ORIGINAL ARTICLE

Nr 2025;15 (2):222-228

Sports Injuries and Re-Educational Treatments in Soccer: A Questionnaire Survey to Young Italian Athletes

Nicola Manocchio, Concetta Ljoka, Anna D'Amato, Giulia Vita, Laura Giordani, Calogero Foti

Physical and Rehabilitation Medicine, Department of Clinical Sciences and Translational Medicine, Tor Vergata University, Rome, Italy

CORRESPONDING AUTHOR:
Nicola Manocchio
Physical and Rehabilitation Medicine
Department of Clinical Sciences and Translational Medicine
University of Rome Tor Vergata
via Montpellier 1
00133 Rome, Italy
E-mail: nicola.manocchio@uniroma2.it

DOI:
10.32098/mltj.02.2025.12

LEVEL OF EVIDENCE: 4

SUMMARY

Background. Soccer is a popular sport with a high prevalence of musculoskeletal injuries in young players. This study aimed to investigate injury patterns, re-educational interventions, and recovery times in adolescent male soccer players (Under 15-Under 16) in Tor Vergata University Hospital, Rome, Italy.

Methods. A cross-sectional observational study involving 43 players (24 U15, 19 U16) was conducted. Players completed a questionnaire on training, injuries throughout their careers, and re-educational interventions.

Results. A significant portion of players (71% U15, 47% U16) reported at least one injury. Lower limbs were most affected, with the thigh (U15) and ankle (U16) being the most common sites. U16 injuries primarily occurred during matches (increased competitiveness), while U15 injuries were more frequent in training sessions. Capacitive-resistive diathermy was the most used re-educational intervention, but motor re-education programs were underutilized. U16 players had longer recovery times (1-2 months) compared to U15 players (2 weeks-1 month).

Conclusions. This study highlights the high prevalence of injuries in young soccer players. Injury context differed by age group, suggesting a need for targeted prevention strategies. The underutilization of motor re-educational programs points to a potential gap in injury management. Future research with a larger sample size and longitudinal design is needed to explore risk factors and preventive measures in more depth.

KEY WORDS

Adolescent soccer players; injury patterns; motor re-education; recovery time; rehabilitation.

INTRODUCTION

Soccer is widely considered the most popular sport globally, with millions registered players and an even larger number of individuals who are believed to participate in the game. Soccer is a team sport where two teams, each consisting of 11 players, strive to score as many goals as possible by propelling the ball into the opposing team's goal (1).

Soccer can play a significant role in the development of young people. Research has shown that physical endurance, aerobic fitness and cognitive skills (*i.e.*, concentration and visuospatial ability) are crucial for match performance (2-4). During training sessions and competitive matches, soccer players typically engage in intricate movements demanding a high level of athleticism. These movements can subject the musculoskeletal system to stress, placing athletes at risk of potential injuries (5-7).

Thus, understanding the risk factors for soccer-related musculoskeletal injuries in adolescent male soccer players can aid in the development of prevention and rehabilitation strategies (8).

It is also noteworthy that rehabilitative approaches, such as the use of motor re-education or physical agents, can help

in the recovery after soccer injury in young men by shortening the time to return to play and reducing the burden on athletes (9-11).
The primary aim of this work was to evaluate the type of training and workload, the prevalence of sports injuries, performed by young sportsmen playing in a sport club in the city of Rome.
As secondary aim, we meant to identify the types and intensity of re-educational interventions applied to this population.

MATERIALS AND METHODS

The study was conducted in accordance with the Declaration of Helsinki. Ethical review and approval were waived for this study due to the explorative/observational nature of the study and the non-intervention. This cross-sectional observational study involved young male soccer players between 14 and 16 years of age (divided in two categories: Under 15 (U15) and Under 16 (U16)) who were invited to answer a 19 items questionnaire. The questionnaire was submitted in the period February 2021 to April 2021.
Being under the Italian legal age, informed consent was given by players' parents as well as themselves. All data were collected and stored anonymously; privacy was observed according to the current legislation. The study was conducted according to the ethical standards established in the Declaration of Helsinki of 1946 (12).
An initial section of the questionnaire focused on other physical activities the athlete may play in addition to basic training with the team. After the first section, a second one focused on the injury itself, with the possibility to specify if more than one occurred. A third section involved the re-educational approaches used by the athletes and the time needed to return to sport.
The club's medical team was responsible for the first diagnosis of the injuries sustained during training sessions or matches; our research team then reviewed the injuries and classified them. We used the definition of injury in soccer provided by the International Football Injury Consensus Groups: "any physical complaint sustained by a player that results from a soccer match or soccer training" (13). This definition encompasses any physical issue or complaint that arises during or as a result of participation in soccer activities.
A physician from our team assisted the participants in answering the questionnaire, to address all questions and doubts related to injuries and re-educational interventions.

RESULTS

Results are reported as absolute frequencies and percentages.
A total of 43 male soccer players participated in this study, and all participants completed the questionnaire in its entirety.

Under 15 Category

Of the 43 participants, 24 (56%) belonged to this category.
A high number (21, 88%) reported engaging in physical activities outside of regular soccer training. Among these participants, 14 (67%) trained at home, highlighting a preference for home-based exercise. Public Park usage was low (1 participant, 5%). Four players (19%) exercised at school, and 2 participants (9.5%) engaged in additional sports.
The cumulative duration of physical activity within this group, which includes soccer-related activities such as training and matches, as well as recreational activities, was distributed as follows: 7 players (29%) dedicated about 8-10 hours, 13 players (54%) engaged in activities for 6-8 hours, 3 players (13%) dedicated 4-6 hours training. Only 1 player (4%) was an exception in this assessment, committing more than 10 hours to training.
In this group, 17 participants (71%) reported suffering at least one injury that led to a momentary halt in activity during their career. Overall, a total of 26 injuries occurred in all participants.
None of the participants suffered early injuries under the age of 10; 9 injuries occurred between 11-12 years (35%) and 3 (11%) at 15 years. The highest frequency was found between the ages of 13 and 14, with 14 injuries (54%). This shows the adaptation's difficulties they have to face from soccer school to their first year of competitive play at that time.
Twelve injuries (46%) occurred during training, 9 (35%) during a match and 5 (19%) during leisure time. 10 of the 26 injuries (38%) were caused by a collision with a playmate or opponent and therefore by external factors, 16 (62%) occurred independently.
As for the affected body districts, 6 out 26 (23%) affected thigh, 5 (19%) affected ankle, 4 (15%) affected foot, 2 (8%) affected upper limbs, 2 (8%) affected leg, 1 (4%) affected head, 1(4%) affected trunk, 1 (4%) affected pelvic bone, 1 (4%) affected knee, 3 (11%) affected other parts of the body (**table I**).
Seven injuries (27%) were bone fractures, 5 (19%) muscle elongations, 5 (19%) joint injuries, 4 (15%) muscle distractions, 4 (15%) tendinopathies, 1 (5%) head trauma (**table II**).
Following an injury, physical agent-based re-educational programs were implemented in 50% of cases, with the possibility of more than one modality for player for a total of 14 combinations of physical therapy modalities. Capaci-

Table I. Anatomical Sites Affected – U15 group.

Body part	n
Head	1
Trunk	1
Shoulders	0
Upper Limbs	2
Pelvic bone	1
Thighs	6
Knees	1
Legs	2
Ankles	5
Feet	4
Other	3
Total	**26**

Table II. Mechanism of Injury – U15 group.

Body part	n
Body part	n
Head Trauma	1
Bone Fracture	7
Joint lesion	5
Muscle Elongation	5
Muscle Distraction	4
Tendinopathy	4
Total	26
Ankles	5
Feet	4
Other	3
Total	**26**

Table III. Re-educational Interventions – U15 group.

Type of intervention	n
Capacitive-Resistive Diathermy	9
Magnetotherapy	1
Laser therapy	2
Ultrasound therapy	1
TENS	1
Other	0
Physiotherapy	3
Total	**17**

tive-resistive diathermy was the most frequent modality (9, 64%), followed by Laser therapy (2, 14%), magnetotherapy (1, 7%), Ultrasound therapy (1, 7%), and Trans Cutaneous Electrical Nerve Stimulation (TENS) therapy (1, 7%). The duration of physical therapy ranged from one to two weeks for 9 (64%) of participants and three to four weeks for the remaining 5 (36%).

Notably, only 3 (12%) players received additional motor re-educational programs (**table III**).

Following rehabilitation, the majority of participants (15, 58%) were able to return to competitive activities within two to four weeks. Specifically, 15 (58%) participants recovered within two weeks, while 9 (35%) and 2 (8%) took one to two months and three to four months, respectively.

Under 16 Category

Nineteen participants out of 43 (44%) fell into this category. Eighteen of the 19 (95%) U16 participants engaged in sports activities in addition to team training. 13 (72%) of these 18 athletes trained at home, 3 (28%) played other types of sports and 3 (28%) school-based activities. Cumulative duration of physical activity was distributed as follows: 8 players (42%) dedicated from 6 up to 8 hours, 8 (42%) engaged in activities for a total duration of 8 to10 hours, 3 players (16%) dedicated 4 to 6 hours.

In the U16 category, 9 athletes (47%) suffered at least one injury, requiring a minimum two-week cessation of competitive activities. These injuries, including both initial occurrences and any recurrences from the same player, resulted in a total of 18 reported injuries.

Among the injuries, 8 (44%) occurred between the ages of 13 and 14, 4 (22%) injuries occurred between the ages of 11 and 12, 3 (17%) injuries before 10 years old and 3 (17%) after 15 years old.

Seven (39%) injuries occurred during training, 10 (56%) injuries occurred during a match, 1 (5%) injury occurred during free time or during another activity.

In this age group, 9 (50%) of the injuries occurred in clash with other players, 9 (50%) independently.

Table IV. Anatomical Side Affected – U16 group.

Body part	n
Head	0
Trunk	0
Shoulders	1
Upper Limbs	2
Pelvic bone	0
Thighs	3
Knees	0
Legs	3
Ankles	4
Feet	3
Other	2
Total	**18**

Table V. Mechanism of injury – U16 group.

Body part	n
Head Trauma	0
Bone Fracture	6
Joint lesion	4
Muscle Elongation	2
Muscle Distraction	2
Tendinopathy	4
Total	**18**

Table VI. Re-educational Interventions – U16 group.

Type of intervention	n
Capacitive-Resistive Diathermy	7
Magnetotherapy	0
Laser therapy	2
Ultrasound therapy	3
TENS	0
Other	2
Physiotherapy	2
Total	**16**

The most frequent injury locations were the ankles (4, 22%), feet (3, 17%), and legs (3, 17%). The pelvic bone and upper limbs were each affected in 2 cases (11% per body area). Additionally, 1 injury occurred in the shoulder (5%), 1 in the thighs (5%), and 2 in other areas (11%) (**table IV**).

The distribution of injuries in this group was as follows: 6 bone fractures (33%), 4 joint injuries (22%,), 2 muscle elongations (11%), 2 muscle distractions (11%), and 4 tendinopathies (22%)(**table V**).

Nine (50%) of the 18 injured players underwent a re-educational program. Physical-instrumental therapy was used in 15 cases and some athletes combined different physical therapy modalities. In 7 (47%) cases participants used the capacitive-resistive diathermy, 3 (20%) Laser therapy, 3 (20%) Ultrasound therapy, 2 (13%) other type of instrumental therapy not specified. The duration of physical therapy ranged from one to two weeks for most participants (8, 89%), with 1 (12%) case lasting three to four weeks.

Two (11%) injured players also associate with a re-educational motor program (**table VI**).

The majority (11, 61%) of U16 players took 1-2 months to return to competitive activities. The remaining 7 (39%) players required a shorter recovery time, ranging from 2 weeks to 1 month.

DISCUSSION

The primary aim of this study was to explore the prevalence

ing is consistent with other literature reports (15).

The kind of training applied, and social interactions means a lot in the buildup of young players' personality and competitiveness. The training pattern may include relevant complementary exercises such as proprioceptive, coordination, plyometric or joint mobility exercises (16). The U16 category has a different impact from an athletic point of view compared to the previous years. Although in most cases the number of sessions does not vary between U15 and U16, over time players are subjected to increasingly demanding and less playful training and competitions. Broadly speaking, a lower concentration of matches compared to the professional context allows for better planning in the short, medium and long term. Thus, even considering the increasingly demanding activities of U16 players, we didn't observe a big difference in terms of injuries (56% in U15 *vs* 44% in U16). Comprehensive warm-up programs and proprioceptive balance training, usually applied more carefully in young (professional or non-professional) athletes may help in reducing the prevalence of injuries and explain this result (17).

Distinct injury patterns were emerged between U15 and U16 athletes. While U16 injuries primarily occurred during matches, U15 injuries were more common in training sessions. This difference likely reflects the higher competitiveness of U16 matches, increasing the risk of contact injuries. Conversely, U15 athletes, in a less competitive environment, may be more prone to self-inflicted injuries due to factors like improper technique or overexertion. This finding aligns with previous research on self-inflicted injuries in young athletes (15, 18).

In our population, age seemed to play a significant role in injury susceptibility aligning with existing literature, which suggests a lower injury rate in players below 11 years of age (19).

Lower limbs were undoubtedly the most affected area, consistently with Inklaar's *et al*. review (20). Supporting our observations, Thiebat *et al*. (19) also reported a higher incidence of lower limb injuries, with variations across age groups. However, unlike previous literature, we observed a curious decrease in muscular elongation injuries as age increased. In contrast, existing studies suggest muscle injuries comprise 31% of all sports injuries, with their incidence rising with age (18, 21). Lower limb injuries are a concern not only for young athletes but also for senior professionals, with the thigh and ankle remaining the most commonly affected areas. Interestingly, our study observed a lower prevalence of knee injuries compared to what is typically reported in the literature (22-25).

Capacitive-resistive diathermy therapy emerged as the most prevalent used re-educational intervention, followed by Laser therapy and Ultrasound therapy. Capacitive-resistive diathermy therapy has been increasingly applied in sports medicine for the treatment of muscular and tendinous injuries (26). Studies have shown its effectiveness in reducing pain and improving quality of life in various orthopedic degenerative and inflammatory conditions such as muscle, joint, and tendon injuries (27,28). Incorporating capacitive-resistive diathermy therapy into the re-educational protocols for soccer players could potentially aid in enhancing muscle function, preventing injuries, and promoting recovery (29). Laser therapy and Ultrasound therapy have shown potential benefits mostly on muscle and joint injuries (30, 31).

Notably, only a small number of players underwent a motor re-educational program. This finding was surprising considering literature reports showing that motor re-education has proven to be a valuable tool in enhancing movement quality and quantity in the general population and even more in fully-rehabilitated soccer players (32, 33), a fact acknowledged by athletes themselves (34). Educating players, coaches, and technical staff about the significance of physiotherapy in injury prevention and management is vital for promoting early treatment-seeking behavior and effective rehabilitation outcome. Our study seems to suggest that this process is still in the making and further efforts should be made to this perspective (35).

Analysis of return-to-play timelines revealed a notable difference between U15 and U16 athletes. U16 athletes required a longer recovery period. This difference may be partially attributed to the less competitive environment of the U15 category. A more cautious return-to-play approach and reduced risk of re-injury in this category could allow for a more gradual return to training and minimize the risk of re-injury.

Lastly, the COVID-19 pandemic likely influenced the physical activity behaviors observed in this study. While most athletes (U15: 67%; U16: 72%) reported engaging in physical activity at home, only one U15 athlete participated in outdoor activities at public parks. Social distancing measures and restrictions on movement during the pandemic may have limited opportunities for outdoor exercise, particularly in public spaces (36).

Limitations and strength

There are several limitations in this study.

A detailed clinical examination was not performed, as injury reporting is based on self-reporting, so some athletes may have omitted some injuries that did occur.

Furthermore, it is not possible to report whether there are any relationships between the clinical variables described, for example, player's difference roles in the field, and as this determines the race's quality, the number of contrasts and head shots, the type of training performed. Defenders and attackers run somewhere the same distance, with more high speed and sprint than midfielders; in fact, midfielders run for a lot of time, but with a slower speed. In addition, midfielders make a lot of contrast and head shots, while attackers make more head shots and defenders more contrasts.

Another limitation is the size of the sample examined. This can be attributed to the fact that the research was conducted shortly after the COVID-19 pandemic, which may have impacted recruitment efforts.

Lastly, as a cross-sectional study, this research design does not allow for statistical analysis of correlations or causal relationships. Future longitudinal studies could be conducted to explore these relationships in more depth.

However, a key strength lies in the age group investigated. While existing literature often explores injury patterns in younger or older athletes, this study focuses on a critical

developmental period (U15-U16). Additionally, our questionnaire offers a unique perspective by collecting data on injuries sustained throughout their entire playing careers, rather than focusing solely on a single season. This broader timeframe may provide more comprehensive insights into injury patterns.

CONCLUSIONS

This study highlights the importance of implementing targeted injury prevention strategies for young soccer players, particularly during this critical developmental period. The findings suggest that focusing on proper technique, managing training intensity, and emphasizing motor re-educational programs could be beneficial. Surprisingly, only a small number of players in our population underwent a motor re-educational program, highlighting a potential gap in injury prevention and management practices. Additionally, educating players, coaches, and staff about the value of physiotherapy in injury management and recurrences prevention is crucial to promote early intervention and effective rehabilitation. Future research with a larger sample size and a longitudinal design could provide more robust data on the risk factors associated with injuries and explore the effectiveness of various preventive measures.

FUNDINGS

None.

DATA AVAILABILITY

Data are available under reasonable request to the corresponding author.

CONTRIBUTIONS

MN: writing - review & editing, investigation, conceptualization. LC: methodology, writing - review & editing. DA, VG: writing - original draft, investigation. GL: writing - original draft, data curation.
FC: conceptualization, supervision.

CONFLICT OF INTERESTS

The authors declare that they have no conflict of interests.

REFERENCES

1. Lees A, Nolan L. The biomechanics of soccer: A review. J Sports Sci. 1998;16(3):211-34. doi: 10.1080/026404198366740.
2. Castagna C, Impellizzeri F, Cecchini E, Rampinini E, Alvarez JCB. Effects of Intermittent-Endurance Fitness on Match Performance in Young Male Soccer Players. J Strength Cond Res. 2009;23(7):1954-9. doi: 10.1519/JSC.0b013e3181b7f743
3. Castagna C, Manzi V, Impellizzeri F, Weston M, Barbero Alvarez JC. Relationship Between Endurance Field Tests and Match Performance in Young Soccer Players. J Strength Cond Res. 2010;24(12):3227-33. doi: 10.1519/JSC.0b013e3181e72709
4. Glavaš D. Basic Cognitive Abilities Relevant to Male Adolescents' Soccer Performance. Percept Mot Skills. 2020;127(6):1079-94. doi: 10.1177/0031512520930158
5. Brophy RH, Schmitz L, Wright RW, et al. Return to Play and Future ACL Injury Risk After ACL Reconstruction in Soccer Athletes From the Multicenter Orthopaedic Outcomes Network (MOON) Group. Am J Sports Med. 2012;40(11):2517-22. doi: 10.1177/0363546512459476
6. Onaka GM, Gaspar-Jr JJ, Graças DD, Barbosa FSS, Martinez PF, Oliveira-Junior SAD. Sports injuries in soccer according to tactical position: a retrospective survey. Fisioter Mov. 2017;30(suppl 1):249-57. doi: 10.1590/1980-5918.030.s01.ao24
7. Kakavas G, Malliaropoulos N, Gabbett T, et al. A 90 Minute Soccer Match Induces Eccentric Hamstring Muscles Fatigue. Muscles Ligaments Tendons J. 2021;11(2):318. doi: 10.32098/mltj.02.2021.15
8. Sugimoto D, Loiacono AJ, Blenis A, Morse JM, Borg DR, Meehan WP. Risk Factors in Elite, Adolescent Male Soccer Players: Prospective Study. Clin Pediatr (Phila). 2020;59(6):596-605. doi: 10.1177/0009922820916895
9. Askling CM, Tengvar M, Thorstensson A. Acute hamstring injuries in Swedish elite football: a prospective randomised controlled clinical trial comparing two rehabilitation protocols. Br J Sports Med. 2013;47(15):953-9. doi: 10.1136/bjsports-2013-092165
10. Abreu R, Figueiredo P, Beckert P, et al. Portuguese Football Federation consensus statement 2020: nutrition and performance in football. BMJ Open Sport Exerc Med. 2021;7(3):e001082. doi: 10.1136/bmjsem-2021-001082
11. Cerciello S, Rossi S, Visonà E, Corona K, Oliva F. Clinical applications of vibration therapy in orthopaedic practice. Muscles Ligaments Tendons J. 2019;06(1):147. doi: 10.32098/mltj.01.2016.18
12. World Medical Association Declaration of Helsinki: Ethical Principles for Medical Research Involving Human Subjects. JAMA. 2013;310(20):2191. doi: 10.1001/jama.2013.281053
13. Fuller CW. Consensus statement on injury definitions and data collection procedures in studies of football (soccer)

injuries. Br J Sports Med. 2006;40(3):193-201. doi: 10.1136/bjsm.2005.025270
14. Helgerud J, Engen LC, Wisl??Ff U, Hoff J. Aerobic endurance training improves soccer performance. Med Sci Sports Exerc. 2001;33(11):1925-31. doi: 10.1097/00005768-200111000-00019
15. Tourny C, Sangnier S, Cotte T, Langlois R, Coquart J. Epidemiologic study of young soccer player's injuries in U12 to U20. J Sports Med Phys Fitness. 2014;54(4):526-35.
16. Gasim ZK, Cengizel E, Günay M. Core vs plyometric training effects on dynamic balance in young male soccer players. Rev Bras Med Esporte. 2022;28(4):326-30. doi: 10.1590/1517-8692202228042021_0048
17. Daneshjoo A, Mokhtar AH, Rahnama N, Yusof A. The Effects of Comprehensive Warm-Up Programs on Proprioception, Static and Dynamic Balance on Male Soccer Players. Lucia A, editor. PLoS ONE. 2012;7(12):e51568. doi: 10.1371/journal.pone.0051568
18. Light N, Johnson A, Williams S, Smith N, Hale B, Thorborg K. Injuries in youth football and the relationship to player maturation: An analysis of time-loss injuries during four seasons in an English elite male football academy. Scandinavian Med Sci Sports. 2021;31(6):1324-34. doi: 10.1111/sms.13933
19. Thiebat G, Spreafico A, Mazzoni S, Ravasio G, De Girolamo L, Schoenhuber H. Incidence of injuries in young soccer players: epidemiological study in an Italian elite club. J Sports Med Phys Fitness. 2020;61(1). doi: 10.23736/S0022-4707.20.11157-5
20. Inklaar H. Soccer Injuries: I. Sports Medicine. 1994;18(1):55-73. doi: 10.2165/00007256-199418010-00006
21. Ekstrand J, Hägglund M, Waldén M. Epidemiology of Muscle Injuries in Professional Football (Soccer). Am J Sports Med. 2011;39(6):1226-32. doi: 10.1177/0363546510395879
22. Dvorak J, Junge A. Football Injuries and Physical Symptoms. Am J Sports Med. 2000;28(5_suppl):3-9. doi: 10.1177/28.suppl_5.s-3
23. Schmidt-Olsen S, Bünemann LK, Lade V, Brassøe JO. Soccer injuries of youth. Br J Sports Med. 1985;19(3):161-4. doi: 10.1136/bjsm.19.3.161
24. Schmidt-Olsen S, Jørgensen U, Kaalund S, Sørensen J. Injuries among young soccer players. Am J Sports Med. 1991;19(3):273-5. doi: 10.1177/036354659101900311
25. Corazza A, Orlandi D, Baldari A, et al. Thigh muscles injuries in professional soccer players: a one year longitudinal study. Muscles Ligaments Tendons J. 2013;3(4):331-6.
26. López-de-Celis C, Hidalgo-García C, Pérez-Bellmunt A, et al. Thermal and non-thermal effects off capacitive-resistive electric transfer application on the Achilles tendon and musculotendinous junction of the gastrocnemius muscle: a cadaveric study. BMC Musculoskelet Disord. 2020;21(1):46. doi: 10.1186/s12891-020-3072-4
27. Paolucci T, Pezzi L, Centra M, et al. Effects of capacitive and resistive electric transfer therapy in patients with painful shoulder impingement syndrome: a comparative study. J Int Med Res. 2020;48(2):030006051988309. doi: 10.1177/0300060519883090
28. Rodríguez-Sanz J, López-de-Celis C, Hidalgo-García C, Canet-Vintró M, Fanlo-Mazas P, Pérez-Bellmunt A. Temperature and current flow effects of different electrode placement in shoulder capacitive-resistive electric transfer applications: a cadaveric study. BMC Musculoskelet Disord. 2021;22(1):139. doi: 10.1186/s12891-020-03918-7
29. Pollet J, Ranica G, Pedersini P, Lazzarini SG, Pancera S, Buraschi R. The Efficacy of Electromagnetic Diathermy for the Treatment of Musculoskeletal Disorders: A Systematic Review with Meta-Analysis. JCM. 2023;12(12):3956. doi: 10.3390/jcm12123956
30. Scaturro D, De Sire A, Vitagliani F, et al. Effectiveness of cryo plus ultrasound therapy versus diathermy in combination with high-intensity laser therapy for pain relief in footballers with muscle injuries: A prospective study. BMR. 2024;37(3):771-80. doi: 10.3233/BMR-230265
31. Putri AJY, Kusuma RA, Alpiah DN. Effectiveness of Ultrasound Modality In Ankle Sprain. Int J Social Res. 2024;2(2):56-62.
32. Van Melick N, Van Rijn L, Nijhuis-van Der Sanden MWG, Hoogeboom TJ, Van Cingel REH. Fatigue affects quality of movement more in ACL-reconstructed soccer players than in healthy soccer players. Knee Surg Sports Traumatol Arthrosc. 2019;27(2):549-55. doi: 10.1007/s00167-018-5149-2
33. Baroncini A, Maffulli N, Schäfer L, et al. Physiotherapeutic and non-conventional approaches in patients with chronic low-back pain: a level I Bayesian network meta-analysis. Sci Rep. 2024;14(1):11546. doi: 10.1038/s41598-024-62276-9
34. Odole AC, Agbomeji OT, Onyeso OKK, Ojo JO, Odunaiya NA. Perspectives of Nigerian Athletes About Physiotherapy Services in Sports Injury Management: Implications for Rehabilitation. J Sport Rehabil. 2021;30(6):876-83. doi: 10.1123/jsr.2020-0292
35. Siba N, Quartey J, Kwakye SK. Knowledge and Perception of the Role of Physiotherapy Among Members of Hockey Teams In Accra Ghana. JPRM. 2020;2(1):53-60. doi: 10.21617/jprm2020.219
36. Carta MG, Orrù G, Littera R, et al. Comparing the responses of countries and National Health Systems to the COVID-19 pandemic: a critical analysis with a case-report series. Eur Rev Med Pharmacol Sci. 2023;27(16):7868-80. doi: 10.26355/eurrev_202308_33442