians accompanied by interquartile ranges (IQRs).

Results

Over 12 months, a total of 3,605 patients admitted were assessed. Among these patients, 1,578 were excluded from the study due to athlete's license examinations, 461 were excluded for reasons unrelated to the musculoskeletal system, and 363 were excluded because they were undergoing follow-up examinations after their initial admission. Consequently, the study comprised 1,203 patients.

Of the patients, 67% (808 out of 1,203) were male. The average age of the patients was 31.3 (14.3) years, with an age range of 6 to 77 years. Among the patients, 29% (352 out of 1,203) were not engaged in any sports, and the most common sport was soccer (n=255, 30%) (Table 1). A total of 1,383 injuries were recorded, with the highest number of clinic visits occurring in June (14.7%) (Figure 1). Most musculoskeletal injuries (n=398; 30.7%) affected the knee (Figure 2). Injuries categorized under OSIICS v.13 as muscle/tendon accounted for 33.7% (n=466) of the injuries, followed by cartilage/synovium/bursa (n=432; 31.2%) (Table 2).

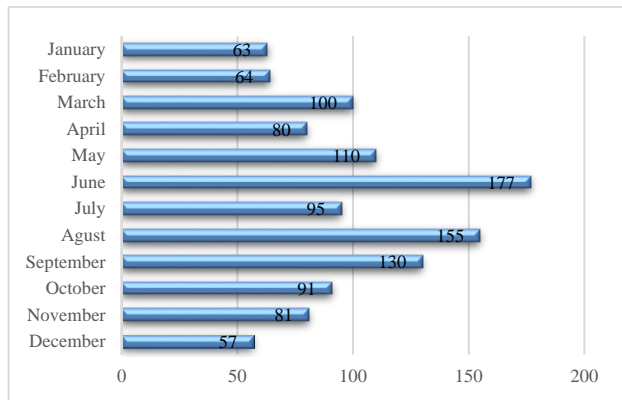Figure 1: Distribution of the number of patient applications by months.

Table 1: The sports branches of participants.

Branches of sports	Participants, n=850	(%)
Soccer	255	30
Fitness	156	18.4
Volleyball	48	5.6
Basketball	44	5.2
Running	36	4.3
Preparation for police/military service	31	3.6
Athletics	26	3
Pilates	25	2.9
Walking	25	2.9
Kick boks	23	2.7
Tennis	18	2.2
Swimming	14	1.7
Military personnel	14	1.7
Taekwondo	12	1.4
Gymnastics	12	1.4
Cycling	12	1.4
American football	11	1.3
Yoga	9	1
Boks	8	0.9
Trekking	8	0.9
Hiking	6	0.7
Karate	6	0.7
Police	5	0.5
Dancing	5	0.5
Triathlon	4	0.4
Water ball	4	0.4
Martial arts	4	0.4
Crossfit	4	0.4
Sailing	4	0.4
Fencing	4	0.4
Wrestling	3	0.3
Orienteering	3	0.3
Archery	2	0.2
Paragliding	1	0.1
Folk dancing	1	0.1
Ballet	1	0.1
Underwater rugby	1	0.1
Judo	1	0.1
Table tennis	1	0.1
Capeora	1	0.1
Barbell	1	0.1
Figure skating	1	0.1

n: number, %: percent.
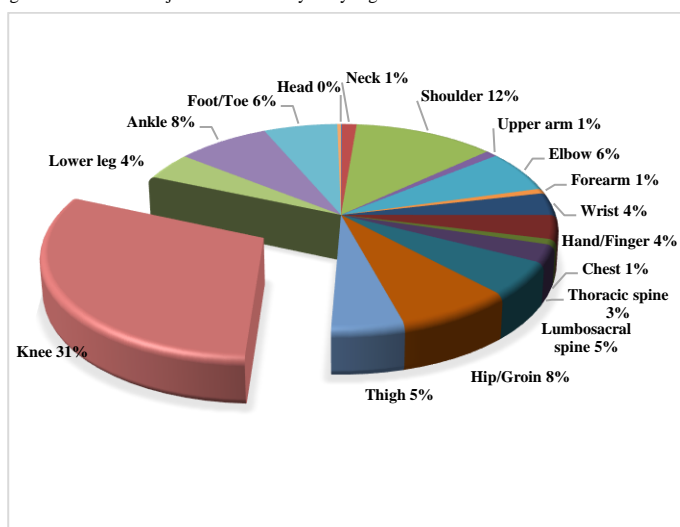
Figure 2: Number of injuries classified by body region.

Table 2: Categories of injury types.

Tissue	Pathology type	n=1.383	(%)
Muscle/tendon		**466**	33.7
	Muscle injury	116	
	Muscle strain	*109*	
	Muscle rupture	*7*	
	Myofascial pain syndrome	49	
	Muscle spasm	21	
	Delayed onset muscle soreness (DOMS)	2	
	Fibromyalgia	1	
	Compartment syndrome multiple sites lower leg	1	
	Tendinopathy	202	
	Achilles tendinopathy	*32*	
	Medial tibial stress syndrome (Shin splints)	*16*	
	Adductor longus tendinopathy	*16*	
	Patellar tendinopathy	*15*	
	Rotator cuff syndrome	64	
	Tendon rupture	7	
	Snapping hip syndrome	2	
	Trigger finger	1	
Nerve		**36**	2.6
	Peripheral nerve injury	36	
	Lumbar disc herniation	*25*	
	Piriformis syndrome	*11*	
	Cervical disc herniation	*5*	
	Carpal tunnel syndrome	*4*	
	Tarsal tunnel syndrome	*3*	
Bone		**141**	10.1
	Acute fracture	31	
	SIAS epiphyseal separation	*3*	
	Bone stress injury	54	
	Stress fracture	*20*	
	Spondylolysis	*5*	
	Stress reactions	*30*	
	Bone contusion	20	
	Bone deformity	14	
	Scoliosis	*8*	
	Hallucs valgus	*5*	
	Kyphosis	*1*	
	Enthesopathy	22	
	Epin calcanei	*9*	
	Haglund deformity	*1*	
	Apophysitis	17	
	Os good schlatter syndrome	*12*	
	Sever disease	*5*	
Cartilage/Synovium/Bursa		**432**	31.2
	Cartilage injury	217	
	Patellofemoral pain syndrome	*201*	
	Chondromalazia patella	*42*	
	Osteochondral dissecans (OCD)	*10*	
	Triangular fibrocartilage complex (TFCC)	*6*	
	Arthritis	58	
	Synovitis/Capsulitis	11	
	Femur-acetabulum impingement	*6*	
	Sacroileitis	*3*	
	Adhezive capsulitis (shoulder)	*2*	
	Medial and lateral meniscal tears	82	
	Degenerative meniscal tear	34	
	Bursitis	26	
	Iliotibial band (ITB) syndrome	*11*	
	Sinovial cyst	*4*	
Ligament/Joint capsule		**177**	12.7
	Plantar fasia injuries	6	
	Plantar fasiit	*5*	
	Plantar fasia rupture	*1*	
	Joint sprain	65	
	ATFL sprain	*42*	
	Acromioclavicular sprain	*22*	
	Lisfranc injury	*1*	
	Acut joint dislocation	23	
	Chronic instability	83	
	ACL rupture	*52*	
	PCL rupture	*7*	
	Radioulnar instability	*7*	
	SLAP tear	*7*	
	Patellar tilt	*5*	
	Patella alta	*3*	
	Sternocostal joint subluxation	*1*	
	Spondylolisthesis	*1*	
Superficial tissues/skin		**95**	6.8
	Contusion	95	
Non-specific		**36**	2.6
	Ganglion cyst	11	
	Synovial plica of knee	6	
	Tumour lower leg	4	
	Pes planus	4	
	Hoffa syndrome	3	
	Glomus tumour	1	
	Tumour thigh	1	
	Avascular necrosis	1	
	Winging scapula	1	
	Restless leg syndrome	1	
	Ankylosing spondylitis	1	
	Metatarsalgia	1	

ACL: Anterior cruciate ligament, ATFL: Anterior talofibular ligament, PCL: Posterior cruciate ligament, SLAP: Superior labrum anterior to posterior, %: percent. Note: Musculoskeletal injuries are classified according to OSIICS v.13 (Orchard Sports Injury and Illness Classification System version 13).

Discussion

This study investigated musculoskeletal injuries in patients seeking treatment at sports medicine outpatient clinics. Muscle and tendon injuries were the most common, followed by cartilage, synovium, and bursa injuries. The knee was the most frequently injured body region. To the best of our knowledge, this is the first study to examine the musculoskeletal injury profile of all patients visiting the sports medicine outpatient clinic, and their diagnoses were categorized using OSIICS v.13.

Epidemiological studies play a crucial role in understanding sports injuries. Primarily, they serve as a roadmap for research to prevent sports injuries and enhance sports safety. These studies offer fundamental insights essential for sports physicians, assisting them in resource allocation for injury treatment and management. Additionally, they aid in pinpointing key areas for research within particular sports disciplines. Sports organizations can use this data to underscore their commitment to providing a secure sports environment for participants. Furthermore, these studies are indispensable for evaluating the effectiveness of interventions, such as rule modifications. They also serve as the foundation for designing tailored sports injury prevention programs [3].

In Turkey, two similar studies were conducted by Tahirbegolli et al. [14,15]. One of these studies focused on injuries among athletes seeking treatment at sports medicine facilities [14], while the other examined injuries in sedentary individuals [15]. Like our study, both investigations employed a retrospective design and encompassed patients seeking treatment over 1 year. The participant cohorts included 1,302 athletes and 744 sedentary individuals, with a male predominance. In all three studies, the knee emerged as the most frequently injured body region, and soccer was the most prevalent sport, aligning with our findings. Notably, neither of the previous studies utilized a classification method for injuries.

In the studies by Tahirbegolli et al. [14,15], ligament injuries predominated among athletes, while sedentary individuals frequently reported patellofemoral pain syndrome. In contrast, our current study identified muscle-tendon injuries as the most common, cartilage/synovium/bursa injuries as the second most frequent, and ligament injuries as the third most common. While the classification systems employed in these studies differ, the variance in injury types between them and our current study remains unexplained. Possible factors contributing to these differences may include variations in the geographic locations where the studies were conducted and differences in the study populations.

Interestingly, Tahirbegolli et al. [14] reported the highest outpatient clinic applications in April, whereas our study observed the highest number of applications in June, followed closely by August. Several factors may explain this discrepancy. Firstly, it could be attributed to students attending sports schools during the summer months or the region's popularity as a holiday destination. Additionally, increased city population and activities during this season may play a role. Compared to June and August, the lower number of applications in July could be due to researcher availability and potential days off during that month.

Numerous epidemiological studies conducted in various countries have examined musculoskeletal injuries in patients seeking treatment at sports clinics. Consistent patterns emerge from these studies: a predominance of male patients (69% to 85%), the knee as the most frequently injured body region (23.2% to 32%), and soccer as the most common cause of injuries (14% to 50%) [7-12]. These findings mirror the results of our study. Soccer enjoys widespread popularity and enthusiastic participation in Turkey and internationally [16]. Consequently, injuries are more prevalent in this sport.

Some studies in the literature were designed prospectively [7,9,11], while others adopted a retrospective approach [8]. However, it's noteworthy that none of these studies employed a classification method for injuries. For example, Garrido et al. [11] also refrained from using a classification method and categorized injuries broadly as ligament/tendon/muscle, with ligament injuries being the most frequently reported. Additionally, Kannus et al. [7] reported that while acute contusions, dislocations, and fractures were more common in men, stress fractures and nerve compression syndromes were more prevalent in women.

Muscle injuries account for 31% of all sports-related injuries, with hamstring muscle injuries being the most prevalent type [17]. Our study also identified the hamstring muscle group as the most commonly injured (23%). Furthermore, the Achilles tendon ranks as the most frequently injured tendon, with a prevalence of 21.5% [18]. This finding aligns with our study, where Achilles tendon injuries were the most common type (18%). These findings from our study are consistent with existing literature in this regard.

The International Statistical Classification of Diseases and Related Health Problems (ICD) is a frequently employed tool in passive surveillance but tends to be less specific when classifying musculoskeletal injuries [19]. In contrast, the Delphi study recommends using ICD or OSIICS for active surveillance, with a preference for OSIICS when more detailed injury categorization is necessary [20]. OSIICS was designed to provide a more comprehensive definition of sports injuries [13]. Consequently, while several studies examining patient injury profiles did not utilize any classification system, ICD was employed in some instances [12]. This variability can lead to different interpretations of the study results.

Limitations

Our study possesses several strengths, including a well-defined characterization of musculoskeletal injuries and the utilization of a classification system specifically designed to describe sports-related injuries. However, it also exhibits several limitations. Firstly, a single physician diagnosed all injuries, and alternative diagnoses could not be independently verified; diagnoses were reliant on the knowledge of a single physician. We excluded patients with missing data from our analysis to mitigate information bias within our extensive population-based cohorts. Furthermore, there was a reduction in the number of applications during certain months due to the physician's scheduled leaves. It is important to note that the findings of this study may not apply to the entire country, various sports disciplines, or other medical specialties.

We contend that employing the OSIICS represents a more precise method for categorizing injuries arising from exercise or sports activities. The utilization of a standardized

classification system in epidemiological investigations focused on these types of injuries, coupled with a consistent approach in selecting such a system, can yield more reliable findings for interpreting and comparing studies in this domain.

Conclusion

In summary, the knee emerged as the most commonly affected body region among patients seeking treatment for musculoskeletal injuries at the sports medicine outpatient clinic, with muscle/tendon injuries being the prevailing injury type. It is imperative to comprehensively assess the musculoskeletal injury landscape in patients to identify and address potential risk factors and prevention strategies. Adopting a classification system in epidemiological studies investigating these injuries, combined with a consistent approach in selecting such a system, can enhance the accuracy of results when interpreting and comparing these studies.

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