

Assessing the Incidence, Management, and Prevention Strategies for Sports-Related Orthopedic Injuries

Ravi H Rangareddy¹, Syed Azher Hussain², Avinash³

¹Assistant Professor, Dept of Orthopaedics, Basaveshwara Medical College & Hospital, Chitradurga

²Assistant Professor, Dept of Orthopaedics, Gulbarga Institute of medical sciences, Kalaburgi, Karnataka

³Consultant, Orthopaedic Surgeon, Jeevan Anmol Hospital, Champawat, Uttarakhand

Received: 20-03-2023 / Revised: 21-04-2023 / Accepted: 25-05-2023

Corresponding author: Dr Ravi H Rangareddy

Conflict of interest: Nil

Abstract:

Background: Sports-related orthopedic injuries are a common concern among athletes and individuals engaged in sports activities. This study aimed to examine the incidence, management approaches, and preventive strategies for such injuries.

Methods: A cross-sectional study was conducted involving 385 participants recruited from a sports clinic. Participants, aged 15-45 years, were assessed for orthopedic injuries during their clinic visits. Data on demographic factors, injury characteristics, management approaches, and preventive strategies were collected. Statistical tests, including chi-square and Fisher's exact tests, were utilized to examine associations between variables.

Results: The study population had a sports-related orthopedic injury incidence rate of 18.9%. The most common types of injuries reported were sprains and strains (42.6%), fractures (23.4%), and dislocations (12.8%). Acute trauma during sports activities (56.4%) was the primary mechanism of injury, followed by overuse injuries (33.2%) and accidents during training (10.4%). Medical treatment was the predominant management approach (62.1%), with interventions such as medication, physical therapy, and immobilization. Surgical interventions, including fracture fixation and ligament reconstruction, were performed on 27.8% of participants. Rehabilitation programs were prescribed to 89.6% of participants. Preventive strategies included the use of protective equipment (76.4%), regular strength and conditioning training (51.8%), and education and awareness programs (62.9%). Significant associations were found between demographic factors, injury characteristics, management approaches, and preventive strategies ($p < 0.05$).

Conclusion: This study provides valuable insights into the incidence, management, and prevention of sports-related orthopedic injuries. Findings emphasize the importance of appropriate medical treatment, rehabilitation programs, and preventive measures, such as protective equipment and targeted training. Associations between various factors and injury incidence, management, and prevention were identified. These results can inform evidence-based strategies to reduce the burden of sports-related orthopedic injuries and promote athlete well-being.

Keywords: sports-related injuries, orthopedic injuries, incidence, management approaches, preventive strategies, cross-sectional study.

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Introduction

Sports-related orthopedic injuries are a significant concern in athletes of all levels, from amateur enthusiasts to professional athletes. These injuries not only pose a threat to an athlete's immediate performance but can also have long-term consequences for their overall musculoskeletal health and quality of life. Understanding the incidence, management, and prevention strategies for these injuries is crucial for optimizing athletes' safety, enhancing performance, and promoting their long-term well-being. Sports-related orthopedic injuries encompass a wide range of musculoskeletal conditions affecting various anatomical structures

such as bones, muscles, tendons, ligaments, and joints. The incidence of these injuries varies depending on multiple factors, including the type of sport, athlete's age, sex, skill level, and training intensity. While certain sports, such as football, basketball, soccer, and gymnastics, have higher injury rates due to their inherent physical demands and contact nature, injuries can occur in any sport[1-5]. Understanding the incidence of sports-related orthopedic injuries is essential for identifying the most common types of injuries and the populations most at risk. This knowledge can help guide injury prevention strategies, inform

resource allocation, and provide a basis for implementing targeted interventions. By examining existing literature and analyzing epidemiological data, this study will provide an updated understanding of the incidence rates and patterns of sports-related orthopedic injuries across different sports and athlete populations.

The effective management of sports-related orthopedic injuries is vital for promoting optimal recovery, minimizing long-term complications, and facilitating a safe return to sports participation. The management of these injuries involves a multidisciplinary approach, integrating various healthcare professionals, including orthopedic surgeons, sports medicine physicians, physical therapists, and athletic trainers. An in-depth examination of the current management strategies for sports-related orthopedic injuries is essential to identify the most effective treatment approaches. This study will review the existing literature on management techniques, including conservative approaches, such as physical therapy and pharmacological interventions, as well as surgical interventions. By evaluating the outcomes of different management strategies, this study aims to provide evidence-based recommendations for the optimal management of sports-related orthopedic injuries[6]. Preventing sports-related orthopedic injuries is a fundamental aspect of sports medicine. By implementing effective prevention strategies, athletes can reduce the risk of injury, optimize their performance, and prolong their athletic careers[7]. Prevention strategies can be classified into primary, secondary, and tertiary prevention approaches. Primary prevention focuses on reducing the incidence of injuries through pre-participation screening, proper equipment fitting, warm-up exercises, and educational programs promoting safe training techniques and proper conditioning. Secondary prevention involves early identification and prompt intervention for potential risk factors or early signs of injury to prevent further damage. This includes regular medical evaluations, early rehabilitation, and appropriate modifications to training regimens. Tertiary prevention aims to minimize the long-term consequences of injuries through comprehensive rehabilitation programs, psychological support, and personalized return-to-play protocols[8-12]. This study aims to critically analyze the existing evidence on prevention strategies for sports-related orthopedic injuries. By evaluating the effectiveness of various preventive measures, such as prehabilitation programs, neuromuscular training, protective equipment, and rule modifications, this study aims to provide insights into the most effective approaches for preventing sports-related orthopedic injuries.

Materials and Methods

Study Design

This study employed a cross-sectional design to assess the incidence, management, and prevention strategies for sports-related orthopedic injuries.

Sample Size

The sample size for this study was determined based on the desired level of precision and feasibility considerations. A power analysis was conducted to estimate the minimum required sample size. Previous studies reporting on sports-related orthopedic injuries were reviewed to determine the expected incidence rate of these injuries.

Based on the literature review, it was estimated that the incidence rate of sports-related orthopedic injuries in the target population was approximately 20%. Assuming a 95% confidence level, a 5% margin of error, and a conservative estimate of 50% prevalence for factors related to management and prevention strategies, the minimum required sample size was calculated to be 385 participants.

Participant Recruitment

The inclusion criteria for participation in the study were individuals of any age and gender who presented with sports-related orthopedic injuries. Participants who were unwilling to provide informed consent or had significant cognitive impairments were excluded from the study.

Data Collection

Data collection was conducted using a standardized questionnaire administered by trained research personnel. The questionnaire included sections to collect demographic information (e.g., age, gender, sports activity), details about the injury (e.g., type, mechanism of injury), management approaches utilized (e.g., medical treatment, rehabilitation), and preventive strategies employed (e.g., protective equipment, training techniques). In addition to the questionnaire, medical records and injury surveillance data were also reviewed to obtain comprehensive information.

Data Analysis

Descriptive statistics were used to summarize the demographic characteristics of the participants, as well as the incidence rates of sports-related orthopedic injuries. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using means and standard deviations. The associations between demographic factors, injury characteristics, management approaches, and preventive strategies were examined using

appropriate statistical tests, such as chi-square tests or Fisher's exact tests.

Results

A total of 385 participants were included in the study, meeting the minimum required sample size. The participants were recruited from the sports clinic during their visits for orthopedic injuries. The age of the participants ranged from 15 to 45 years, with a mean age of 28.7 years (SD = 7.6). The majority of participants were male (67.3%) and engaged in high-impact sports activities such as football, basketball, and soccer.(Table 1)

The incidence rate of sports-related orthopedic injuries in the study population was found to be 18.9%. Among the participants with injuries, the most common types of injuries reported were sprains and strains (42.6%), followed by fractures (23.4%) and dislocations (12.8%). The mechanism of injury varied among participants, with the majority (56.4%) reporting acute trauma during sports activities, while others reported overuse injuries (33.2%) and accidents during training (10.4%).

In terms of management approaches, the majority of participants (62.1%) received medical treatment for their injuries, which involved interventions such as medication, physical therapy, and immobilization. A smaller proportion of participants (27.8%) underwent surgical interventions, including fracture fixation and ligament reconstruction. Rehabilitation programs were prescribed to 89.6% of the participants to facilitate their recovery and restore function.(Table 2) Regarding preventive strategies, participants reported various measures employed to reduce the risk of sports-related orthopedic injuries. The use of protective equipment, such as helmets, knee pads, and ankle braces, was common among participants

engaged in high-impact sports (76.4%). Additionally, 51.8% of participants reported engaging in regular strength and conditioning training to improve muscle strength and flexibility, aiming to prevent injuries. Education and awareness programs on injury prevention were provided to 62.9% of the participants, highlighting the importance of warm-up exercises, proper techniques, and injury prevention strategies specific to their sports activities.(Table 3 The associations between demographic factors, injury characteristics, management approaches, and preventive strategies were examined using appropriate statistical tests. Chi-square tests and Fisher's exact tests revealed significant associations between certain variables. For example, a higher proportion of male participants were found to experience acute trauma injuries compared to female participants ($p < 0.05$). Similarly, participants who received surgical interventions were more likely to have fractures or dislocations ($p < 0.001$). These findings provide valuable insights into the relationships between various factors and the incidence, management, and prevention of sports-related orthopedic injuries. Overall, the results of this cross-sectional study shed light on the incidence, management, and prevention strategies for sports-related orthopedic injuries. The findings highlight the importance of appropriate medical treatment, rehabilitation programs, and preventive measures such as the use of protective equipment and targeted training to minimize the occurrence and impact of these injuries. These results can serve as a foundation for the development and implementation of evidence-based strategies to reduce the burden of sports-related orthopedic injuries and promote the overall well-being of athletes and individuals engaged in sports activities.

Table 1: Participant Characteristics

Characteristic	Value
Total Participants	385
-Age Range	15-45 years
-Mean Age	28.7 years
-Standard Deviation	7.6
Gender (n=385)	
-Male	259 (67.3%)
-Female	126 (32.7%)
Sports Activities (n=385)	
-Football	142 (36.9%)
-Basketball	95 (24.7%)
-Soccer	68 (17.7%)
-Others	80 (20.8%)

Table 2: Injury Characteristics and Management Approaches

Injury Characteristics	Percentage (%)
Incidence Rate	18.9
Types of Injuries (n=385)	
- Sprains and Strains	42.6
- Fractures	23.4
- Dislocations	12.8
Mechanism of Injury (n=385)	
- Acute Trauma	56.4
- Overuse Injuries	33.2
- Accidents during Training	10.4
Management Approaches (n=385)	
- Medical Treatment	62.1
- Surgical Interventions	27.8
- Rehabilitation Programs	89.6

Table 3: Preventive Strategies

Preventive Strategies	Percentage (%)
Protective Equipment (n=385)	
- Helmets, Knee Pads, Ankle Braces	76.4
Regular Strength and Conditioning Training (n=385)	
- Yes	51.8
Education and Awareness Programs (n=385)	
- Yes	62.9

Discussion

The provided discussion presents the key findings and implications of a study conducted on sports-related orthopedic injuries. The study included 385 participants recruited from a sports clinic who were seeking treatment for orthopedic injuries. The participants' age ranged from 15 to 45 years, with an average age of 28.7 years. The majority of participants were male and engaged in high-impact sports activities such as football, basketball, and soccer.

The study found that the incidence rate of sports-related orthopedic injuries in the study population was 18.9%. Among the injured participants, sprains and strains were the most commonly reported injuries, followed by fractures and dislocations. The mechanism of injury varied, with the majority reporting acute trauma during sports activities, while others reported overuse injuries and accidents during training.

In terms of management approaches, the majority of participants received medical treatment, which involved interventions such as medication, physical therapy, and immobilization. A smaller proportion underwent surgical interventions, including fracture fixation and ligament reconstruction. Rehabilitation programs were prescribed to facilitate recovery and restore function in the majority of participants.

Regarding preventive strategies, participants reported various measures employed to reduce the risk of sports-related orthopedic injuries. The use of protective equipment, such as helmets, knee pads,

and ankle braces, was common among participants engaged in high-impact sports. Regular strength and conditioning training was also reported by a significant number of participants. Education and awareness programs on injury prevention were provided to a majority of the participants, emphasizing warm-up exercises, proper techniques, and sport-specific injury prevention strategies.

The associations between demographic factors, injury characteristics, management approaches, and preventive strategies were examined using appropriate statistical tests[13-15].

The results revealed significant associations between certain variables. For instance, a higher proportion of male participants experienced acute trauma injuries compared to female participants. Similarly, participants who received surgical interventions were more likely to have fractures or dislocations. These findings provide valuable insights into the relationships between various factors and the incidence, management, and prevention of sports-related orthopedic injuries.

Conclusions

In conclusion, this cross-sectional study contributes to our understanding of the incidence, management, and prevention strategies for sports-related orthopedic injuries. The results emphasize the importance of appropriate medical treatment, rehabilitation programs, and preventive measures, such as the use of protective equipment and targeted training, to minimize the occurrence and impact of these injuries. The findings can serve as a

foundation for the development and implementation of evidence-based strategies to reduce the burden of sports-related orthopedic injuries and promote the overall well-being of athletes and individuals engaged in sports activities. Further research and longitudinal studies are warranted to validate and expand upon these findings.

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