DOI 10.26773/smj.231018

SportMont

REVIEW PAPER

Speed and Agility Training in Female Soccer Players - A Systematic Review

Mima Stankovic[1], Dusan Djordjevic[1], Borko Katanic[1], Anja Petrovic[1], Igor Jelaska[2], Dusko Bjelica[3], Amel Mekic[4]

[1]University of Nis, Faculty of Sport and Physical Education, Nis, Serbia, [2]University of Split, Faculty of Kinesiology, Split, Croatia, [3]University of Montenegro, Faculty for Sport and Physical Education, Niksic, Montenegro, [4]University of Sarajevo, Faculty of Sport and Physical Education, Sarajevo, Bosnia and Herzegovina

Abstract

Female soccer players performs between 1350-1650 activity changes, along with jumping, accelerating and decelerating. The ability to repeat these actions identically in competition are essential for success in female soccer. Hence, the study aim was to summarize relevant literature on the effects of speed and agility training in female soccer players. Literature identification were conducted according to the PRISMA guidelines and in multiple databases (Google Scholar, PubMed, Scopus, Cochrane Library, ProQuest, EBSCOhost and Science Direct). Based on the pre-defined inclusion criteria (year of publication (2003-2022), full-text study published in English, the experimental study that had included healthy and injury-free female soccer players as participant sample) database search have identified 23502 potential studies. In the end, a total of seven full-text studies were included, with a total of 165 female participants. There were a variety of experimental programs, such as resisted, assisted and traditional sprint training, high-speed treadmill, speed and agility trainings, and repeated agility and strength group, along with their comparison with strength training group. Likewise, different types of duration, intensity and frequency were observed and resulted overall speed and agility improvements in female soccer players. Authors can conclude that only with well prepared and organized program, especially in pre-season, female soccer players should be able to improve important and specific factors, in order to achieve desired aim and result in terms of speed and agility.

Keywords: *football, sprint, quickness, power performance*

Introduction

Women's soccer has advanced significantly in terms of play, finance and media in recent years and as a result, the demands for women's soccer as team sport have risen sharply (Peeters & Elling, 2005). Nevertheless, it's growing popularity, female athletes are subjected to higher training volumes and competition demands than ever before, necessitating a better understanding of female athletes' performance changes in order to design effective training programs (Datson et al., 2004). Changes in the movement mechanism of the arms or legs can influence linear action such as acceleration and velocity. Thus, the ability to develop speed quickly (acceleration) is an important component for supporting performance in a variety of sporting activities (Azmi & Kusnanik, 2018). Speed, agility, along with the quickness (SAQ) exercises covers the entire training intensity spectrum and it is a very small percentage that can be improved due to heredity (Szabo, Neagu, & Sopa, 2020). What is more, acceleration and sprint performance is associated with maturity status (Murtagh et al., 2020).

According to the match statistics, female soccer players covers 9-12km during the game (Mohr, Krustrup, Andersson, Kirkendal, & Bangsbo, 2008), with as much as 8-12% of that being high-intensity running or sprinting (Rampinini et al., 2007). The average sprint duration is between 2-4sec. and occurs during crucial moments of the soccer game, with the vast majority of sprint displacements being less than 20m (Andrašić et al., 2021). Furthermore, fe-

Correspondence:

Amel Mekic
University of Sarajevo, Faculty of Sport and Physical Education, Patriotske lige St. No. 41. 71000, Sarajevo, Bosnia and Herzegovina
E-mail: amel.mekic@fasto.unsa.ba

male soccer players performs between 1350-1650 activities changes, including dribbling passing and tackling (Munro & Herrington, 2011). Jumping, accelerating, decelerating, different sprints with changes of direction and the ability to repeat these actions identically in competition are essential for success in team sports like soccer (Stankovic et al., 2022). Moreover, mentioned explosive actions, like tackling, jumping, changing directions (COD) and sprinting, have a direct impact on the outcome of the result (Loturco et al., 2022). Therefore, explosive strength of the lower extremities is one of the most important motor characteristics (Prvulović, Martinović, Kostić, & Katanić).

There are numerous studies that compare the level of speed between competition levels, age categories, as well as the relationship between reactive speed, COD speed and individual movement speed (Ates, 2018; Andrašić et al., 2021; Stankovic et al., 2022). Despite the research mentioned above, there is currently little scientific evidence to shows effects of speed and agility training in female soccer players (Paradis, 2003; Upton, 2011; Shalfawi et al., 2013a; Shalfawi et al., 2013b; Mathisen & Danielsen, 2014; Mathisen & Svein, 2015; Page et al., 2021). Paradis et al. (2003) reported that the SAQ program improved power, speed and agility, but not strength in young soccer players. In addition, Shalfawi et al. (2013a) reported significant improvements in repeated agility training and repeated sprint training in elite female soccer players, with no significant differences between groups in any of the measured variables. Furthermore, two studies (Mathisen & Danielsen, 2014; Mathisen & Svein, 2015) found that short sprint bouts at maximum effort had a significant effect on agility performance in adolescent female soccer players. On the other hand, Shalfawi et al. (2013b), reported that agility and repeated sprint training had no significant effects in well-trained elite female soccer players.

To the authors' knowledge, there are a few studies that have analyzed the effects of speed and agility training in female soccer players. However, no study has been conducted that summarizes the literature in women's soccer. As a result, the purpose of this study is to summarize relevant literature on the effects of speed and agility training in female soccer players.

Materials and Methods

Literature Identification

PRISMA guidelines (Page et al., 2021; Rethlefsen et al., 2021) were used for the search and analysis of the studies. Furthermore, a multiple database identification was carried out, such as Google Scholar, PubMed, Scopus, Cochrane Library, ProQuest, EBSCOhost and Science Direct.

For study identification in mentioned databases, the multiple keywords (combination are separately) were used: („speed enhancement "OR „quickness "OR „soccer speed "OR „agility enhancement "OR „agility" OR „soccer agility" OR „SAQ" OR „mechanical stress" OR „physical stress") AND („soccer" OR „football" OR „female soccer" OR „female football" „team sport" OR „collective sport" OR „female team sport"). The study identification and data extraction were examined separately, by a total of two authors (M.S. and D.Dj.). Then, each author had to cross-examine the identified studies, and considered if the study is eligible for further analysis or not.

Furthermore, a descriptive method was used for obtained data examination, whereas all titles, abstracts and full-text articles were reviewed for eventual study inclusion in the systematic review. After detailed identification process, studies were considered to be relevant and included, only if they met the pre-defined inclusion criteria.

Inclusion Criteria

Each study had to meet the following inclusion criteria: year of publication (2003-2022), full-text study published in English, the experimental study that had included healthy and injury-free female soccer players as participant sample. In addition, there were no exclusion criteria in terms of years of training nor experience or rank (elite, sub elite, amateur, etc.).

Exclusion Criteria

The studies were not included if they have realized before 2003, published studies in other language than English, studies with male or mixed gender participants, studies where full-text possibility was unable, the studies that have included supplements usage and studies where experimental program was influenced on other parameters beside physical performance.

Bias Risk Assessment

The study quality and the potential risk of bias was assessed and determined by the PEDro scale (de Morton, 2009). Assessment were carried out by two authors, separately. The author's concordance was calculated using k-statistics data to examine the complete text, to determine relativity and bias risk. In case of disagreement, the provided data was evaluated and finalized by a third reviewer, independently. The concordance between reviewers was k=0.93.

Data Extraction

The necessary information was extracted from the studies, using Cochrane Consumer and Communication Review Group's. The main study characteristics were: first author and year of publication, age, sample size, experimental intervention program (type, duration, frequency and training duration), measured outcomes and study results.

Results

Study Quality

According to Maher et al. (2003), a PEDro scale points has to be awarded in order to identify the study quality. Further, if the study has gained between 0-3 points, the study will be classified with poor quality, 4-5 points with fair quality, 6-8 points with good quality and 9-10 points with excellent quality. Same authors have also stated that 8-11 points are optimal. In studies that have included in the final analysis, three studies have classified with fair quality, while rest of three studies with good quality. Table 1 presents PEDro scale total results.

Selection and Characteristics of Studies

Based on the database study identification, a total of 23502 were identified. At the main beginning, 522 duplicate studies were excluded, whereas a total of 22980 studies were further taken into consideration. According to the pre-defined inclusion criteria, 78 were excluded by review-

Table 1. PEDro scale for cross-sectional studies

	Criterion											
Study	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**Σ**
Paradis et al. (2003)	Y	N	N	Y	N	N	N	Y	Y	Y	Y	4
Upton (2011)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	7
Jonhson et al. (2013)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	8
Shalfawi et al. (2013)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	7
Shalfawi et al. (2013)	Y	Y	Y	Y	N	N	N	Y	Y	Y	Y	7
Mathisen et al. (2014)	Y	N	N	Y	N	N	N	Y	Y	Y	Y	5
Mathisen et al. (2015)	Y	N	N	Y	N	N	N	N	Y	Y	Y	4

Legend: 1—eligibility criteria; 2—random allocation; 3—concealed allocation; 4—baseline comparability; 5—blind subject; 6—blind clinician; 7—blind assessor; 8—adequate follow-up; 9—intention-to-treat analysis; 10—between-group analysis; 11—point estimates and variability; Y—criterion is satisfied; N—criterion is not satisfied; Σ—total awarded points.

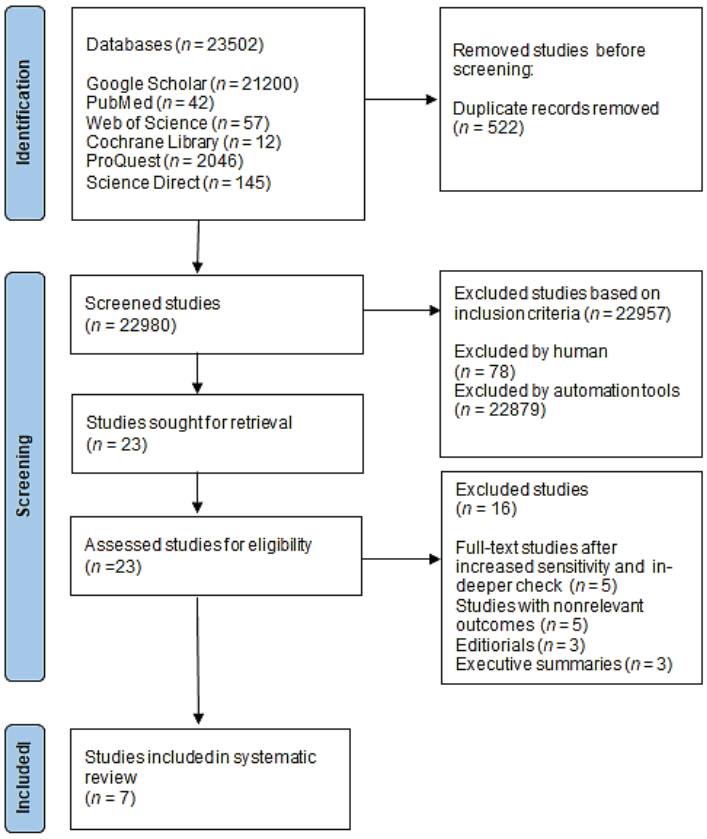

FIGURE 1. PRISMA flow chart of study identification

ers and 22879 were excluded by automation tools, whereas 23 studies were assessed for eligibility. Additional 16 studies were excluded based on in-deeper check, non-relevant outcomes, editorials and executive summaries. In the end, seven studies were included in the systematic review (Figure 1.).

Table 2 presents studies that have included in the systematic review based on pre-defined criteria.

There were a total of 165 female participants. The youngest participant was 13 years old (Mathisen et al. 2014), while the oldest was 21 years old (Shalfawi et al., 2013a). A total of 2 studies have presented 3 groups only (without control group) (Upton, 2011; Shalfawi et al., 2013a; Shalfawi et al., 2013b) and 4 studies have presented one experimental and one control group (Paradis et al., 2003; Mathisen et al., 2014; Mathisen et al., 2015). Experimental program duration variated from 4-10 weeks, whereas variables variated from running speed in all studies, RSA (Shalfawi et al., 2013a; Shalfawi et al., 2013b), agility (Shalfawi et al., 2013a; Shalfawi et al., 2013b; Mathisen et al., 2014; Mathisen et al., 2015) and explosive strength (Paradis et al., 2003; Shalfawi et al., 2013a; Shalfawi et al., 2013b). Only one study have had examining the influence on the Yo-Yo IR1 test (Shalfawi et al., 2013a) and one on the high-speed treadmill (Shalfawi et al., 2013b).

There were a variety of experimental programs, such as resisted, assisted and traditional sprint training (Upton, 2011), high-speed treadmill (Johnson et al., 2013), speed and agility trainings (Paradis et al., 2003), repeated agility and strength group (Shalfawi et al., 2013a), along with their comparison with strength training group (Shalfawi et al., 2013b).

Table 2. Studies that have included in the systematic review

First author and year of publication	Participants		Duration (weeks)	Program (type, intensity frequency, training duration	Measured outcomes	Results		
	Age (Years)	Number and groups						
Paradis et al. (2003)	13.07 ±0.59	SA-19 C-13	6	SA–training program 2x a week C–regular soccer training	T-test 40yd CMJ LJ	SA T-test ↑* 40yd ↑* CMJ ↑* LJ ↑		C T-test ↓ 40 yd ↓ CMJ ↑ LJ ↑
Upton (2011)	19.6 ±0.9	N-27 AST-8 RST-9 TST-10	4	AST–supramaximal efford 20yd + 20yd deceleration to jog, 10x assisted sprint, 3min rest RST–20yd + 20yd maximal effort sprint + 20yd deceleration to jog, 10x resisted sprint, 3min rest TST–20yd sprint + 20yd deceleration to jog, 10x maximal efford sprint, 3min rest	5, 15, 25, 40 yd	AST 5yd ↑* 10yd ↑* 25yd ↑* 40yd ↑*	RST 5yd ↔ 10yd ↓ 25yd ↑ 40yd ↑*	TST 5yd ↓ 10yd ↑ 25yd ↑ 40yd ↑
Jonhson et al. (2013)	16.6 ±1.19	SPO-11 HST-13	6	HST-3 series 10min; 2 min warm-up at 0% incline at 6–8 mph; training-maximal speeds ranged from 18 to 22 mph. 10sec sprints with 40-60sec rests at a maximum incline of 10%; 5sec sprints with 20-40-sec	40-Yard sprint Isometric Strength (flexor, extensors)	HST 40yd ↑* Flexor ↔ Extensors ↑*		SPO 40yd ↓ Flexor ↓ Extensors ↑
Shalfawi et al. (2013)	21.2 ±2.6	RAG-8 RSG-9	8	RAG–2x4 agility run, 120sec. recovery between exercises, 10min recovery between sets, Intensity=95-100% first 5 weenks, rest of 3 was 100% RSG–2x(5-9)x40m, 90sec. recovery between exercises, 10min recovery between sets, Intensity=95-100% first 5 weeks, rest of was 100%	40m sprint 40m agility CMJ RSA-10x40m YY1	RAG 40m sprint ↑ 40m agility ↑* CMJ ↑ RSA ↑* YY1 ↑*		RSG 40m sprint ↑* 40m agility ↑ CMJ ↑* RSA ↑* YY1 ↑*
Shalfawi et al. (2013)	19.4 ±4.4	N-20 RAG/RSG STG	10	RAG–2-4 sets, 1min. recovery between exercises, 10min. recovery between sets, 100% intensity RSG–2-5 sets of 4-5x40m, 90sec. rest between exercises, 10min. rest between sets, Intensity=95-100% first 4 weeks, rest of was 100% STG–leg press, squat jump, nordic hamstring, leg extension, cable hip flexion and extension	SJ CMJ RSA-7x30m 40m sprint 40m agility Bt	RAG/RSG SJ ↑ CMJ ↑ RSA ↓ 40m sprint ↓ 40m agility ↑ Bt ↑*		STG SJ ↑* CMJ ↑ RSA ↑ 40m sprint ↓ 40m agility ↓ Bt ↑*
Mathisen et al. (2014)	13.6 ±0.2	E-13 C-13	8	E–32 short-burst sprints 10min warm-up, 50min short-burst running LIN or COD sprints (40-90sec. rest) (once a week in addition to 2 regular trainings) per week C–regular soccer training	10m sprint 20m sprint Agility	E 10m sprint ↑* 20m sprint ↑* Agility ↑*		C 10m sprint ↔ 20m sprint ↑ Agility ↓
Mathisen et al. (2015)	15.5 ±0.7	E-10 C-9	8	E–32 short-burst sprints 10min warm up, 45 min short-burst running LIN or COD sprints (60-90sec. rest) (once a week in addition to 2 regular trainings) per week C–regular soccer training	10m sprint 20m sprint Agility	E 10m sprint ↑* 20m sprint ↑* Agility ↑*		C 10m sprint ↔ 20m sprint ↑ Agility ↓

Legend: N–total number of participants, E–experimental group, C–control group, SA–speed and agility, yd–yards, T-test–agility T-test, CMJ–countermovement jump, SJ–squat jump, LJ–long jump, RST–resisted sprint training, AST–assisted sprint training, TST–traditional sprint training, RAG–repeated agility group, RSG–repeated sprint group, STG–strength training group, RSA–repeated sprint ability, COD–change of direction, LIN–linear sprint, YY1–Yo-Yo IR1 test, Bt–Beep test, SPO–soccer practice-only, HST–high-speed treadmill, *–significant result, ↑–result improved, ↓–result decreased, ↔–result maintained.

Discussion

The study aim was to summarize relevant literature on the effects of speed and agility training in female soccer players. The main study findings are seven studies that have presented various types of speed and agility training, with different types of duration, intensity and frequency that have resulted overall speed and agility improvements in female soccer players.

Increased step frequency and reduced ground contact time have a positive effect on maximum speed as well as the result of reduced acceleration time (Mero et al., 1992; Paradis, 2003). Kyröläinen, Avela and Komi (2005) have found that during the acceleration phase of sprinting, maximal integrated electromyographic (EMG) activity is greater than during the constant velocity period, indicating that this is the moment when the sprinter's neural activation is greatest. A significant increase in muscle force development in initial acceleration in the AST group occurred in the first 5yd (4.6m) of the sprint, while the RST group had the greatest increase in speed during the 15 to 25yd (13.7 to 22.9m), and as it was hypothesized acceleration increased significantly ($p<0.001$) over a 4 week period (Upton, 2011). Repeated linear sprint training improves intermittent running ability more than agility training, while repeated agility training improves specific agility improvement and both groups on the RSA test (10x40m) with 95% maximum running speed finished with 97% in the post-test (Shalfawi et al., 2013a). In that regard, similar results were also presented elsewhere (Tønnessen et al., 2011). Above mentioned indicates the ability to achieve repeated sprints close to maximal intensity.

Since it was observed only moderate improvements ($d=0.8$) in the RAG/RSG group, as well as trivial to negative in agility performance in the STG group (Shalfawi et al., 2013b), these results are not in accordance with Dupont et al. (2004), who have observed improvements in RSA. These soccer players have performing one repeated sprint session and one aerobic training session each week, in addition to one game and 8-10 normal soccer training sessions during the season. As a result, a physical conditioning program must be carefully balanced with regular soccer training (Morgans, Orme, Anderson, & Drust 2004). A carefully constructed training program for one set of skills may impede the development of other vital attributes and vice versa (Jalilvand, 2015). It is also recognized that the constant stress, along with the strength and conditioning program, can create a „chronic catabolic environment" for the neuromuscular system. Because these studies were done in-season, this setting may result in modest or no changes in other physical characteristics (Kraemer et al., 2004). Hence, an additional physical fitness program must be well planned and balanced together with regular soccer training, especially during in-season period.

According to Yap and Brown (2000), female training regimens are identical to males training protocols, as women's training programs have improved significantly over the years. Mathisen & Danielsen (2014) have resulted a significant increase (6.2%) in agility performance in a 8 week LIN and COD program, which is consistent with findings Pettersen and Mathisen (2012). Although initial acceleration and short sprint are reported to be more difficult to improve than maximal speed (Meilan & Malatesta, 2009), this study also shows a significant improvement in the acceleration phase (5.1%) in the 10m sprint and (3.5%) in 20m sprint. Furthermore, results from other study (Mathisen et al., 2015), with a bit older participants have revealed 10m straight sprint (4.1%), 20m straight sprint (3.2%) and agility performance (5.2%) improvement. Since growth and maturation could increase sprint performance (Vescovi et al., 2011), maturity status has a crucial role in modulating the response to speed exercises (Malina et al., 2004).

Likewise, women go through a biological process during the menstrual cycle, where hormone levels rise and fall (Keay et al., 2021). Julian et al. (2017) have highlighted that there could be a performance decreases during the mid-luteal phase where hormones were contrasted in the peak phase of the menstrual cycle and this decreases was not found in jumping or sprint performance. Hence, in order to examine and analyze how the phases of the menstrual cycle affect physical performance, it is necessary to take into consideration the specificity of sport (Mkumbuzi et al., 2021). But further investigation is needed.

The strength of this study lies in the fact that it is the only systematic review on the topic of speed and agility training in women's soccer. This is especially significant given that the majority of soccer training research focuses on men. Additionally, the paper has provided valuable guidelines for the training of female soccer players. Thus, the practical implications would involve the implementation of various training programs that have shown positive effects on speed and agility qualities in female soccer players.

As far as the study limitations, there is some. First, they have taken into consideration studies that have dealt with regular speed and agility, but not reactive. Second, they did not take into consideration the anterior cruciate ligaments (ACL) condition in the participants' sample, which can be an important factor for both speed and agility. Hence, future studies can include the mentioned medical state for both future experimental studies and systematic reviews.

Conclusion

Since the speed is about 95% congenital, the same can be relatively enhanced. On the other hand, agility is not congenital as speed, but it can be more influenced. Hence, only with well prepared and organized program, especially in pre-season, female soccer players should be able to improve these important and specific factors, in order to achieve desired aim and result.

Acknowledgements
There are no acknowledgements.

Conflict of Interest
The authors declare that there is no conflict of interest.

Received: 30 July 2023 | **Accepted:** 07 September 2023 | **Published:** 01 October 2023

References

Andrašić, S., Gušić, M., Stanković, M., Mačak, D., Bradić, A., Sporiš, G., & Trajković, N. (2021). Speed, change of direction speed and reactive agility in adolescent soccer players: Age related differences. *International Journal of Environmental Research and Public Health, 18*(11), 5883.

Ates, B. (2018). Age-Related Effects of Speed and Power on Agility Performance of Young Soccer Players. *Journal of Education and Learning, 7*(6), 93-99.

Azmi, K., & Kusnanik, N. W. (2018). Effect of exercise program speed, agility, and quickness (SAQ) in improving speed, agility, and acceleration. In *Journal of Physics: conference series* (Vol. 947, No. 1, p. 012043). IOP Publishing.

Datson, N., Hulton, A., Andersson, H., Lewis, T., Weston, M., Drust, B., & Gregson, W. (2014). Applied physiology of female soccer: an update.

Sports Medicine, 44, 1225-1240.
De Morton, N. A. (2009). The PEDro scale is a valid measure of the methodological quality of clinical trials: a demographic study. *Australian Journal of Physiotherapy, 55*(2), 129-133.
Dupont, G., Akakpo, K., & Berthoin, S. (2004). The effect of in-season, high-intensity interval training in soccer players. *The Journal of Strength & Conditioning Research, 18*(3), 584-589.
Jalilvand, F. A. R. Z. A. D., & RSCC, U. (2015). Development of biomotor abilities for soccer. *National Strength & Conditioning Association Journal, 2*(1), 12.
Johnson, A. W., Eastman, C. S., Feland, J. B., Mitchell, U. H., Mortensen, B. B., & Eggett, D. (2013). Effect of high-speed treadmill training with a body weight support system in a sport acceleration program with female soccer players. *The Journal of Strength & Conditioning Research, 27*(6), 1496-1502.
Julian, R., Hecksteden, A., Fullagar, H. H., & Meyer, T. (2017). The effects of menstrual cycle phase on physical performance in female soccer players. *PloS One, 12*(3), e0173951.
Keay N, Craghill E, Francis G. (2021). Female football specific energy availability questionnaire and menstrual cycle hormone monitoring. medRxiv. *Published Online*.
Kyröläinen, H., Avela, J., & Komi, P. V. (2005). Changes in muscle activity with increasing running speed. *Journal of Sports Sciences, 23*(10), 1101-1109.
Kraemer, W. J., French, D. N., Paxton, N. J., Häkkinen, K., Volek, J. S., Sebastianelli, W. J., ... & Knuttgen, H. G. (2004). Changes in exercise performance and hormonal concentrations over a big ten soccer season in starters and nonstarters. *The Journal of Strength & Conditioning Research, 18*(1), 121-128.
Loturco, I., Jeffreys, I., Abad, C. C. C., Kobal, R., Zanetti, V., Pereira, L. A., & Nimphius, S. (2020). Change-of-direction, speed and jump performance in soccer players: a comparison across different age-categories. *Journal of Sports Sciences, 38*(11-12), 1279-1285.
Maher, C. G., Sherrington, C., Herbert, R. D., Moseley, A. M., & Elkins, M. (2003). Reliability of the PEDro scale for rating quality of randomized controlled trials. *Physical Therapy, 83*(8), 713-721.
Malina, R. M., Bouchard, C., & Bar-Or, O. (2004). *Growth, maturation, and physical activity.* Human kinetics.
Mathisen, G., & Danielsen, K. H. (2014). Effects of speed exercises on acceleration and agility performance in 13-year-old female soccer players. *Journal of Physical Education and Sport, 14*(4), 471 – 474.
Mathisen, G. E., & Pettersen, S. A. (2015). The effect of speed training on sprint and agility performance in 15-year-old female soccer players. *Lase Journal of Sport Science*, (6), 63-72.
Mero, A., Komi, P. V., & Gregor, R. J. (1992). Biomechanics of sprint running: A review. *Sports Medicine, 13*, 376-392.
Meylan, C., & Malatesta, D. (2009). Effects of in-season plyometric training within soccer practice on explosive actions of young players. *The Journal of Strength & Conditioning Research, 23*(9), 2605-2613.
Mkumbuzi, N. S., Dlamini, S. B., Chibhabha, F., Govere, F. M., & Manda-Taylor, L. (2022). The menstrual cycle and football: The experiences of African women football players. *Science and Medicine in Football, 6(*5), 626-632.
Mohr, M., Krustrup, P., Andersson, H., Kirkendal, D., & Bangsbo, J. (2008). Match activities of elite women soccer players at different performance levels. *The Journal of Strength & Conditioning Research, 22*(2), 341-349.
Morgans, R., Orme, P., Anderson, L., & Drust, B. (2014). Principles and practices of training for soccer. *Journal of Sport and Health Science,* 3(4), 251-257.
Munro, A. G., & Herrington, L. C. (2011). Between-session reliability of four hop tests and the agility T-test. *The Journal of Strength & Conditioning Research, 25*(5), 1470-1477.
Murtagh, C. F., Brownlee, T. E., Rienzi, E., Roquero, S., Moreno, S., Huertas, G., ... & Erskine, R. M. (2020). The genetic profile of elite youth soccer players and its association with power and speed depends on maturity status. *PloS One, 15*(6), e0234458.
Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., ... & Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *International Journal of Surgery, 88,* 105906.
Paradis, S. A. (2003). *The effects of a 6-week speed and agility program on the development of explosive power, strength, speed, and agility in youth soccer players (Doctoral dissertation, University of Pittsburgh).* Pittsburgh, GB: University of Pittsburgh.
Peeters, R., & Elling, A. (2015). The coming of age of women's football in the Dutch sports media, 1995–2013. *Soccer & Society, 16*(5-6), 620-638.
Pettersen, S. A., & Mathisen, G. E. (2012). Effect of short burst activities on sprint and agility performance in 11-to 12-year-old boys. *The Journal of Strength & Conditioning Research, 26*(4), 1033-1038.
Prvulović, N., Martinović, D., Kostić, L., & Katanić, B. (2021). Differences in Explosive Strength in Athletics and Various Sports: A Systematic Review. In *Pantelić, S.(Ed.): XXIII International Scientific Conference "FIS Communications 2019" in Physical Education, Sports and Recreation* (pp. 62-69).
Rampinini, E., Bishop, D., Marcora, S. M., Bravo, D. F., Sassi, R., & Impellizzeri, F. M. (2006). Validity of simple field tests as indicators of match-related physical performance in top-level professional soccer players. *International Journal of Sports Medicine*, 228-235.
Rethlefsen, M. L., Kirtley, S., Waffenschmidt, S., Ayala, A. P., Moher, D., Page, M. J., & Koffel, J. B. (2021). PRISMA-S: an extension to the PRISMA statement for reporting literature searches in systematic reviews. *Systematic Reviews, 10*(1), 1-19.
Stanković, M., Đorđević, D., Aleksić, A., Lazić, A., Lilić, A., Čaprić, I., & Trajković, N. (2022). The relationship between jump performance, speed and cod speed in elite female soccer players. *Facta Universitatis, Series: Physical Education and Sport*, 047-059.
Szabo, D. A., Neagu, N., & Sopa, I. S. (2020). Research regarding the development and evaluation of agility (balance, coordination and speed) in children aged 9-10 years. *Health, Sports & Rehabilitation Medicine*, *21*(2).
Shalfawi, S. A., Young, M., Tønnessen, E., Haugen, T. A., & Enoksen, E. (2013a). The effect of repeated agility training vs. repeated sprint training on elite female soccer players'physical performance. *Kinesiologia Slovenica, 19*(3), 29-42.
Shalfawi, S. A., Haugen, T., Jakobsen, T. A., Enoksen, E., & Tønnessen, E. (2013b). The effect of combined resisted agility and repeated sprint training vs. strength training on female elite soccer players. *The Journal of Strength & Conditioning Research, 27*(11), 2966-2972.
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.
Upton, D. E. (2011). The effect of assisted and resisted sprint training on acceleration and velocity in Division IA female soccer athletes. *The Journal of Strength & Conditioning Research, 25*(10), 2645-2652.
Vescovi, J. D., Rumpf, R., & Brown, T. D. (2011). Sprint ability increases in young women up through 15-17 years of age. *Scandinavian Journal of Medicine & Science in Sports, 21*, 670-678.
Yap, C. W., & Brown, L. E. (2000). Development of Speed, Agility, and Quickness for the Female Soccer Athlete. *Strength & Conditioning Journal, 22*(1), 9.