

OBTAINING THE MAXIMUM FOOTBALL PERFORMANCE (SPECIFIC IN MOTOR CAPACITIES)

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ABSTRACT

This study investigated the perceptual and behavioral responses regarding the football how they obtain the maximum sports performance comparison between men's and women's football from the point of view of the motor capacities." Subjects in this study, 18 male and 18 female players from India from an amateur sports club were involved respectively. The physical characteristics of the participants are shown in this experimental study. The players performed a battery of five tests during a normal weekly training. They were made in the period between January and March 2022. Each concerned a specific motor ability. More in detail, the speed was analysed with a 20 m Sprint, the strength with a counter movement without using the arms (CMJ), the resistance with the "YoYo Intermittent Recovery Test - Level 1 "(YYIR1), agility with the " 20 Yards Agility Run Test "and coordination with a test characterized by running, slalom with the ball, jumping of the obstacle. We started with that of speed, then move on to that of agility, strength, endurance and conclude with that of coordination. Before each, the protocol was explained and the correct technique was demonstrated; the speed, agility, endurance and coordination tests were carried out on a synthetic grass surface, while the strength test was carried out on a natural grass surface. The present study found superiority of the male gender in the ability of speed, agility, strength and coordination, while the female gender in stamina. Thus, the hypotheses formulated in the initial moment of the research were confirmed. In fact, we had noted, on the basis of previous works, the existence of inequalities between men's and women's football, with higher parameters in the players. The resistance parameter allowed us to reach an interesting conclusion. It was not considered valid to highlight the differences between the two football realities and in particular on the female side an adequate, continuous and specific training of this ability can lead to efficient performance any sports club. The Yo-Yo IR test can be used as an indicator of the physical performance of female soccer players during all competitive matches (Bangsbo J, Krstrup P et al., 2005). Future research is required to investigate the possible effect of training loads on physical development and the effect of fitness level on match performance between genders, competition standards and age groups. Keywords: Methodology, physical performance, technical skills, mix of qualitative and quantitative research and educational preparation.

Keywords: Coach Competence, Motor Capacity, Physical Test, Performance, Selection players.

1.1 IDENTIFICATION OF PROBLEMS

The statistically significant differences between men and women are many: height and weight, for example, are examples that are easy to observe. These, however, are partially significant. The specific power, that is the power expressed by the muscle mass divided by the total body mass, can benefit lighter people, if equipped with sufficiently powerful muscles and the length of the levers is not necessarily an advantage if it is not accompanied by the right agility and coordination. Which usually benefit the short-lived. More hidden differences are, for example, the levels of haemoglobin in the blood: for men this is about 10% more than for women. On the other hand, under stress the female organism seems to consume a few percent less oxygen

than the male one, cancelling or almost cancelling the different blood composition. Another significant difference lies in hormone levels, which are reflected in a greater amount of fat mass present in the female body: even for athletes at the best of training, a man hardly drops below 6% fat mass and a woman below the 12%. Below these values, the risk of damage to the body is real: this difference, however, represents a weight that women systematically carry with them when they tackle sports. Another problem that men do not have is the menstrual cycle, which certainly creates problems for a good 10-15% of athletes in each race. As often happens when looking at the human body, it is difficult to identify a single cause for an effect, so probably the aspects we have mentioned so far are just some of the possible contributing causes of the differences in performance that exist between male and female athletes. In many sports specialties, however, these differences are not really relevant.

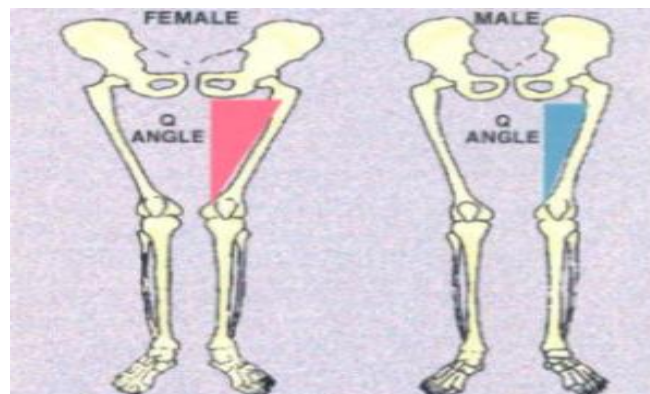
Classification	Women (% fat)	Men (% fat)
Essential Fat	10-12%	2-4%
Athletes	14-20%	6-13%
Fitness	21-24%	14-17%
Acceptable	25-31%	18-25%
Obese	32% plus	25% plus

At the level of the muscle fiber there is no anatomical difference, the difference in strength between the two sexes is to be found in the different% of muscle tissue (36% in women compared to 45% in men) and in the lower amount of testosterone , which exerts an excitatory effect on the neuromuscular system.

1. 2 ANATOMICAL-PHYSIOLOGICAL DIFFERENCES BETWEEN WOMEN AND MEN

Compared to men, women have on average one:

- Lower stature, muscle mass and bone mass.
- Higher fat percentage and reduced capacity of energy systems.
- Lumbar curve is more pronounced and Q angle increased (which affects walking with pronation at the foot and valgus of the knees).
- Lower pubic symphysis and small wider pelvis resulting in a wider pelvis diameter than in man.
- Accumulation of fat is mainly in the areas of the thighs, buttocks, hips for hormonal reasons and for needs related to childbirth-breastfeeding.
- Greater joint mobility except in the shoulders and upper trunk.



1.3 METABOLIC AND PERFORMANCE DIFFERENCES

Compared to men, women have on average one:

- Lower anaerobic power capacity due to lower testosterone levels (from 0.15 to 0.4 mg / day while in men the secretion varies from 4 to 9 mg / day).
- Reduced ability to deliver power by exploiting the glycolytic pathway; due to a lower overall muscle mass and a lower amount of phosphate available (in fact, with the same cross section of the muscle there is a significant difference in strength compared to humans, especially at the level of the upper body). On average the woman is 75% weaker than a man of the same weight, this difference decreases in the lower limbs and increases in the arms.
- Number of mitochondria per minor myofibril; this appears to be a biochemical limit to what is maximum aerobic power.
- Less hemoglobin (10-14% less than men).
- The performance differences in the race to the highest levels differ on average of 15% between men and women.

1.4 PERFORMANCE IN WOMEN'S FOOTBALL:

Women's football, like men's football, is a difficult sport to analyse since the performances are mainly acyclical, with intermittent metabolic commitment of an alternating aerobic-anaerobic type. Scientific works on the subject, despite a considerable increase in women playing football, are still not very many and publications, as well as the data available in the scientific literature, indicate that performance in high-level competitions is conditioned by a high degree of aerobic condition that allows you to run about 9-12 km on average. These data allow the players to perform during the 90 'repeated high intensity phases, which are in turn also supported by the anaerobic abilities, as in the sprint movements, jumps, contrasts, shots that are mostly used in the most important moments crucial parts of the game. Women's soccer matches consist of about 250 short anaerobic actions per player, with sprint repetitions lasting an average of 2.4 seconds, for about 40 times per game, with variable recoveries of up to 90

seconds. Despite the above data, it is also true that numerous studies have shown that women have greater resistance to fatigue and are, therefore, able to sustain continuous and intermittent muscle contractions, at low or moderate intensity, for longer than men. In conclusion, we can say that the aerobic characteristics of soccer players do not differ much from those of male soccer players or other athletes practicing team sports; while the significant differences are evident as regards the high intensity movements and the mechanical and muscular characteristics. In fact, the latter are almost always accompanied by insufficient coordinated technical characteristics, if compared with those of male athletes.

1.5 MATCH STATISTIC MEN'S AND WOMEN'S FOOTBALL:

On the world scene, this sport is practiced not only by the male gender, but also has many members on the female side. The popularity and professionalism of women's football has increased markedly in recent years, with senior players now employed on a professional or semi-professional basis. The use of technologies such as global positioning systems (GPS) and semi-automatic cameras are also common in this reality and provide a lot of information on the status of the players. From some data, it emerged that those militants in the high level cover a total distance of 10 km, with 1.7 km completed at high speed (> 18 km / h) and average sprint distances of 14.9 ± 5.6 m. The involvements of game-specific skills (such as passing, dribbling, tackling and stoppages) were quantified as 76 ± 30 events per game, specifically 11 ± 1 headers and 16 ± 1 tackles and 1350 were also performed - 1650 changes of activity. Top-level soccer players complete 28% high-speed running and 24% sprint than moderate-level players. The players also produce greater peaks of repeated sprints during international matches than in national ones; consequently complete more high-speed running (13%) and sprint (14%) when playing international matches.

Midfielders cover more than 1000m than attackers and 600m more than defenders; but also the central defenders achieve a lower high-speed run than the midfielders and the forwards. Decreases in high-speed racing was reported between and within the two times. The 5 minutes following a 5-minute peak period of high-speed running during a match was frequently used as an indicator of temporary fatigue, and a 17% decrease in high-speed running was evident in high-speed players level. This suggests an inability to maintain a high intensity run and a failure to execute the required intensity throughout the game. There were decreases in speed, counter-movement jumping, repeated sprinting, intermittent endurance measured with the "Yo-Yo Intermittent Endurance test level 2" (YYIE2), knee extension and flexion. This information provides an indication of the appearance of fatigue after a game. Mean oxygen consumption (VO_2) during a women's match was estimated at 77 - 80% of VO_{2MAX} , with peak values of 96%. Hence the aerobic energy system is highly taxed during a match, with periods approaching maximum effort. The lactate concentrations of the elite players corresponded to 5.1 ± 0.5 and 2.7 ± 0.4 mmol / L, occurring after the first and second halves.

Women between the ages of 13 and 50 are subject to a monthly rhythm called the "Menstrual Cycle". High training loads can have an adverse effect on the latter. Some studies have shown that VO_{2MAX} does not affect the phase of the cycle; ventilation, heart rate, and stress

perception rates increase during the luteal phase; lactate thresholds are the same or slightly low during intense - moderate activity. However, numerous studies have concluded that fluctuations in female steroid hormones do not affect muscle strength and fatigue. Furthermore, there were no differences in performance in high intensity intermittent shuttle running throughout the menstrual cycle. Aerobic performance is reduced by 5 - 15% in trained and active women, using the oral contraceptive pill (OCP). Instead the anaerobic one and more in detail the intermittent high intensity performance and strength appear to be unaffected by the OCP. The incidence of injuries for soccer players is between 1.2 and 7.0 for 1000 hours of training and 12.6 - 24.0 for 1000 hours of matches. The typical distance covered by a high-level player during a match is 10 - 13 km, with midfielders having higher values than other playing positions. Much of this distance occurs when walking or running at a low intensity and a limited energy turnover is required. In terms of energy production, periods of high intensity exercise are of extreme importance. In fact, the amount of high-intensity exercise divides elite players from low-level ones.

The players of important international teams reach 28% more of the high intensity running and 58% of the sprints than the low-level ones. The number of tackles and jumps depends on individual playing style and team position and at an advanced level it has been shown to vary between 3 - 27 and 1 - 36. There are greater individual differences in a player's physical demands, partly relative to the position in the team. The central defenders cover a shorter total distance and a high intensity race; full-backs a considerable distance at high intensity and by sprinting; the forwards a high intensity distance equal to the full-backs and midfielders, but they are faster than the latter and the defenders. In general, players from all positions have a significant decline in high intensity running towards the end of the game. In elite football, physical capacity is used during a match by all team members. Football is an intermittent sport in which the aerobic energy system is highly taxed, with average and peak heart rate values around 85 and 98% of the maximum. Since heart rate values during a game lead to an overestimation of oxygen consumption, certain factors such as dehydration, hyperthermia and mental stress raise it without affecting oxygen consumption. The latter was shown to be around 70% during a match.

Body temperature is another indirect measure of energy production during an exercise; in football it increases relative to that compared with the average intensity during the intermittent nature of a match. In the eyes of any observer and in particular of an expert, men's football appears more intense, dynamic, explosive... compared to women's football which has the same characteristics, but with a much lower level of each. This can be explained by the fact that the male subjects enjoy a greater physicality, which allows them to perform the movements, the various game actions in a different way from their peers. However, if you look at a women's football match, you notice that, despite the clear physical gap, this reality is also of great importance. Men's football has always played a leading role, thanks to the increased media visibility that has allowed it to gain popularity among the people. However, this does not suggest that the female world cannot reach its level, but, on the contrary, both can reach important goals and performances.

2.1 DATA COLLECTION TECHNIQUES AND INSTRUMENTS MATERIALS & METHODS, PROCEDURE.

Subjects In this study, 18 male from India and female players from an amateur sports club were involved respectively. The female subjects belonged to the "Juniors" category, while those opposed to the "Students" category. The physical characteristics of the participants are shown in the Experimental Study. The players performed a battery of five tests during a normal weekly training. They were made in the period between January and March 2022. Each concerned a specific motor ability. More in detail, the speed was analysed with a 20 m Sprint, the strength with a counter movement without using the arms (CMJ), the resistance with the "YoYo Intermittent Recovery Test - Level 1 "(YYIR1), agility with the " 20 Yards Agility Run Test "and coordination with a test characterized by running, slalom with the ball, jumping of the obstacle

All tests were carried out at the beginning of the first training session, each once a week for each category of subjects. We started with that of speed, then move on to that of agility, strength, endurance and conclude with that of coordination. Before each, the protocol was explained and the correct technique was demonstrated; the speed, agility, endurance and coordination tests were carried out on a synthetic grass surface, while the strength test was carried out on a natural grass surface. I'm States carried out in the complex through method manual.

The aim of the present research was to understand if there are differences between the two kinds of football. It has been hypothesized, on the basis of previous studies that these should exist and the male gender would show higher values than the female counterpart.

Methodology, physical performance, technical skills, mix of qualitative and quantitative research and educational preparation

2.2 RESEARCH OBJECTIVES

A main gender effect was identified for all measures (Table I, II). Specifically, the players showed better results in all physical tests, except for the resistance one and better anthropometric lines than the female players. The comparisons between the groups are presented in Tables I and II.

Table I. Physical characteristics of the football players involved in this study.

Variable	Males	Females
Age (years)	17 ± 0	18,3 ± 0,9
Height (m)	1,76 ± 0,05	1,63 ± 0,05
Body mass (kg)	63,8 ± 8,1	54,05 ± 7,1
BMI	20,6 ± 2,5	20,3 ± 2,2

Table II. Field test performance of the players involved in this study.

Variable	M	F
Yo-YoIR1 (m)	370 ± 230	832 ± 220
CMJ (cm)	2.58 ± 0.14	2.44 ± 0.08
Sprint (m . S ⁻¹)	3.42 ± 0.48	3.53 ± 0.44
20 Yards Agility Run (m . S ⁻¹)	5.17 ± 0.45	5.38 ± 0.55
Coordination Test (m . S ⁻¹)	35.4 ± 10.92	29.3 ± 14.42

From the analysis carried out to verify the gender differences between male and female football in relation to the proposed tests, it is clear that there are statistically significant differences between the two groups. Furthermore, we can also note a different level of physical preparation between the two teams. From the test data, it is possible to deduce an insufficient level of physical performance as regards the organic conditional aspect (“Yo-yo Intermittent Recovery Level 1” resistance test) for both teams. All this probably denotes the amateur level of the league it belongs to. For the 20m sprint speed test, the average of the female test is statistically higher and significant than the male test ($p < 0.05$; $ES = 0.58$ moderate-large), highlighting how between the two genders, the muscular aspect for this age is different, due to the growth processes (pubertal period), in which the hormonal and structural aspect (weight gain and height) considerably affects the expression of physical abilities, in this case neuromuscular. From all this yes shows how the male gender differs considerably on this aspect from the female gender, which is unable to express neuromuscular parameters close to the latter The percentage of improvement of males compared to females is equal to 6.43%.

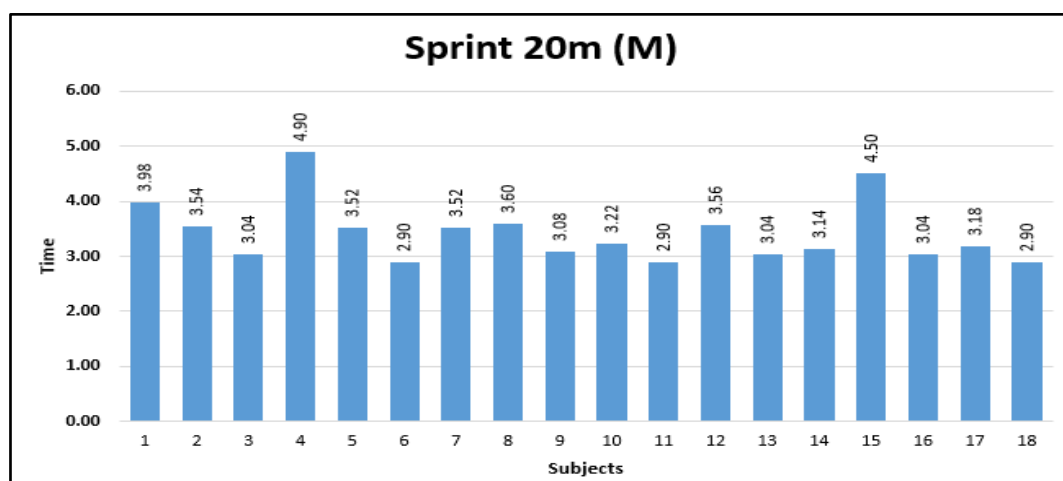


Figure 1: - The figure shows the performance of the players during the execution of the speed test.

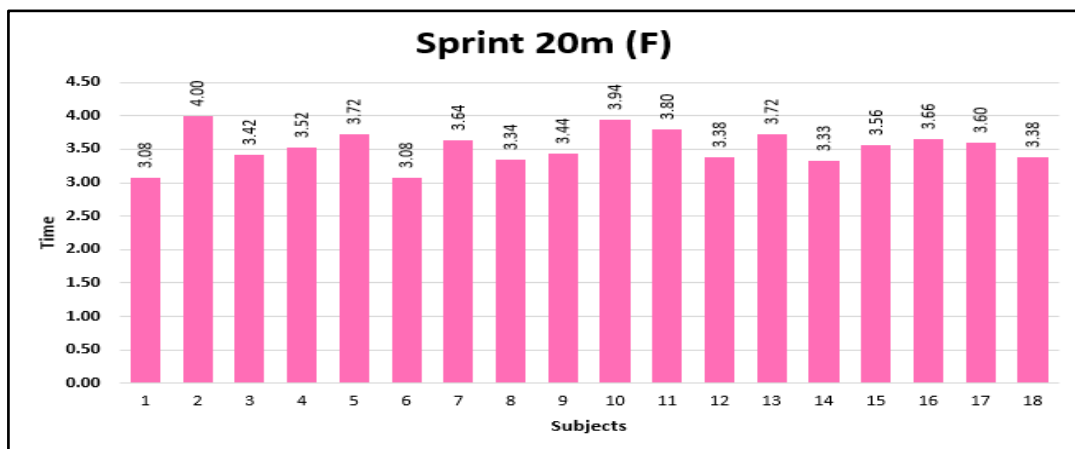


Figure 2: The figure shows the performance of the players during the execution of the speed test.

For the Agility Test (20 Yards Agility Run), the mean of the female test is statistically high and significant of the male test ($p < 0.05$; ES = 0.28 small change), but the change that occurs between the two genders is small, as evidence of how the coordinative aspect greatly affects the execution of this test, therefore the players are able to express a quality close to that of the players. It should be noted that the difference is to the advantage of the male gender due to the neuromuscular aspects mentioned above due to the pubertal period. The percentage improvement of males compared to females is 2.73%.

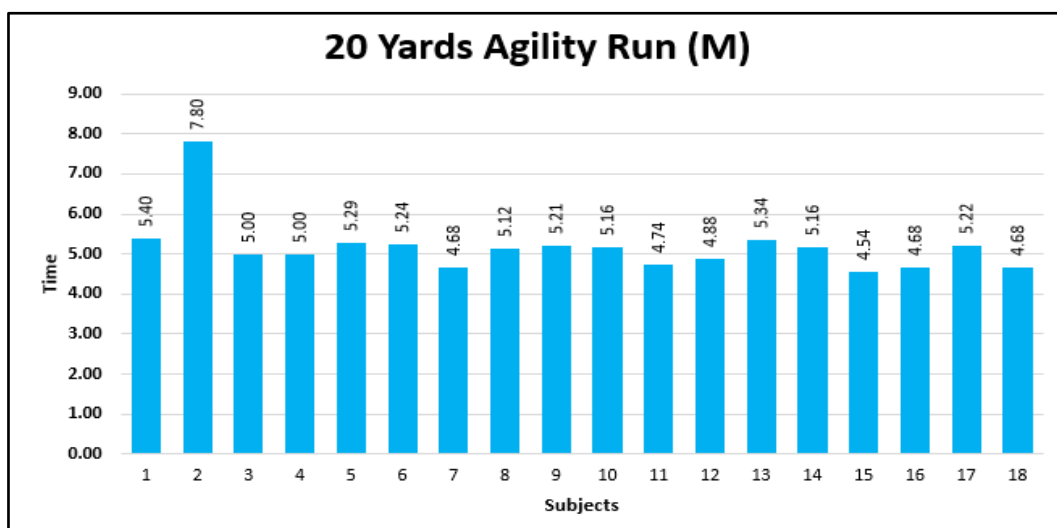


Figure 3:- The figure shows the performance of the players during the execution of the agility test.

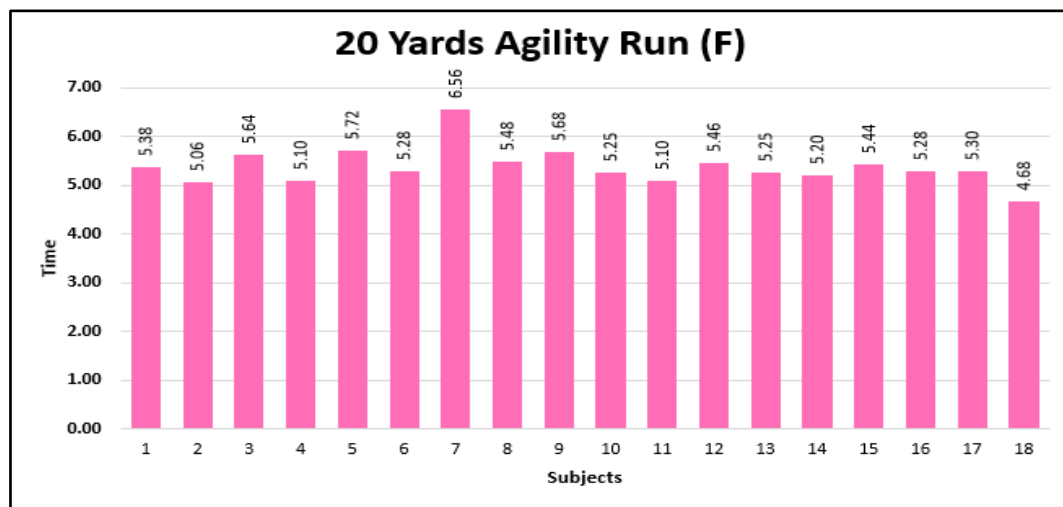


Figure 4:- The figure shows the performance of the players during the execution of the agility test.

For the Lower Limb Explosive Strength (CMJ) test, the male jumping test average is statistically higher than females ($p < 0.05$; $ES = 2.59$, Very Large), highlighting how the neuromuscular aspect is predominant at this age and that the gender difference is marked in pubertal period due to the explosive force expressed by the lower limbs. The percentage of improvement of males compared to females is equal to 8.78%.

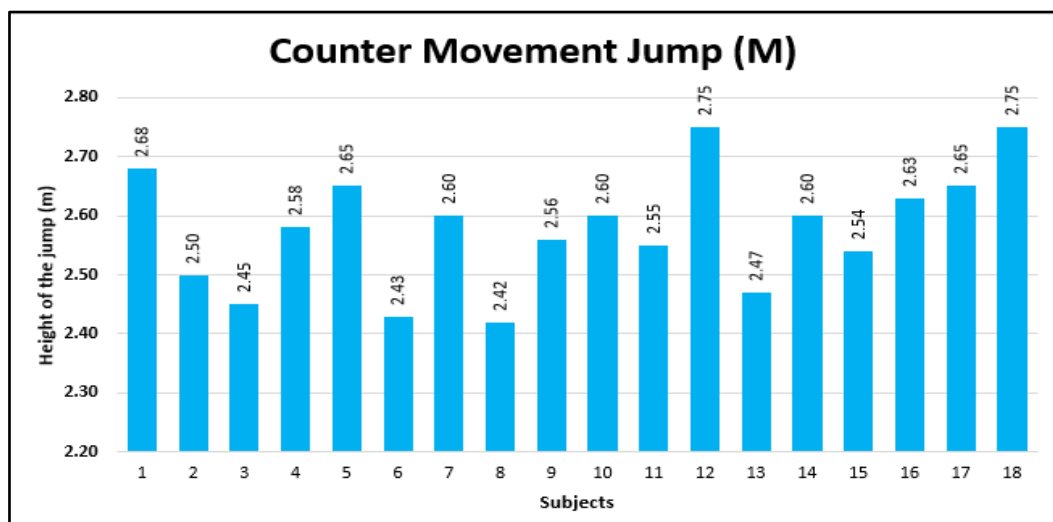


Figure 5: - The figure shows the performance of the players during the execution of the strength test.

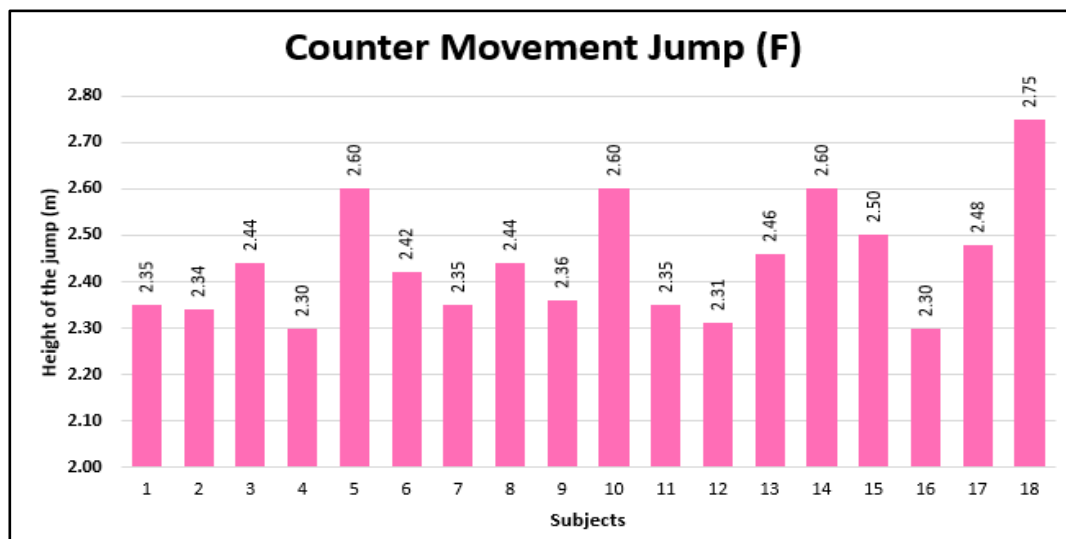


Figure 6: - The figure shows the performance of the players during the performance of the strength test.

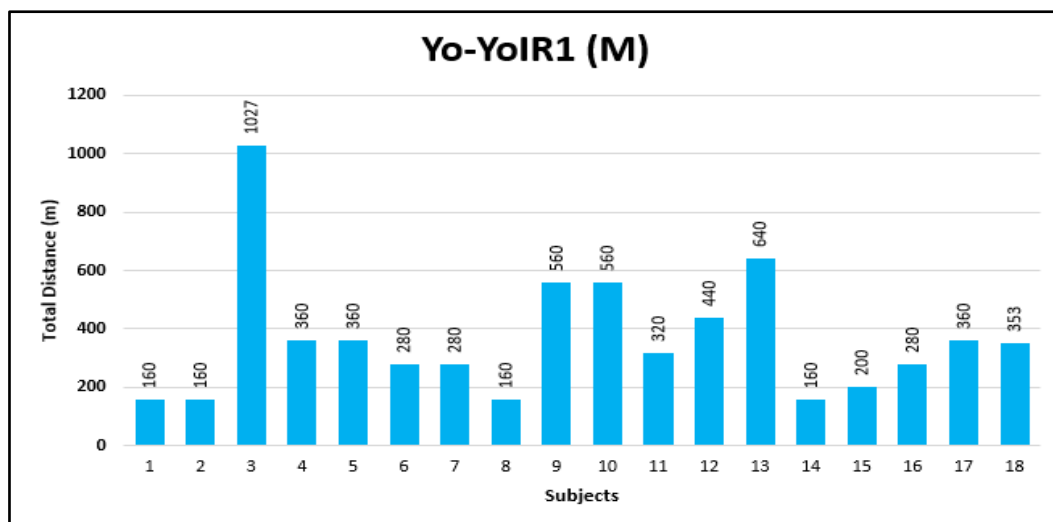


Figure 7:- The figure shows the performance of the players during the execution of the test resistance.

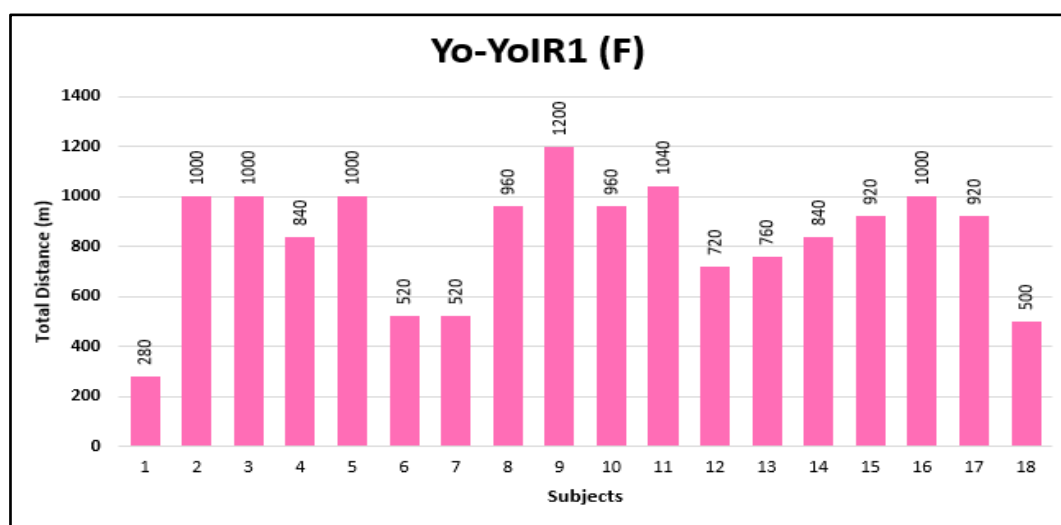


Figure 8: - The figure shows the performance of the players during the execution of the test resistance.

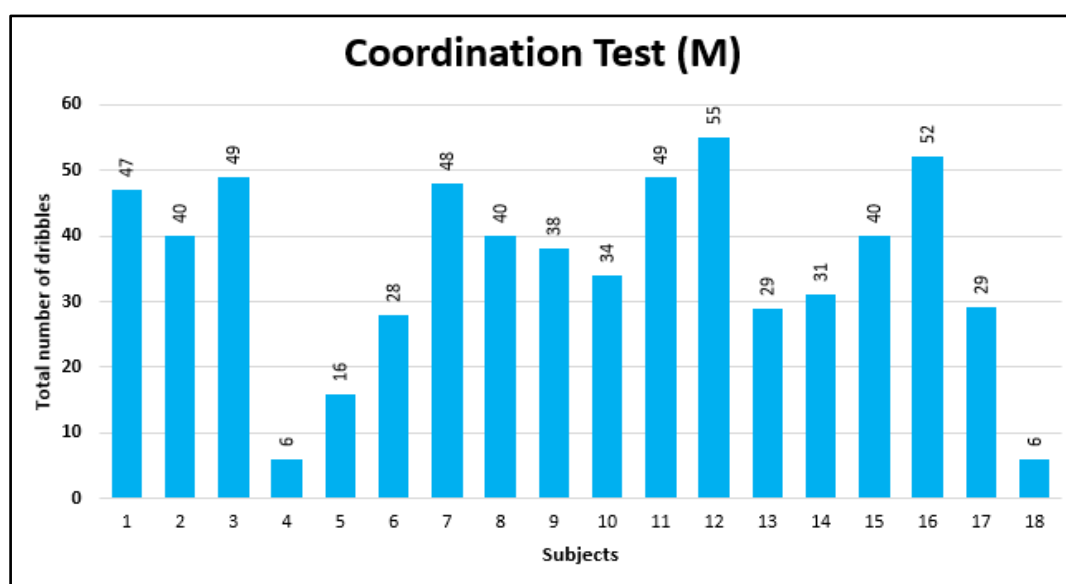


Figure 9: - The figure shows the performance of the players during the execution of the test coordination with reference to the variable “Total number of dribbles”.

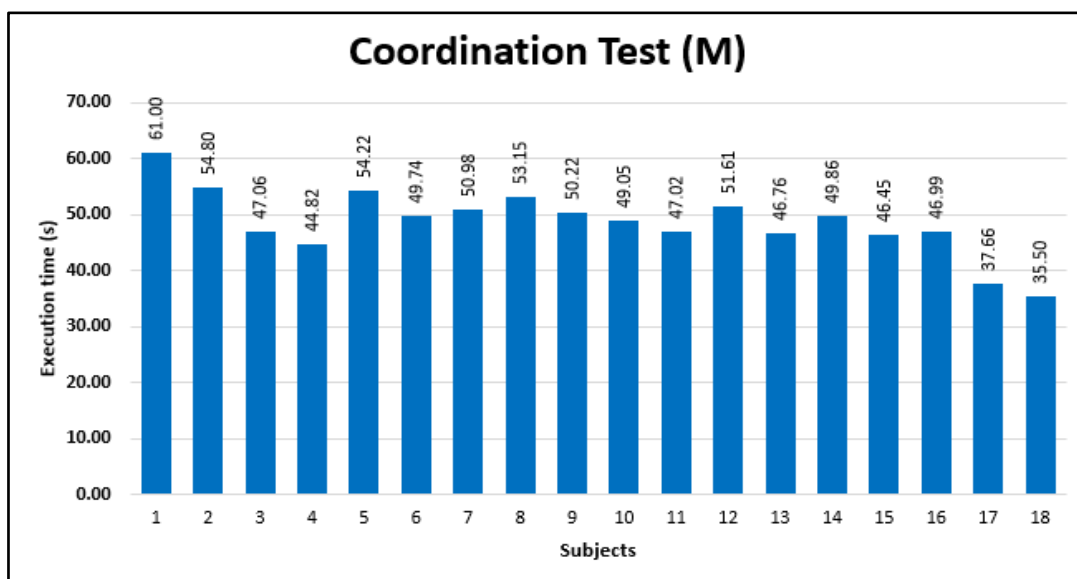


Figure 9.1: – The figure shows the performance of the players during the execution of the coordination test, with reference to the "Execution time" variable.

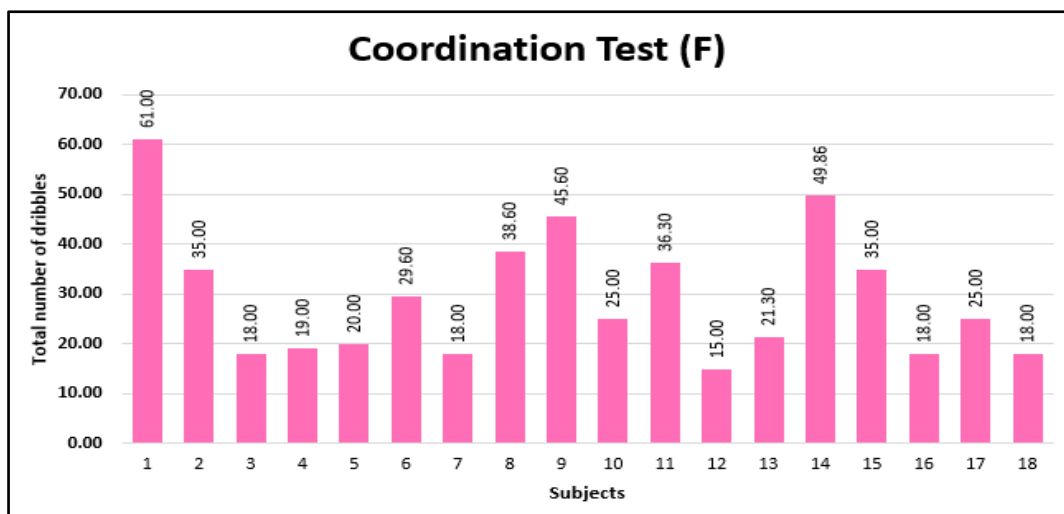


Figure 10: - The figure shows the performance of the players during the execution of the test coordination, with reference to the variable “Total number of dribbles”

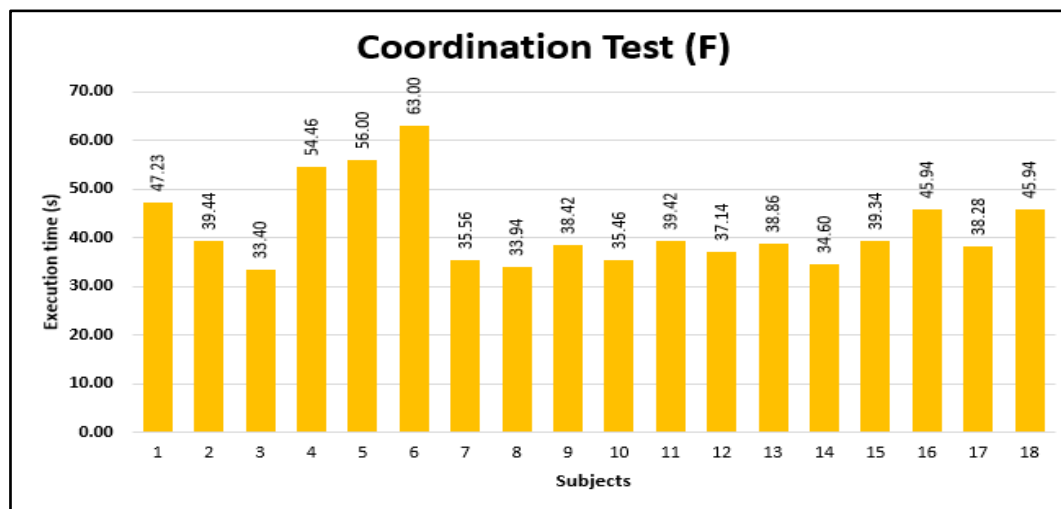


Figure 10.1: - The figure shows the performance of the players during the execution of the test coordination, with reference to the variable "Execution time".

3.1 DATA ANALYSIS TECHNIQUES

This work has allowed us to understand that the Fitness component can be considered a discriminatory variable in the two kinds of football. The differences were felt in the abilities of speed, agility, strength and coordination; on the other hand, resistance does not discriminate between the male and female gender as it depends on the cardiac aspect and not on the neuromuscular aspects, as for the other physical abilities. In a recent study, there were greater divergences in agility and endurance; a predominance of anaerobic ability over aerobic endurance was found in female soccer players; furthermore, the latter showed marked differences in the Yo-YoIR1 compared to the speed and vertical jump test (Castagna C, Impellizzeri FM et al., 2009). Strength is a variable that makes it possible to distinguish the two kinds of football. The vertical jump performance was evaluated, for the first time, in the players of the Indian national team. The women's sector was more subject to disparities, while no differences at the competitive level were evident in the players. The use of "Countermovement Jump "(CMJ) and" Squat Jump" (SJ) can help athletic trainers in prescribing explosive strength training in soccer players (Castagna C and Castellini E, 2012). Contrary to what is expressed in this work, aerobic capacity can present discrepancies between players and female players. Gender differences in lactate threshold and intermittent shuttle running performance were evaluated for the first time. Furthermore, inequalities were found in the anaerobic threshold and in the maximum running speed. The female soccer players, in fact, had a low anaerobic threshold and a maximum running speed and covered a shorter distance (Baumgart C et al., 2014). In the current reality, we are aware that the athletes have higher values in the activities of coordination and joint mobility, while the athletes hold the dominance in the conditional skills (strength and endurance). In the various types of speed, on the other hand, similar values are manifested between the two genres. The present study found superiority of the male gender in the ability of speed, agility, strength and coordination, while

the female gender in stamina. Thus, the hypotheses formulated in the initial moment of the research were confirmed. In fact, we had noted, on the basis of previous works, the existence of inequalities between men's and women's football, with higher parameters in the players. The resistance parameter allowed us to reach an interesting conclusion. It was not considered valid to highlight the differences between the two football realities and in particular, on the female side an adequate, continuous and specific training of this ability can lead to efficient performance any sports club. The Yo-Yo IR test can be used as an indicator of the physical performance of female soccer players during all competitive matches (Bangsbo J, Krstrup P et al., 2005). Finally, as shown by Reilly, 2003, it can be said that the differences between the sexes could be related to physiological factors, to differences in the state of training and to the intensity of the exercises proposed by the coach and the athletic trainer.

3.2 CONCLUSIONS

We can affirm that my research highlights the data present in the literature on the gender differences between male and female football. As we have repeatedly shown, from the pubertal period onwards the difference in the expression of strength and speed, partly due to agility (for known reasons), is to the advantage of the male gender. On the other hand, the resistance aspect does not show noticeable changes to the advantage of males over females. In our case under consideration, female soccer players are better in endurance performance than female soccer players. This work could help in reformulating the hypotheses, to verify them in future research as there are some aspects that have not yet been the subject of scientific investigation; for example assessing the performance of speed, agility and coordination in the two kinds of football. Future research is required to investigate the possible effect of training loads on physical development and the effect of fitness level on match performance between genders, competition standards and age groups. An evaluation of the demands of the different playing positions is essential to ensure greater specificity to the training and to identify the talent in the various players (Andersson H, Datson N et al., 2014).

3.3 FUTURE INVESTIGATION:

Future investigations should investigate the physical demands of different playing positions in footballers and female players. What can be seen in our study, the lack of physical performance of both groups analysed, which suggests the need to improve the proposed training in intensity and volume, as regards the contents (exercises) to be carried out. All this to ensure a foundation and constant improvement for the boys and girls of the team. This work aims to make it clear that both types of football (male and female) are of great importance in the national panorama and must always be strengthened and improved in order to remain in line with European and International parameters.

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