Injury pattern and risk factors in grassroots football: A study of 10-year-old athletes

Leo Ferdinand[1*A-F], Yulingga Nanda Hanief[2,A,D-F], Randy M. Manimtim[3,D-F]

[1,2] Malang State University, Street of Semarang No 5, Malang City, East java Province, Indonesia
[3] Batangas State University TNEU, Philippines

***Corresponding author:** Leo Ferdinand; Malang State University, Street of Semarang No 5, Malang City, East java Province, Indonesia; email: leo.ferdinand2106316@students.um.ac.id

Received: 2025-01-02
Accepted: 2025-04-24
Published: 2025-05-23

A – Research concept and design
B – Collection and/or assembly of data
C – Data analysis and interpretation
D – Writing the article
E – Critical revision of the article
F – Final approval of article

ABSTRACT

Background: Young football players, especially in grassroots competitions, are highly susceptible to injury due to physical contact, fatigue, and underdeveloped motor skills, making injury prevention a critical aspect of early childhood sports.
Objectives: This study aims to analyze the types, causes, and needs for injury prevention in 10-year-old football players.
Methods: A descriptive quantitative design was used with the survey method. Data was collected through a structured questionnaire distributed to players injured during the competition. A purposive sampling technique was applied with inclusion criteria: (1) players injured during the match and (2) willing to participate. The final sample consisted of 25 athletes.
Results: A total of 25 injury incidents were recorded. The most common type of injury was contusion, reaching 13 cases (52%), followed by muscle cramps (20%) and sprains (8%). Most injuries (64%) occurred in the lower extremities, especially the knee and thigh. Injuries predominantly occurred in the second half of matches (60%), with 88% caused by physical contact with an opponent. In the absence of medical personnel, coaches often found themselves in the role of first responders, a challenging position that requires adequate training and support. Many players continued to play despite their injuries, indicating a need for improved injury management.
Conclusions: The study concluded that football injuries in children generally occur in the lower extremities, with bruising being the most dominant type. Player-to-player collisions caused most injuries, and many players could continue the match. This shows the importance of prevention, education, and follow-up for developing the sport of football.

Keywords: first aid, grassroots football, injury prevention, lower extremities, sports injuries, youth athletes.

How to cite this article: Ferdinan, L., Hanief, Y. N. & Manimtim, R. M. (2025). Injury pattern and risk factors in grassroots football: A study of 10-year-old athletes. *Sport, Exercise, and Injury*, *1*(1), 27-39. https://doi.org/10.56003/sei.v1i1.512

INTRODUCTION

Sport is not just a significant physical activity but a thrilling experience that all humans should embrace. It is a channel for expression, a way to fulfill physical and psychological needs, and a path to physical fitness and proper activity (Tadlapurkar, 2021). Sports are beneficial physical activities and an integral part of human life. When we exercise, we are not just making movements; we are living the thrill of the game, understanding the rules, and mastering the techniques from physical, psychological, and technical perspectives (Malm et al., 2019). It is crucial to understand that the benefits of sports, such as improved physical fitness and mental well-being, far outweigh the risks of injury when proper precautions are taken.

Football is one of the most popular sports in Indonesia; many young people aspire to become Indonesian national team players, which, of course, must be supported by many things in terms of technique, physical, and mental. The sport of football in Indonesia is growing rapidly; it can be characterized by the number of football schools (SSB) in which there is special football training using age categories to support the development of the quality of athletes in the world of football and avoid the risk of injury (Agus, 2017). Athletes with excellent physical condition will significantly support themselves in achieving their achievements. Having an excellent physical condition can be characterized by not experiencing sports injuries.

Injuries are common in football games. Injury is something that many athletes fear. Football has a risk of injury ranging from mild to severe. Besides being a popular sport in the world, football is one with the possibility of injury to its players with a higher percentage than other sports (Novriza, 2023; Pérez-Gómez et al., 2022). Injuries often occur in early sports athletes and are caused by mistakes in designing training programs, such as excessive physical exercise, improper techniques, and tactics, or lack of rules and supervision during matches. This is where the role of coaches and supervisors becomes crucial. They are responsible for designing safe and effective training programs, teaching proper techniques, and ensuring that matches are conducted safely and fairly.

Injury is a response to a force acting on the body that has exceeded the limits of the body's ability (Okta & Hartono, 2020). Injuries do not see age limits; they can experience injury events from young to adulthood. Research in America shows that around 20% of children and adults who engage in sports activities are injured every year. One of them suffered a serious injury. Injuries are caused by physical contact, and the forces generated in the muscles during activity can also pose a risk of injury. It usually occurs in tendons, ligaments, bones, and joints. At the same time, injuries can occur at the beginning or during physical activity, possibly caused by mistakes in warming up, poor body flexibility, and fatigue factors (Purba, 2017). For an athlete or sports player, injuries that occur can hinder and interfere with achieving higher achievements (Fredianto & Noor, 2021).

Sports injuries are any form of damage sustained by our body during exercise that results in the body being unable to function fully and requires a recovery period for our body to recover. This disease usually affects the musculoskeletal system of bones, tendons, muscles, and cartilage and often causes pain such as edema, tenderness, and the inability of the body to perform strenuous activities (Ilham, 2024). Several factors can cause injuries in people who engage in physical activity. The factors that cause injury are: 1) external violence (the cause comes from outside), 2) internal violence (the cause comes from the person), and 3) overuse (users are always overtired). This

injury occurs because the muscles work beyond the maximum limit (Simatupang, 2016). All sports players, including athletes, must understand how to deal with injuries to reduce the risk of fatal events due to late response to injury (Rofik & Kafrawi, 2022). Injuries in early childhood can be caused by various factors, such as physical training, techniques, and tactics provided during training and competitions that are not explicitly developed for early childhood. Common injuries in early childhood football include cuts, muscle cramps, sprains, dislocations, and fractures. Several factors contribute to people getting injured during sporting activities. Therefore, there is a need for injury prevention and proper treatment of injuries. However, in reality, there are still many people who do not know how to deal with their injuries and are unable to respond immediately. This causes the injury to heal immediately, but it takes a long time and can worsen.

Previous research on injuries in early-age group football matches has shown that the highest incidence of injuries is in the lower extremities (85.6%). The remaining injuries occur in the upper extremities, with the most common being sprains (55.1%), bruises (25.5%), and other abrasions, fractures, muscle cramps, and dislocations (Kajeng et al., 2019). In response to these injuries, it is crucial to identify and update injury information. This emphasis on updated information is essential for keeping coaches, sports organizations, and parents informed and prepared to minimize future injuries. Your role in this, as stakeholders, is crucial and empowering.

Grassroot Football Festival competitions, especially for the 10-year age category, are often held to develop potential while looking for Indonesian footballers who will later become great prospective players. This emphasis on potential should give us hope and optimism despite the inherent risks of injury in football. However, we can significantly reduce these risks with the proper research and prevention strategies. Therefore, research on the prevalence of athlete injuries at the Grassroots Football Festival competition in the 10-year age category is very relevant. This study, and the potential impact it can have on injury prevention, should motivate and engage us all. While elite youth football injuries are well-documented, grassroots-level data remains scarce. This study addresses grassroots-specific injury patterns to inform accessible prevention strategies tailored for early childhood athletes.

METHODS

Study Design and Participants

This study employed a descriptive quantitative design with a survey method to examine the prevalence and characteristics of injuries in grassroots football athletes aged 10 years. The research was conducted during the 'Grassroot Football Festival' held at the ARG football field, Lawang District, Malang Regency, Indonesia, a vibrant hub for youth football.

The population consisted of athletes participating in the tournament, which involved 24 teams. The sampling method used was purposive sampling, with the following inclusion criteria:

1. Athletes who experienced an injury during the match,
2. Athletes who were willing to participate and complete the questionnaire.

The exclusion criterion was athletes who did not report injuries during the event. Based on these criteria, a sample of 25 injured athletes was obtained. The sample size was considered adequate for a descriptive injury surveillance study, adhering to the standards set by previous studies with similar sample ranges (Soegiyono, 2011).

These studies have demonstrated that such numbers are sufficient to describe injury patterns in early-age athletes, especially in a tournament setting, providing a solid foundation for our research.

Ethical approval statement

This research received ethical clearance from the Universitas Negeri Malang Ethics Committee, with reference number 29.11.7/UN32.14/PB/2024. All participants were informed about the purpose of the study, and informed consent was obtained from their parents or legal guardians.

Research Instruments

The main instrument for data collection was a structured questionnaire, a product of a collaborative effort developed by the research team. The questionnaire collected information on injury type, body location, cause, time of occurrence, and first aid treatment, reflecting the team's collective expertise. To ensure content validity, the instrument was reviewed by three experts in sports injury and pediatric physical education. Their feedback was instrumental in making significant revisions to the instrument, enhancing its clarity and relevance, and demonstrating our commitment to producing high-quality work. A comprehensive pilot study was conducted with 10 athletes outside the sample population for reliability testing. The instrument demonstrated high internal consistency (Cronbach's alpha = 0.87), a result that provides strong evidence of the reliability of the items.

Data were collected at the venue immediately after the injuries or during match breaks by the research team. The injured players were accompanied by a coach or guardian while completing the questionnaire to ensure accuracy and ethical compliance.

Data Analysis

The collected data were analyzed using descriptive statistics to determine frequencies and percentages of various injury characteristics (Malik & Minan Chusni, 2018). To ensure methodological soundness, we performed the statistical analysis using the widely accepted tools of Microsoft Excel 2019 and SPSS version 26.

Injury prevalence, types, locations, causes, and timing were presented in a percentage format. It is important to note that no inferential analysis was performed, as our study was specifically designed to provide a descriptive account, not to establish causal relationships.

RESULTS

The Grassroot Football Festival for the 10-year-old age group involved 24 teams from the Java-Bali region, playing 88 matches. Each match consisted of 2x10 minutes. The following results describe the types of injuries, affected body regions, causes, timing, treatment, and player positions.

Table 1. Distribution of Injury Types among Athletes (n=25)

Type of injury	Frequency (n)	Percentage (%)
Bruise (Contusion)	13	52%
Muscle cramps	5	20%
Sprain	2	8%
Bleeding	1	4%
Wound/Grazed	1	4%
Concussion	3	12%
Total	25	100%

Based on Table 1, bruises were the most frequently reported injuries, accounting for 52% of cases, likely resulting from the physical contact inherent in tackles. This statistic underscores the high-contact nature of football. Muscle cramps ranked as the second most common injury, comprising 20% of reported issues, which points to possible concerns related to hydration or conditioning among young players.

Table 2. The part of the body that is injured

Body Region	Sub Regio	Frequency (n)	Percentage (%)	Total
Head, Neck	Head	3	12	16%
	Nose	1	4	
	Neck	0	0	
Upper extremity	Shoulder	0	0	0%
	Elbow	0	0	
	Hand	0	0	
	Wrist	0	0	
	Finger	0	0	
Torso	Back	1	4	20%
	Chest	1	4	
	Stomach	2	8	
	Hips	1	4	
Lower extremity	Thighs	6	24	64%
	Knee	7	28	
	Feet	0	0	
	Ankle	2	8	
	Toes	1	4	
Total		25	100	100%

From Table 2, most injuries (64%) were concentrated in the lower extremities, underscoring the biomechanical stress associated with dynamic movements like running, kicking, and abrupt directional changes. This data highlights the importance of implementing preventive strategies focused on the lower limbs, particularly for youth football players.

Table 3. Factor occurrence of injury

Causal factors	Frequency (n)	Percentage (%)
Physical contact (opponent)	22	88%
Fatigue	2	8%
Falling (non-contact)	1	4%
Total	25	100

Based on Table 3, the predominant etiology of injuries observed was attributed to physical contact, accounting for 88% of cases, which aligns with the nature of competitive sports. Although fatigue-related injuries were less frequent, their occurrence may indicate insufficient recovery time or inadequate rest periods between matches.

Table 4. Time of injury

Match Time	Frequency (n)	Percentage (%)
First Half	10	40%
Second Half	15	60%
Extra Time	0	0%
Total	25	100

Most injuries occurred during the second half of matches (60%) (Table 4), likely due to fatigue accumulation or declining motor coordination. This finding reinforces the need for better physical preparation and substitution strategies.

Table 5. First Aid Providers and Type of Treatment

Providers and Treatment Type	Frequency (n)	Percentage (%)
Providers		
Coach	25	100
Medical Staff	0	0
Treatment Type		
Pain relief spray	18	
Ice compress	3	
Bandage	3	
Gauze	1	
Referral to clinic/hospital	0	

As shown in Table 5, all first-aid treatment was administered by coaches, with pain relief spray being the most common treatment. The lack of medical personnel at the venue highlights a critical gap in early childhood football event organization.

DISCUSSION

This study offers insights into the types, causes, timing, and treatment of injuries that 10-year-old athletes sustain in grassroots football competitions. The findings align with previous research on youth football and provide valuable evidence from an understudied context—grassroots tournaments in Indonesia.

1. Type of Injuries

The study identified bruises (52%) and muscle cramps (20%) as the most common injuries, aligning with findings by Faude et al. (2013) and Kajeng et al. (2019), who reported similar patterns in youth football. The high frequency of contusions reflects the contact-intensive nature of football, particularly at competitive levels. Such injuries often result from player collisions, which are more likely in players with underdeveloped motor coordination. This finding aligns with the research by Faude et al. (2013), which also identified muscle cramps, sprains, and bruises as the most common types of injuries.

A high percentage of bruising injuries are caused by collisions with opponents or friends during the game (Wijaya et al., 2023). Bruises are formed due to damage to the tissue beneath the surface structure of the skin and due to the rupture of small blood vessels or capillaries, resulting in blood and cellular fluid spreading into the surrounding tissue (Meikahani & Kriswanto, 2015).

Handling bruising injuries can be done using PRICE methods, an acronym for Protection, Rest, Ice, Compression, and Elevation. This approach involves protecting the injured area, resting it, applying ice to reduce swelling, using compression to support the injured area, and elevating the injured limb above the level of the heart to reduce swelling. For instance, giving ice compresses to bruises experienced by athletes can help relieve pain and prevent wound swelling. Besides that, creams containing arnica and apigenin can also be provided for bruises that can reduce inflammation and accelerate healing (Robin et al., 2015).

2. Location of Injury

Most injuries occurred in the lower extremities (64%), particularly in the knees and thighs. This aligns with studies by Nilsson et al. (2016) and Pérez-Gómez et al. (2022), highlighting the biomechanical demands of football sprinting, dribbling, and rapid directional changes. These activities produce high-ground reaction forces (the force exerted by the ground on a body in contact with it) and eccentric loading (the

lengthening of a muscle under tension), which elevate the risk of injury, especially in immature musculoskeletal systems.

Given the foot's role as the primary support for kicking, running, and winding to pass opponents, and its high risk of physical impact, it is crucial to implement effective injury prevention strategies. These strategies, such as structured warm-up programs like FIFA 11+ Kids (Sumartiningsih et al., 2022), strength training for lower limbs, the use of protective gear, and educating coaches on proper tackling techniques, have been proven to significantly reduce the risk of injury to athletes over time, providing a reassuring safety net for your team.

3. Factor of Injuries

Physical contact was the primary mechanism of injury, accounting for 88% of cases, which aligns with the inherent nature of football. Coaches, as responsible leaders, must be trained to facilitate contact-safe drills, teach proper tackling techniques, and institute structured warm-up and recovery programs. This commitment to training is crucial in preventing injuries. Specific initiatives such as FIFA 11+ Kids, which have been shown to reduce injury risk by up to 50% (Ramos et al., 2024), should be incorporated into regular training routines.

This finding is similar to the research by Kajeng et al. (2019), which reveals that most injuries to athletes are caused by collisions with opponents or with their friends. This is related to the characteristics of the game of football, which requires explosive movements and has a high intensity, resulting in physical collisions between players. The cause of fatigue is due to the match format, which uses a group system, and the weather is quite hot during the competition, draining a lot of athletes' energy. The field condition factor is also a factor in causing injuries to athletes; from the research findings, the field conditions at the grassroots football festival competition can be said to be good because of the lack of injuries that result from field factors such as cuts/abrasions or sprain due to the surface of the field.

The magnitude of the cause of injury due to body contact must be given special attention. Coaches can make significant efforts to prevent and minimize injuries to athletes by designing strength training, especially in the lower extremities. This empowers coaches to build muscle mass, reducing the risk of injury caused by physical collisions between players. In addition, strength training can be in the form of wearing protective equipment, as per football regulations (Zouita et al., 2016).

4. Time of Injuries

A more significant proportion of injuries occurred in the second half of matches (60%), indicating that fatigue may impair neuromuscular control and increase the risk of injury. This finding is supported by Faude et al. (2013), who discovered that a decline in motor performance due to fatigue raises injury risk among young athletes. These insights underscore the importance of conditioning, proper hydration, and strategic substitutions during youth matches, offering potential solutions to mitigate the risk of injuries.

The incidence of injuries in KU-10 athletes was 96% during the match, and the most significant percentage occurred during the second half. This is not surprising, given the commonality of physical contact in football games. Athletes who are injured the majority can continue the match again even though some are in pain.

The number of collisions that occur during the match is due to the characteristics of youth football; the players still have difficulty controlling their emotions and do not think about the impact of the injury on their future careers. This lack of

consideration is a significant factor in more injuries occurring during the match than during training sessions (Faude et al., 2013).

5. Injury Treatment

The handling given to athletes is by giving ice compresses by 12%, bandages by 12%, cotton by 4%, and the majority of the first treatment given to KU-10 athletes who are injured is giving pain relieving spray with a percentage of 72%. The coach entirely carries out first aid for injuries to KU-10 athletes.

The handling must be based on the type of injury the athlete suffers so that the injury can recover quickly and vice versa. If the handling is inappropriate, it will hurt the athlete's injury condition (Bezpalova et al., 2024). The provision of appropriate treatment also has a positive impact on psychological conditions in the form of a decrease in anxiety levels (Lempainen et al., 2022). This underscores the crucial role of the coach in injury relief beyond their primary duties. Understanding how to first aid in the right injury is important, and the coach's contribution to this process is invaluable.

The number of treatments by giving pain relieving spray is because the majority of injuries experienced by athletes are bruised, so the spray aims to reduce the pain experienced by athletes. Providing cold effects in the form of spray and ice packs can help treat bruises for 72 hours and minimize the risk of hematoma in the wound (Amaniyan et al., 2020; Wang et al., 2020).

The absence of medical personnel and the reliance on coaches as first aid responders (100%) is a significant safety concern. Educating coaches, parents, and organizers on basic injury management skills, such as the PRICE protocol and referral criteria, is crucial. However, this should not replace the need for medical personnel, whose presence is essential for ensuring quick and appropriate injury treatment.

The absence of medical personnel at grassroots football festival competitions can be assumed to result from a lack of attention to the importance of player safety in early childhood football. This may be due to the low awareness of the risk of injury in early childhood players or the lack of regulations that require the presence of medical personnel during matches. However, with increased awareness and better coordination between organizers and local health institutions, there is a potential for quick and appropriate injury treatment, offering hope for a safer future for young athletes.

6. Injury Prevention

In order to minimize the occurrence of injuries in athletes, it is necessary to pay attention to preventive efforts, one of which is warming up before doing sports activities. A well-known warm-up program is FIFA 11. This program has proven effective in reducing the risk of injury by 46% and can accelerate the recovery process by 28.6%, especially in the lower extremities (Khairunnisa et al., 2024). A unique early childhood program, FIFA 11+ Kids, is proven to reduce the risk of injury in children by 50% and for serious injuries by 60% (Ramos et al., 2024).

In addition, a Furball program can reduce the risk of injury in early-age athletes (Obërtinca et al., 2024). Warming up for about 20 minutes can increase muscle strength and flexibility so that during the match, the body is ready (Faude et al., 2018). In addition to warming up, strengthening physical conditions through exercise programs can also prevent injuries; research shows Balagué et al. (2023) and Fanchini et al. (2020) stated that physical exercise, especially training muscle strength using

the overload principle, can reduce the risk of lower extremity injuries in football games. Protective equipment by the standard rules of the game of football and attention to facilities are also important because adequate facilities will provide a sense of comfort for athletes.

7. Impact of Injury

Based on the study's results, it is clear that injuries can significantly disrupt athletes' daily activities. These disruptions can lead to discomfort and anxiety, impacting the athletes' overall well-being. The severity of these injuries further amplifies their impact, making it crucial for us to understand and address this issue.

Injuries to early-age athletes can impact their physical and psychological development. The negative impact is that it can reduce athlete performance, leading to frustration and a lack of motivation to practice. Injuries can also lead to increased anxiety levels, feelings of depression, and a loss of time to do everyday activities (Haraldsdottir & Watson, 2021; Kenis et al., 2024). These psychological effects can be as debilitating as the physical ones, if not more.

Limitations of the study

This study has several limitations. The small sample size (n=25) restricts the generalization of the findings to other situations. The purposive sampling may also introduce selection bias since only visibly injured athletes were included. Furthermore, self-report questionnaires could be affected by recall bias or social desirability, particularly if completed in the presence of coaches.

CONCLUSIONS

The research results show that bruising is the type of injury that most often occurs in early childhood football athletes. For the location of the injury, the majority occurs in the lower extremities. The findings show that injuries to football athletes occur during the match and most when entering the second half. Most injuries are treated with pain-relieving spray, and the coach carries out all first aid.

Injury prevention in early childhood football athletes is the first step in maintaining athlete performance and athlete success in achieving achievements. Prevention can be done with several efforts that have been structured by providing the right training program, paying attention to facilities, and appealing to wear protective equipment according to existing regulations. In addition, coaches, parents, and athletes must realize that it is important to have knowledge and insight regarding injury prevention.

Based on the results of the research, suggestions that might be given are the first, of course, to learn the knowledge of sports injuries and how to handle them properly both for coaches, parents, and organizers of early childhood football competitions and can be done using socialization or education, then provide injury prevention efforts to young athletes for future safety and health, and for further research it must be broader in terms of discussion and have new findings related to early childhood football injuries so that research on injuries at an early age continues to grow.

Further research involving larger multicenter samples is necessary to more accurately capture injury patterns across diverse regions and age groups. Longitudinal studies could investigate the impact of early injuries on athlete development. Moreover, studies assessing the effectiveness of coach-led

interventions or technology-based monitoring (such as wearable sensors) in grassroots football would greatly enhance the literature on injury prevention.

ACKNOWLEDGMENTS

The researcher would like to thank all the participants who helped complete this research project.

DATA AVAILABILITY

The data supporting this study's findings are available on request from the corresponding author. The data are not publicly available because they contain information that could compromise the privacy of research participants.

FUNDING

This research did not receive external funding.

CONFLICT OF INTEREST

The author officially certifies that there are no conflicts of interest with any party with respect to this research.

REFERENCES

Agus, S. (2017). Buku Pintar Sepak Bola. In *Intimedia*. http://repo.iain-tulungagung.ac.id/5510/5/BAB 2.pdf

Amaniyan, S., Ghobadi, A., & Vaismoradi, M. (2020). Cold application on bruising at the subcutaneous heparin injection site: a systematic review and meta-analysis. *SAGE Open Nursing*, *6*, 2377960820901370. https://doi.org/10.1177/2377960820901370

Balagué, N., Hristovski, R., Pol, R., Borrallo, A., & García-Retortillo, S. (2024). Preventing or promoting muscle injuries? Strength training as a risk factor in professional football. *Apunts Sports Medicine*, *59*(224), 100462. https://doi.org/10.1016/j.apunsm.2024.100462

Bezpalova, N., Davybida, N., Malyar, N., & Malyar , E. (2024). Pre-hospital care for various types of injuries. *Scientific Journal of the Dragomanov Ukrainian State University. Series 15*, (7(180), 38-41. https://doi.org/10.31392/UDU-nc.series15.2024.7(180).07

Fanchini, M., Steendahl, I. B., Impellizzeri, F. M., Pruna, R., Dupont, G., Coutts, A. J., Meyer, T., & McCall, A. (2020). Exercise-based strategies to prevent muscle injury in elite footballers: a systematic review and best evidence synthesis. *Sports Medicine*, *50*(9), 1653-1666. https://doi.org/10.1007/s40279-020-01282-z

Fares, M. Y., Stewart, K., McBride, M., & Maclean, J. (2023). Lower limb injuries in an english professional football club: injury analysis and recommendations for prevention. *The Physician and Sportsmedicine*, *51*(3), 260-268. https://doi.org/10.1080/00913847.2022.2045176

Faude, O., Rommers, N., & Rössler, R. (2018). Exercise-based injury prevention in football. *German Journal of Exercise and Sport Research*, *48*(2), 157–168. https://doi.org/10.1007/s12662-018-0505-4

Faude, O., Rößler, R., & Junge, A. (2013). Football injuries in children and adolescent players: Are there clues for prevention? *Sports Medicine*, *43*(9), 819–837. https://doi.org/10.1007/s40279-013-0061-x

Fredianto, M., & Noor, H. Z. (2021). Penanganan Cedera Olahraga Dengan Metode Rice. *Prosiding Seminar Nasional Program Pengabdian Masyarakat*, 1267–1272. https://doi.org/10.18196/ppm.36.316

Haraldsdottir, K., & Watson, A. M. (2021). Psychosocial Impacts of Sports-related Injuries in Adolescent Athletes. *Current Sports Medicine Reports*, *20*(2), 104–108. https://doi.org/10.1249/JSR.0000000000000809

Ilham, Z. (2024). *Penanganan pada cedera olahraga*. Cipta Media Nusantara.

Kajeng, I. B. S. T., & Zein, M. I. (2019). Karakteristik Cedera Pemain Sepakbola Usia Dini (7-12 Tahun) Di Yogyakarta. Thesis. Universitas Negeri Yogyakarta.

Kenis, V. M., Baindurashvili, A. G., Sapogovskiy, A. V., Melchenko, E. V., Kasev, A. N., & Shpulev, P. S. (2024). Musculoskeletal injuries and pain in children involved in sports: A literature review. *Pediatric Traumatology, Orthopaedics and Reconstructive Surgery*, *12*(2), 271–283. https://doi.org/10.17816/PTORS633296

Khairunnisa, A. F., Aditya, A. H., & Kholinne, E. (2024). Efektivitas Program Fifa 11+ Terhadap Pencegahan Cedera Ekstremitas Bawah Pada Pemain Sepak Bola. *Jurnal Akta Trimedika*, *1*(4), 458-477. https://doi.org/10.25105/aktatrimedika.v1i4.21064

Lempainen, L., Mechó, S., Valle, X., Mazzoni, S., Villalon, J., Freschi, M., Stefanini, L., García-Romero-Pérez, A., Burova, M., Pleshkov, P., Pruna, R., Pasta, G., & Kosola, J. (2022). Management of anterior thigh injuries in football players: practical guide. *BMC Sports Science, Medicine and Rehabilitation*, *14*(1), 1–9. https://doi.org/10.1186/s13102-022-00428-y

Malik, A., & Minan Chusni, M. (2018). Pengantar Statistika Pendidikan. In *Deepublish* (1st ed., Vol. 1, Issue 1). Deepublish.

Malm, C., Jakobsson, J., & Isaksson, A. (2019). Physical activity and sports—real health benefits: a review with insight into the public health of Sweden. *Sports*, *7*(5), 127. https://doi.org/10.3390/sports7050127

Meikahani, R., & Kriswanto, E. S. (2015). Pengembangan buku saku pengenalan pertolon gan dan perawatan cedera olahraga untuk siswa sekolah menengah pertama. *Jurnal Pendidikan Jasmani Indonesia*, *11*(1), 15-22.

Nilsson, T., Östenberg, A. H., & Alricsson, M. (2016). Injury profile among elite male youth football players in a Swedish first league. *Journal of Exercise Rehabilitation*, *12*(2), 83–89. https://doi.org/10.12965/jer.1632548.274

Novriza, Y. (2023). Pemetaan Jenis Cedera Olahraga Pemain Persis Akademi. *Jurnal Kesehatan Olahraga*, *11*(02), 43-54.

https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/53892

Obërtinca, R., Meha, R., Hoxha, I., Shabani, B., Meyer, T., & der Fünten, K. aus. (2024). Efficacy of a new injury prevention programme (FUNBALL) in young male football (football) players: a cluster-randomised controlled trial. *British Journal of Sports Medicine*, *58*(10), 548–555. https://doi.org/10.1136/bjsports-2023-107388

Okta, R. P., & Hartono, S. (2020). Tingkat Pengetahuan Penanganan Cedera Olahraga Metode Protect, Rest, Ice, Compression, Elevation, Support Pada Mahasiswa FIO UNESA Angkatan 2016. *Jurnal Kesehatan Olahraga*, *8*(2), 101-108. https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/32819

Pérez-Gómez, J., Adsuar, J. C., Alcaraz, P. E., & Carlos-Vivas, J. (2022). Physical exercises for preventing injuries among adult male football players: A systematic review. *Journal of Sport and Health Science*, *11*(1), 115–122. https://doi.org/10.1016/j.jshs.2020.11.003

Purba, R. H. (2017). Pengetahuan Anggota Kelompok Olahraga Prestasi Sepak Bola Fakultas Ilmu Olahraga Universitas Negeri Jakarta Terhadap Penanganan Cedera Olahraga. *In Prosiding Seminar Dan Lokakarya Fakultas Ilmu Keolahragaan Universitas Negeri Jakarta*, *2*(1), 61–65.

Ramos, A. P., de Mesquita, R. S., Migliorini, F., Maffulli, N., & Okubo, R. (2024). FIFA 11+ KIDS in the prevention of football injuries in children: a systematic review. *Journal of Orthopaedic Surgery and Research*, *19*(1), 1–10. https://doi.org/10.1186/s13018-024-04876-9

Robin, S., Courderot-Masuyer, C., Tauzin, H., Harbon, S., Chavagnac-Bonneville, M., Cadars, B., Jourdan, E., Trompezinski, S., & Humbert, P. (2015). Use of a Model of a Blood-Induced Bruise for the Evaluation of Formulations on Bruising. *Journal of Cosmetics, Dermatological Sciences and Applications*, *05*(01), 7–14. https://doi.org/10.4236/jcdsa.2015.51002

Rofik, M. N., & Kafrawi, F. R. (2022). Tingkat Pengetahuan Penanganan Cedera Olahraga Metode PRICES. *Jurnal Kesehatan Olahraga*, *10*(02), 245–252. https://ejournal.unesa.ac.id/index.php/jurnal-kesehatan-olahraga/article/view/48025

Simatupang, N. (2016). Pengetahuan Cedera Olahraga Pada Mahasiswa Fakultas Ilmu Keolahragaan Unimed. *Jurnal Pedagogik Keolahragaan*, *2*(01), 31-42.

Soegiyono. (2011). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Alfabeta.

Sumartiningsih, S., Risdiyanto, A., Yusof, A., Rahayu, S., Handoyo, E., Puspita, M. A., Sugiharto, Mukarromah, S. B., Hooi, L. B., Lubis, J., Hanief, Y. N., Festiawan, R. & Eiberger, J. (2022). The FIFA 11+ for kids warm-up program improved balance and leg muscle strength in children (9–12 years old). *Journal of Physical Education and Sport*, *22*(12), 3122-3127. https://doi.org/10.7752/jpes.2022.12395

Tadlapurkar, K. P. (2021). Physical Education and Sports' Effects on Students' Lives. *International Journal of Advanced Research in Science, Communication and Technology*, *4*(1), 266–267. https://doi.org/10.48175/ijarsct-964

Wang, H., Guan, J., Zhang, X., Wang, X., Ji, T., Hou, D., … & Sun, J. (2020). Effect of cold application on pain and bruising in patients with subcutaneous injection of low-molecular-weight heparin: A meta-analysis. *Clinical and Applied Thrombosis/Hemostasis*, *26*, 1076029620905349. https://doi.org/10.1177/1076029620905349

Wijaya, R. A., & Supriyono, S. (2023). Identifikasi Cedera pada Siswa Sekolah Sepak Bola Indonesia Muda di Kabupaten Purworejo Tahun 2021. *Indonesian Journal for Physical Education and Sport*, *4*(2), 710-720. https://doi.org/10.15294/inapes.v4i2.57638

Zouita, S., Zouita, A., Kebsi, W., Dupont, G., Abderrahman, A. Ben, Salah, F. Ben, & Zouhal, H. (2016). Strength Training Reduces Injury Rate in Elite Young Football Players During One Season. *Journal of Strength and Conditioning Research*, *30*, 1295. https://doi.org/10.1519/JSC.0000000000000920