EFFECT OF SAQ TRAINING WITH & WITHOUT CARBOHYDRATE SUPPLEMENTATION AMONG ELITE FOOTBALLER'S SPEED

Fahad Nadeem
MPhil Scholar, Department of Sports Sciences & Physical Education, The University of Haripur, Pakistan. Email: fahadnadeem643@gmail.com

Syed Zia-Ul-Islam
Associate Professor, Department of Sports Sciences & Physical Education, The University of Haripur, Pakistan. Email: zia.islam@uoh.edu.pk

Muhammad Alamgir
PhD Scholar, Department of Sports Sciences & Physical Education, Gomal University Dera Ismail Khan, Pakistan. Email: Alamgir2882@gmail.com

Abstract

The main objective of the current study was to evaluate the changes in performance (speed) through SAQ training and carbohydrate supplementation of 08 weeks intervention. The study was conducted in the vicinity of Punjab University, Lahore. Participants (n=16) were selected through the inclusion criteria which included elite footballers, and the participants were divided into two groups which were groups (A) and (B). Hypotheses of this study were: H0 1 There is no significant difference between the pre-test of group A (speed) and the pre-test of group B (speed). Ha 2 There is a significant difference between the pre-test of group A (speed) and the post-test of group A (speed). Ha 3 There is a significant difference between the pre-test of group B (speed) and the post-test of group B (speed). Ha 4 It is hypothesized that there is a significant difference between training with the Supplementation group (A) and Training without the Supplementation group (B). Group (A) was allowed to follow the 08-week exercise plan (intervention) and carbohydrate supplementation. Only group (B) was allowed to follow the 08-week exercise plan (intervention). Descriptive statistics, means and standard deviations were calculated. The inferential statistics and different tests including paired sample t-test and independent samples t-test were applied to calculate the differences in performance of all studied groups. The data was analyzed and evaluated statistically using Version 22 of IBM SPSS (Statistical Product and Service Solutions) software. The means (with standard deviation) of the speed tests of training with carbohydrate supplementation group (A) and the means (with standard deviation) of the speed tests of training without carbohydrate supplementation group (B) were compared. This study confirms that there was not a significant difference between groups (A) and (B) before training and carbohydrate supplementation. There was a significant difference in speed in, the pre-test of the group (A) compared with the post-test, followed by SAQ Training with carbohydrate supplementation. On the other hand, there was also a significant difference in speed, in the pre-test of group B compared with the

post-test, followed by SAQ Training only. The study confirms that there was a significant change in the Speed of footballers training with carbohydrate supplementation group (A) compared to training without carbohydrate supplementation group (B), after 08 weeks of intervention.

Keywords: SAQ Training; Speed; University level Footballers; Carbohydrate Supplementation.

Introduction

In the realm of contemporary sports elite football players consistently work towards improving their performance and gaining an advantage over their opponents. One training technique that has received a lot of attention is Speed, Agility, and Quickness (SAQ) training. SAQ training is a rigorous form of conditioning that focuses on boosting an athlete's speed, agility, reaction time, and overall quickness. It includes a range of drills and exercises that replicate the movements and requirements of football. (Lennemann et al., 2013). SAQ training is an intensive form of conditioning meticulously crafted to enhance an athlete's speed, agility, reaction time, and overall quickness – all essential qualities for triumph, in football (Jovanovic et al., 2011) The main objective of SAQ training is to enhance an athlete's capacity to swiftly alter direction increase or decrease speed and react promptly to circumstances that commonly occur on the football field. Football is recognized as one of the demanding and fast-paced team sports, necessitating players to possess exceptional physical abilities to excel in different game scenarios (Milanović et al., 2013)

According to Kirkendall and Sayers (2020), exercises typically involve a combination of linear sprints, lateral movements, cutting and pivoting, multi-directional running, and quick acceleration bursts. Coaches and sports scientists create structured training sessions that progressively challenge the athlete's speed, agility, and quickness while closely simulating real-game scenarios. (Kloby Nielsen et al., 2020). Furthermore, SAQ training fosters cognitive abilities as players must quickly process information, make split-second decisions, and anticipate opponents' actions during training exercises. These cognitive skills translate directly into improved on-field performance, where players must think and react swiftly in ever-changing game situations (Trecroci et al., 2022).

The focus is on creating a stimulating and challenging environment that pushes players to continually enhance their physical and cognitive abilities. To conclude, for elite football players, training in Speed, Agility, and Quickness (SAQ) has become essential to their quest for perfection. Its specific emphasis on improving quickness, agility, reaction time, and general speed fits perfectly with football's dynamic style and the variety of physical demands players face during games (França et al., 2022). Although the advantages of SAQ training are widely established, academics, coaches, and athletes are now interested in learning more about how diet and supplements might optimize the efficacy of this training program. One important area of study is carbohydrate supplementation, which is essential for refueling muscles' glycogen reserves and enabling high-intensity activity. This study project's main goal was to examine and contrast the effects of SAQ training on elite football players' performance and physiological reactions with and without carbohydrate supplementation. The purpose of the study was to offer evidence-based insights into the possible advantages of consuming carbohydrates before SAQ training sessions and its implications for improving football players' athletic performance (Hills & Russell, 2017).

Football and other high-intensity sports require a lot of carbohydrates. The body's glycogen reserves are exhausted during prolonged or vigorous activity, which results in fatigue and decreased performance. Carbohydrate Supplementation in the form of sports drinks, gels, or bars can help keep glycogen levels stable, postpone exhaustion, and increase total exercise capacity (Jäger et al., 2017). Carbohydrate Supplementation is now well recognized as an essential part of sports nutrition, especially when it comes to endurance-based activities where sustained energy expenditure is a major consideration. In the past, the focus has been on keeping muscles' glycogen levels high enough for long-duration activities like cycling or distance running. However, new research has shown that carbohydrates are also essential for maximizing performance during high-intensity, intermittent activities, which are typical of football and other sports (Guest et al., 2021) Football has a variety of physical demands since players must sprint, change directions quickly, and accelerate quickly throughout a play. As the game expands, these intense bursts of activity lead to fatigue and reduced performance because the body's glycogen stores are depleting too rapidly. To

perform at their best during practice and games, professional football players must maintain ideal energy levels and minimize the onset of fatigue (Wang & Zhang, 2016)

Carbohydrate supplementation offers a substantial way to meet the unique energy requirements of games and high-intensity activities like football. Sports drinks, gels, or energy bars are easily obtainable types of carbohydrates that players can use to refuel their glycogen stores and maintain energy levels during the physically taxing parts of the game (Williams & Rollo, 2015). Carbohydrate Supplementation during football-related activity has advantages beyond just refueling glycogen. It has been demonstrated that the presence of carbohydrates in the circulation during activity spares the use of glycogen, postponing the onset of fatigue and saving energy for crucial game moments. This glycogen preservation is especially helpful at high-stress moments, such as pivotal moments in a game or during overtime (Murray & Rosenbloom, 2018). To conduct a thorough evaluation of the impacts of SAQ training both with and without carbohydrate supplementation, elite football players from Punjab University have been enlisted in the research. Participants were split into two groups at random: the first group participated in SAQ training sessions while receiving supplements for carbohydrates, and the second group received identical SAQ training but without any supplements (Zoran Milanović et al., 2013).

Materials And Methods

The sole purpose of this research was to discover the speed of university-level footballers through SAQ training and carbohydrate supplementation. In this research study, the researcher examined the effect of SAQ training and carbohydrate supplementation on selected physical parameters (speed) of footballers of university-level players. Therefore, the participants employed a 08-week SAQ training protocol and carbohydrate supplementation.

Study Site

The University of Punjab, Lahore, Pakistan was selected for the conduct of the intervention. The participants in this study were 16 elite footballers.

Participants

The researcher picked 16 participants for the particular study based on inclusion criteria. The participants were divided into two groups: Training with Supplementation group (A) and the Training without Supplementation group (B). Group (A) was

comprised of 08 participants (TSGA, N=08) given the prescribed SAQ Training protocol and carbohydrate supplementation, whereas group (B) (TGB, N = 08) received the SAQ training protocol without carbohydrate supplementation.

Table 1. Inclusion/Exclusion Criteria

S. No.	Inclusion Criteria
1.	Elite football players
2.	Age between 18-25 years
3.	BMI range (18.5 to 24.9)
4.	No recent injury record (last 6 months)

Ethics & Informed Consent

Informed consents were taken from participants of the respective university.

Training Protocol for the Participants

In this research study, the researcher employed a 08-week SAQ training protocol and carbohydrate supplementation for the participants.

Selection of Tests and Procedures

40m Sprint Test for Speed: A 40m sprint test was used to collect data for speed (Tønnessen et al., 2011).It was used to measure the speed of footballers and less time means better performance. Equipment required for this test includes measuring tape, marked track, One stopwatch, timing gates, cone markers, and neat and clean ground almost 60m. This test was simply performed by running from a starting point toward a finish point with maximum speed. The athlete has to cover a 40m distance. Less time means better performance. The test may be repeated several times with appropriate rest in between to ensure accurate results and avoid fatigue. Usually, the athlete's best time from all of their three efforts was the final score. To lower the chance of injury, we made sure that athletes were adequately warmed up before taking the test.

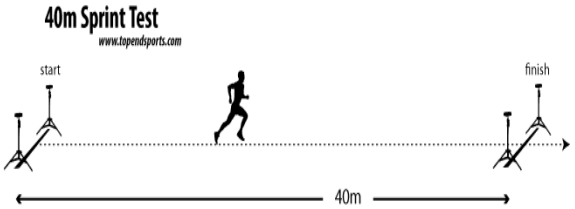

Figure 1. 40 m sprint test for speed

Data Analyses

Data was analyzed using the inferential statistical (Paired sample t-test and independent sample t-test) through International Business Machines Corporation IBM Statistical Product and Service Solutions (SPSS) version 26.

Results

Table 2. Independent Sample T-test

Variable	Groups	Pre-test results (Mean ± SD)	t	Sig. (2-tailed)
Speed	TSGA	6.34±.186	-.645	.530
	TGB	6.40±.152		

Significant level = 0.05, SD=Standard Deviation

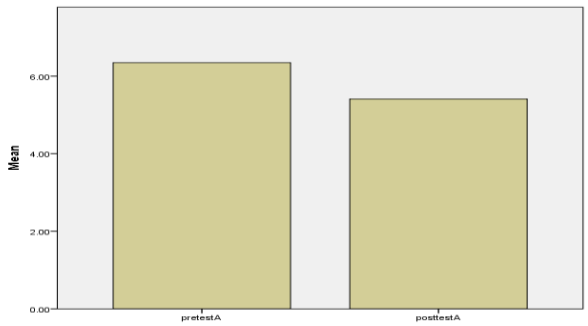

Figure 2

Table 2 shows the difference in speed football players of groups A and B Pre-intervention. An independent sample t-test showed the speed of football players of groups A and B Pre-intervention. There is no significant variance was found in speed values pre-intervention of both groups, the pre-speed value of group A was (M =6.34, SD =.18) to the pre-speed of group B (M =6.40, SD=.15; t (-.645) = 1.91, p =.530 > significant level = 0.05). Figure 2 also demonstrates the detailed data of speed of both groups A and B, before the intervention. On the X-axis it shows the speed values of both groups and on the Y-axis the mean score of speed is the same for groups A and B. The graph shows there is no difference in the speed of both groups. It depicts no significant difference between the pre-test of group A speed and the pre-test of group B speed.

Table 3. Paired Sample T-Test (Group A)

Variable	Groups	Pre and post-test (Mean ± SD)	t	Sig. (2-tailed)
Speed	TSGA TSGA	6.34±.186 5.41±.130	18.6	.0.000

Significant level = 0.05, SD=Standard Deviation

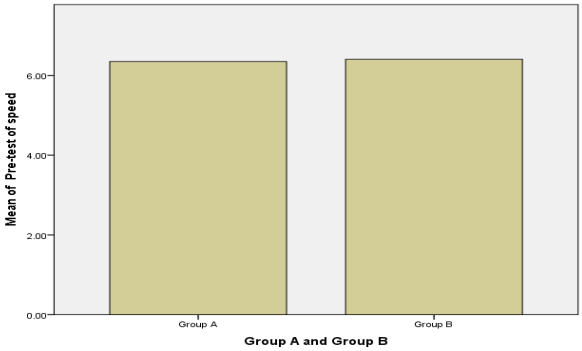

Figure 3

The above table 3 depicts the pre and post-test comparison of football players of group A Pre-intervention and post-intervention characteristics. A paired sample t-test showed the football players of group A Pre-intervention and post-intervention characteristics such as speed, agility, and quickness. There is significant variance was found in speed values pre and post-intervention of the group, the pre-speed value of group A was (M =6.34, SD =.18) to the post-speed of group A (M =5.41, SD=.13; t (18), p =.000< significant level = 0.05). Figure 3 also demonstrates the detailed data of the speed of group A, before the intervention pre-test and after the intervention post-test. On X-axis it shows the speed values of group A. while on the Y-

axis the mean score of speed is different. The graph shows there is a significant difference in the mean score of the speed of group A.

Table 4. Paired Sample T-test (Group B)

Variable	Groups	Post-test results (Mean ± SD)	t	Sig. (2-tailed)
Speed	TSGA TGB	5.41±.13 5.75±.27	3.17	0.01

Significant level = 0.05, SD=Standard Deviation

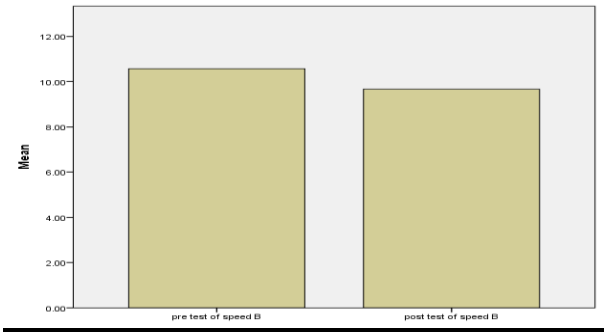

Figure 2

The above table 4 demonstrates the pre and post-test comparison of football players of group B Pre-intervention and post-intervention characteristics. A paired sample t-test showed the football players of group B Pre-intervention and post-intervention characteristics such as speed, agility, and quickness. There is significant variance was found in speed values pre and post-intervention of the group, the pre-speed value of group B was (M =6.40, SD =.15) to the post-speed of group B (M =5.75, SD=.27; t (5.19), p =.001< significant level = 0.05). Figure 4 also demonstrates the detailed data of the speed of group B, before the intervention pre-test and after the intervention post-test. On the X-axis it shows the speed values of group B. while on the Y-axis the mean score of speed is different. The graph shows there is a significant difference in the mean score of the speed of group B.

Table 5. Independent Sample T-test (Group (A) & (B)

Variable	Groups	Pre and post-test results (Mean ± SD)	t	Sig. (2-tailed)
Speed	GB GB	6.40±.15 5.75±.27	.19	0.001

Significant level = 0.05, SD=Standard Deviation

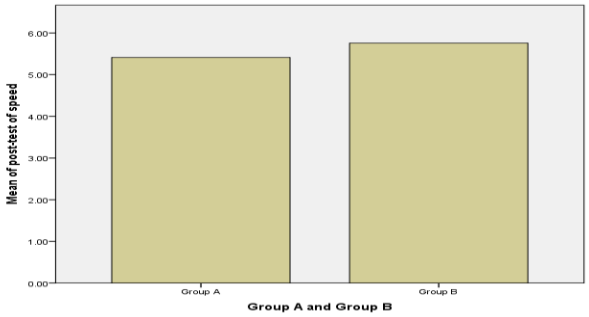

Figure 3

The above table 5 demonstrates the comparison of football players of group A and B Post-intervention characteristics. An independent sample t-test showed the speed football players of groups A and B Post-intervention. It shows that is significant variance was found in speed values post-intervention of both groups, the post-speed value of group A was (M =5.41, SD =.13) to the post-speed of group B (M =5.75, SD=.27; t (-.3.176), p =.01< significant level = 0.05).

Figure 5 also demonstrates the detailed data of speed of both groups A and B, after the intervention. On the X-axis it shows the speed values of both groups and on the Y-axis the mean score of speed is not the same for groups A and B. The graph shows there is a difference in the speed of both.

Discussion

The purpose of this research project was to look into the "effect of SAQ training with and without carbohydrate supplementation among elite footballers speed, agility, and quickness are major components of footballers that play a vital role in performance in terms of winning. Therefore, both SAQ training and carbohydrate supplementation are necessary for the complete development of athletes. It not only prevents athletes from injury but also increases performance, especially for the beginner. It is most effective for new players. This research study contributes to highlighting the impact of 08-week SAQ training and carbohydrate supplementation on the speed of footballers in the age range of 18-25 years. The findings demonstrate that there was considerable change found in pre and post-intervention in speed in both groups. If we compare post-tests of both groups, then the findings demonstrate a transformation in speed.

SAQ training has a significant effect on the speed of football players. The findings of this research also showed that there was a significant difference in speed agility and quickness of footballers of groups A and B. The current study shows that a highly significant change was found in the pre and post-intervention of both groups regarding the speed of footballers. The same study was also conducted by (França et al., 2022) and concluded that SAQ training has a positive impact on the speed, agility, and quickness of footballers. A study by (Jubjitt et al., 2017)explained that SAQ training improved the resynthesizes of glycogen and the content of glycogen. SAQ training with carbohydrate supplementation before exercise not only improves performance but also prevents athletes from injury and depletion of glycogen stores during the whole match. A study concluded that carbohydrate supplementation before a match increases the speed, agility, and quickness of footballers and also prevents them from injury and fatigue during the entire match (Nédélec et al., 2012). Moreover, carbohydrate supplementation and SAQ training at the same time improved the cognition of athletes hence improved reaction time. It also improves the metabolism of athletes and their sleep cycles. A study by (Sporiš et al., 2011)

concludes that SAQ training not only improves speed agility, and quickness but it also improves muscle hypertrophy. A study (Hammami et al., 2018) also concluded that SAQ training has not only improved the speed, agility, and quickness of footballers it also prevented them from injury and improved their fatigue resistance. A study by (Ahmadi Hekmatikar et al., 2019) showed that both SAQ training and carbohydrate supplementation increased the speed agility, and quickness of footballers it also improved their muscle recovery time. This study confirms that both SAQ training and carbohydrate supplementation improved the speed, agility, and quickness of footballers.

Conclusion

The main purpose of this study was to find out the effect of SAQ training with and without carbohydrate supplementation among elite footballers having the age range 18-25 of Punjab University. In this regard, different aspects of the study were evaluated for addressing the facts and findings. In respect of the implemented eight-week intervention (SAQ) with supplementation of carbohydrates, a significant difference was found in the pre and post-score of group A in Speed, Agility, and Quickness. Similarly, the eight-week intervention (SAQ) without supplementation of carbohydrates was applied to group B participants and found a significant difference in pre and post-score concerning speed, Agility, and Quickness. On account of the comparison of the post-test scores of groups A and B, a significant difference was found in speed, and agility. However, no significant difference was found in respect of Quickness in a post-test score of groups A and B. Furthermore, it is concluded that a week of SAQ Intervention with Carbohydrates supplementation has a more effective role in enhancing the quality of Speed, Agility, and Quickness in footballers as compared to eight-week intervention without carbohydrates supplementation.

Limitations

1. Proper and controlled diet of the subjects was a potential limitation, however new study could potentially address this gap for a better understanding of the phenomena.
2. Weather condition was another limitation, as the intervention/protocol was given in the open ground and cold weather, however, the controlled and normal weather could produce more reliable outcomes.

Recommendations

Based on the findings, the researcher recommended that

I. Regular SAQ Training sessions may include improving the speed of footballers in their training sessions.

II. Carbohydrate supplementation with SAQ training is helpful for Footballers to improve their performance.

Suggestions For Future Research

I. For better results of SAQ training and carbohydrate supplementation, number of participants should be increased.

II. Awareness about SAQ training and carbohydrate supplementation among the footballers is organized through seminars, and workshops to improve speed in football.

III. The participants of this study were male, future researchers may conduct on the females with different age groups (19-22) for optimal enhancement of performance.

IV. Consider increasing the time frame of SAQ intervention and another kind of carbohydrate supplementation in addition to SAQ intervention.

V. Consider the nutritional guidance of the participants for better outcomes.

VI. SAQ training with post-carbohydrate intake may have significant impacts on performance.

References

1. Ahmadi Hekmatikar, A., Haghshenas, R., & Mohammad Sadeghipor, A. (2019). The effect of carbohydrate supplementation and pure water on interleukin 10, glucose, and hematological indexes in male football players. *Sport Physiology & Management Investigations*, *11*(4), 135-145.
2. França, C., Gouveia, É., Caldeira, R., Marques, A., Martins, J., Lopes, H., Henriques, R., & Ihle, A. (2022). Speed and agility predictors among adolescent male football players. *International journal of environmental research and public health*, *19*(5), 2856.
3. Guest, N. S., VanDusseldorp, T. A., Nelson, M. T., Grgic, J., Schoenfeld, B. J., Jenkins, N. D., Arent, S. M., Antonio, J., Stout, J. R., & Trexler, E. T. (2021). International Society of Sports Nutrition position stand: caffeine and exercise performance. *Journal of the International Society of Sports Nutrition*, *18*(1), 1.
4. Hammami, M., Negra, Y., Billaut, F., Hermassi, S., Shephard, R. J., & Chelly, M. S. (2018). Effects of lower-limb strength training on agility repeated

sprinting with changes of direction, leg peak power, and neuromuscular adaptations of soccer players. *The Journal of Strength & Conditioning Research*, *32*(1), 37-47.

5. Hills, S. P., & Russell, M. (2017). Carbohydrates for soccer: A focus on skilled actions and half-time practices. *Nutrients*, *10*(1), 22.
6. Jäger, R., Kerksick, C. M., Campbell, B. I., Cribb, P. J., Wells, S. D., Skwiat, T. M., Purpura, M., Ziegenfuss, T. N., Ferrando, A. A., & Arent, S. M. (2017). International Society of Sports Nutrition position stands: protein and exercise. *Journal of the International Society of Sports Nutrition*, *14*(1), 20.
7. Jovanovic, M., Sporis, G., Omrcen, D., & Fiorentini, F. (2011). Effects of speed, agility, quickness training method on power performance in elite soccer players. *The Journal of Strength & Conditioning Research*, *25*(5), 1285-1292.
8. Jubjitt, P., Tingsabhat, J., & Chaiwatcharaporn, C. (2017). New Position-Specific Movement Ability Test (PoSMAT) Protocol Suite and Norms for Talent Identification, Selection, and Personalized Training for Soccer Players. *Journal of Exercise Physiology Online*, *20*(1).
9. Kirkendall, D. T., & Sayers, A. (2020). *Soccer anatomy*. Human Kinetics Publishers.
10. Kloby Nielsen, L. L., Tandrup Lambert, M. N., & Jeppesen, P. B. (2020). The Effect of Ingesting Carbohydrate and Proteins on Athletic Performance: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Nutrients*, *12*(5), 1483. https://www.mdpi.com/2072-6643/12/5/1483
11. Lennemann, L. M., Sidrow, K. M., Johnson, E. M., Harrison, C. R., Vojta, C. N., & Walker, T. B. (2013). The influence of agility training on physiological and cognitive performance. *The Journal of Strength & Conditioning Research*, *27*(12), 3300-3309.
12. Milanović, Z., Sporiš, G., Trajković, N., James, N., & Samija, K. (2013). Effects of a 12 Week SAQ Training Programme on Agility with and without the Ball among Young Soccer Players. *J Sports Sci Med*, *12*(1), 97-103.
13. Milanović, Z., Sporiš, G., Trajković, N., James, N., & Šamija, K. (2013). Effects of a 12-week SAQ training program on agility with and without the ball among

young soccer players. *Journal of sports science & medicine*, *12*(1), 97.

14. Murray, B., & Rosenbloom, C. (2018). Fundamentals of glycogen metabolism for coaches and athletes. *Nutrition Reviews*, *76*(4), 243-259.
15. Nédélec, M., McCall, A., Carling, C., Legall, F., Berthoin, S., & Dupont, G. (2012). Recovery in soccer: part I—post-match fatigue and time course of recovery. *Sports Medicine*, *42*, 997-1015.
16. Sporiš, G., Milanović, Z., Trajković, N., & Joksimović, A. (2011). Correlation between speed, agility, and quickness (SAQ) in elite young soccer players. *Acta kinesiologica*, *5*(2), 36-41.
17. Tønnessen, E., Shalfawi, S. A., Haugen, T., & Enoksen, E. (2011). The effect of 40-m repeated sprint training on maximum sprinting speed, repeated sprint speed endurance, vertical jump, and aerobic capacity in young elite male soccer players. *The Journal of Strength & Conditioning Research*, *25*(9), 2364-2370.
18. Trecroci, A., Cavaggioni, L., Rossi, A., Moriondo, A., Merati, G., Nobari, H., Ardigò, L. P., & Formenti, D. (2022). Effects of speed, agility, and quickness training program on cognitive and physical performance in preadolescent soccer players. *Plos one*, *17*(12), e0277683.
19. Wang, Y.-C., & Zhang, N. (2016). Effects of plyometric training on soccer players. *Experimental and therapeutic medicine*, *12*(2), 550-554.
20. Williams, C., & Rollo, I. (2015). Carbohydrate nutrition and team sport performance. *Sports Medicine*, *45*, 13-22.