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SELECTED PHYSIOLOGICAL PROFILE AMONG MALAYSIAN 3rd TIER FAM LEAGUE FOOTBALL PLAYERS

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ABSTRACT

The purpose of this study was to determine physiological profile of body composition, power, speed, agility, VO_2max, anaerobic capacity and muscular endurance of Malaysian 3rd tier football league players based on four different positions named goalkeepers, defenders, midfielders and strikers. An ex post facto design was employed. Twenty eight [n: 28; mean (±SD) age 24.78 (±3.28); height 172.69 (±4.63) cm; and weight 71.19 (± 8.42) kg] of footballers of Sime Darby FC participated with different positions of play in the field (goalkeeper: 4, defender: 11, midfielder: 8, striker: 5). The fitness testing involved were anthropometrics which include skinfold test, squat vertical jump, 30 meters maximal sprint, Illinois agility run test, Yo-Yo intermittent recovery level 1 test, repeated sprint ability test, and maximum push up test. All testing were in accordance to standard procedures. Inferential analysis was carried out using one-way ANOVA and Tukey post hoc to reveal the sources of significant with $p<.05$ denoting significant. Goalkeepers were observed in their best performance in terms of height, weight, body fat percentages and lean body weight; and also best performance in peak power of squat jump and anaerobic capacity in terms of fatigue index. Defenders were observed in their best performance in terms of height and relative power of squat jump; and muscular endurance. Midfielders were observed in their highest distance and VO^2max of aerobic capacity. Strikers were observed in their best performance in speed and agility and anaerobic power in terms of best and mean time score. The overall findings did not reveal the significant difference in height, body fat percentages, power, speed, and aerobic capacity. However, the significant difference was found in body weight and lean body weight between goalkeeper (p: 0.037) vs midfielder (p: 0.033) respectively. The significant difference was observed in agility between goalkeeper vs defender (p: 0.001), midfielder (p: 0.000) and striker (p: 0.000), and respectively; and defender vs striker (p: 0.001). It also showed the significant difference in RSA mean time score between goalkeeper vs defender (p: 0.013), midfielder and striker, (p: 0.020) and (p: 0.046) respectively. All parameters met the assumption of homogeneity and demonstrated the moderate level of power estimation based on Omega-square index. There were general similarities among members of the team, probably the result of a typical common training programme of the team. The significant difference found in weight, lean body weight, agility and anaerobic power in terms of mean score parameters were insightful with regards to specific fitness requirement based on different playing positions on other health and skill related to the aspect of the games.

Contribution/ Originality: This study contributes on existing literature about the important of understanding physiological characteristics between positions in football match in Malaysia Super League 3rd Tier perspective. This can lead to a better selection and training of player process accordingly and improve overall Malaysia football League Performance.

1. INTRODUCTION

Football is classified as a high intensity intermittent team sport (Bangsbo, 1994). They have several fitness components that have been identified as essential for the particular team to be a successful team. In modern game where positions in football field are evolved, there are differences in tactical and strategy layout which compose different new positions. However, there are four basic positions in football team. The positions are goalkeeper, and outfield players (defender, midfielder and striker). Previous researches were shown the differences demand of the physical fitness and anthropometric accordance to the positions of play (Reilly and Thomas, 1976; Ekblom, 1986; Van and Boutmans, 1988; Bangsbo *et al.*, 1991; Reilly, 1997; Rienzi *et al.*, 2000; Mohr *et al.*, 2003; Bloomfield *et al.*, 2005). Positional of players in the field determines and influences the physiological demand, the total energy expenditure and also the bioenergetics requirement. The players may experience differences in those areas because of the positioning and tactical play (Reilly and Thomas, 1976; Reilly, 1997; Di Salvo and Pigozzi, 1998).

Previous study showed those midfielders covered greater number of distance compared to defender and striker because the role of midfielder is to link play between defender and striker. The goalkeepers only covered four kilometers since the roles of the goalkeepers are to protect the goalpost and prevent the opponent from scoring. Strikers have been found to commit more sprint activity than other outfield players (Bangsbo *et al.*, 1991). The strikers are usually getting long balls and forward run during attacking plays and they have to beat the opposite defenders to score the goal. Furthermore, the high intensity activities during games such as tackling, long passing, jumping and powerful heading which are in certain situation in the game also give extra physiological stress to the players. For example, the strikers are more engaged in the situation where they have to heading and jumping or shooting while the defenders are more engaging on tackling of the ball during the defensive play (Bangsbo, 1994).

The purpose of this study is to determine and develop the physiological profile of a 3rd tier Malaysian football league players based on their playing position. The results of this study would be potentially useful in terms of assisting coaching staff for reference values of fitness characteristics according to specific playing positions in football. The information obtained from this study might be useful to the football clubs, organizations, teams, and coaches that are responsible for the team tournament preparation, in terms of specific positions requirement. It is critical to assign the players with the appropriate positions that match their physical fitness and physiological of players.

2. METHODS

Twenty eight players of Sime Darby Football club participated in this study. The team consisted of players that were assigned to four different playing positions; goalkeeper, defender, midfielder and striker. They were required to undergo the physical fitness and physiological testing process, approximately for two separate weeks upon requesting by team coach required in the training schedule during training session (20th until 22nd January 2010 and 3rd until 4th February 2010). Antropometric measurement including weight, height, and skinfold measurement (7-sites) were held during 20th until 22 january 2010. The test was held in the morning until all tasks are finished.

Height was measured with the subject barefoot and standing still using Seca height stadiometer (Vogel and Halke, Hamburg). Weight was measured using a portable Seca metric scale (Vogel and Halke, Hamburg). Each participant was measured twice, and the mean of the two measurements was used. The measurement of height and weight was taken to nearest 0.1 cm and 0.1 kg respectively, and Body Mass Index (BMI) was calculated. Body fat

percentages were estimated of seven sites skinfold using harpenden skinfold calipers. All the measurements were recorded on the right side and to the nearest one decimal point in millimeter. All the protocols of measurement are followed accordance to the guidelines set by International Standard for Anthropometric Assessment (ISAK) and calculated using formula by Withers *et al.* (1987) and Siri (1961).

Physical fitness component testing was held on the 3rd until 4th February 2010. Selected fitness testing were speed (30 meter maximal sprint), Squat Vertical Jump, and aerobic capacity (Yo-Yo Intermittent Recovery test level 1) for first day of the testing. Agility (Illinois Agility run test), muscular strength endurance (maximum Push Up) and anaerobic capacity (Repeated Sprint Ability test) were held for second day of the testing. Enough recovery time (10 to 15min) is allowed for every testing component and proper standard warm up and trials were allowed to familiarize the testing. Speed was measured over 30 meters with a set of electronic timers (Swift Power timer, Swift Performance Equipment, Australia). This test was conducted from a standing start, with timing started immediately after the subject passed the starting line. Two trials were performed and the fastest time was recorded. The squat vertical jump was measured using Swift Timing Module of jump mat. When it is ready, the subjects were asked to stand on the contact mat with their hands placed on their hip and feet flat on the mat, shoulder-width apart. The subjects were instructed to jump as high as possible and to keep their hands on their hips throughout the duration of the jump. The subjects assume a semi-squat positions with knee bent to ~90 degrees. Two second after assuming this squat position and on the tester command, the subjects immediately extend their knees and hip to jump vertically off from the mat as high as possible; the subjects landed on the balls of their feet in an upright, extended position and at the same point of takeoff. Each performed three trials and the best of maximal trial was recorded. Jump peak power and relative power were calculated (Sayers *et al.*, 1999). Aerobic capacity was estimated from the Yo-Yo intermittent recovery level 1 test (Bangsbo *et al.*, 2008). The objective of the test was to run for a 20 m long lane, keeping to the speed indicated by the 'beeps' on the recording. Then, the subjects have ten seconds to recover and continue running with pace of the beep sound. Two warnings were given when the subjects cannot complete the course in the allocated time. Maximal oxygen uptake was estimated based on formula by Bangsbo *et al.* (2008) and the distance covered was recorded.

The agility test requires each subject to sprint from the starting line to the finishing line followed by agility Illinois test course (Hachana *et al.*, 2013). Two trials were allowed for each subject and the best time was recorded. The maximum number of push ups was measured as an indicator of the strength endurance of the subjects. The subjects had their hands and toes touching the floor, body and legs in a straight line, the arms shoulder width apart, extended and at a right angle to the body. The subjects lowered the body until there was a 90-degree angle at the elbows, and then returned to the starting position with the arms extended. This action was repeated until the subjects are exhausted. Repeated Sprint Ability (RSA) measures the ability to perform repeated sprints at the highest possible speed (anaerobic capacity) using Swift Power Timer light gate. The subjects perform standardized warm up, and then execute three to five sub-maximal twenty meter sprints, progression from 50 to almost 100% of their perceived maximal effort intensity. This was followed by another five to eight minutes passive rest before the actual test. Subjects were instructed to sprint maximally for every sprint and pacing was discouraged. From a standing stance, 0.4 meter behind the starting gates, the subjects sprinted a distance of twenty meter six times, with twenty seconds of active recovery interspersed between the sprints. Subjects then recovered by jogging around the ten meter cone and back to "start line" of the next sprint. The following performance indices were noted: i) RSA mean time, the mean from the six repetitions of sprint ii) RSA best time is the best from the six repetition of sprint and iii) RSA percent decrement is the fatigue index from the six repetitions of sprint (Aziz *et al.*, 2008).

The subjects were assigned to a group based on their positions. The results were analyzed using standard descriptive statistics (e.g. mean, standard deviation), while ANOVA was used to examine among group variability with Tukey Post Hoc applied to identify sources of significant. All data were analyzed using SPSS (version 16.0) using $p<.05$ to indicate statistical significance.

3. RESULT

A total of twenty eight [n: 28; mean (±SD) age 24.78 (±3.28); height 172.69 (±4.63) cm; and weight 71.19 (± 8.42) kg] of footballers of Sime Darby FC participated with difference positions of play in the field (goalkeeper: 4, defender: 11, midfielder: 8, striker: 5). *Demographic and physical Characteristics (Table 1)*

There was no significant difference in height, body fat percentages, and body mass index (BMI) score between all four different groups of position play. However, there were significant difference in weight between Goalkeeper vs Defender *(p = 0.0037)*; and lean body weight between Goalkeeper vs Defender *(p = 0.0033)*.

Table-1. Demographic and Physical characteristics

	Positions														
	G.Keeper (n:4)			**Defender (n:11)**			**Midfielder (n:8)**			**Striker (n:5)**			**Total (n:28)**		
Height (cm)	174.98	±	4.50	173.32	±	4.38	170.40	±	5.36	172.73	±	3.30	172.69	±	4.63
Weight (kg)	80.03*	±	9.63	71.04	±	6.94	67.50	±	7.35	67.95	±	6.95	71.19	±	8.42
B.fat %	17.58	±	2.39	14.83	±	3.11	14.46	±	1.9	14.57	±	3.12	15.18	±	2.79
lean B.weight	65.77**	±	5.98	60.33	±	4.12	57.63	±	5.37	57.88	±	3.95	60.18	±	5.41
BMI	26.13	±	2.10	23.79	±	2.36	23.31	±	1.60	22.97	±	2.16	23.95	±	2.24

*Significant different between Goalkeeper vs Midfielder (p = 0.037)

**Significant different between Goalkeeper vs Midfielder (p = 0.033)

There was no significant difference in mean score for squat vertical jump, Yo-Yo Intermittent Recovery Level 1 test, 30m sprint, Repeated Sprint Ability (except RSA best time score) and maximum push up. However, there were significant difference in Illinois Agility score between Goalkeeper vs Defender (*p = 0.001)*, vs Midfielder *(p = 0.001)*, and vs Striker *(p = 0.001)*. It also shows significant difference between Defender vs Striker *(p = 0.001)*. For Repeated Sprint Ability Test, it shows significant difference in terms of RSA best score between Goalkeeper vs Defender (*p = 0.013)*, vs Midfielder *(p = 0.020)*, and vs Striker *(p = 0.046)*.

Table-2. Physical Fitness Assessment

Fitness Test		**Positions**														
		G.Keeper (n:4)			**Defender (n:11)**			**Midfielder (n:8)**			**Striker (n:4)**			**Total (n:28)**		
30-m Maximal Sprint (s)		4.53	±	0.10	4.45	±	0.19	4.41	±	0.13	4.39	±	0.15	4.44	±	0.16
Squat Jump	Jump Height (cm)	35.80	±	5.36	36.45	±	5.26	34.63	±	3.74	35.50	±	3.11	35.68	±	4.45
	peak power (watt)	3743.42	±	531.81	3375.94	±	338.73	3104.49	±	361.59	3177.99	±	502.06	3335.73	±	444.15
	relative power (watt.kg-1)	46.80	±	4.01	47.72	±	4.88	46.09	±	3.56	46.57	±	2.64	46.92	±	3.97
Yo-Yo Intermittent recovery Level 1	Distance (m)	896.00	±	408.51	1298.18	±	378.36	1300.00	±	260.99	1230.00	±	180.00	1217.14	±	350.48
	vo2max (kg.ml.min)	43.93	±	3.43	47.30	±	3.18	47.32	±	2.19	46.73	±	1.51	46.62	±	2.94
Illinois agility run test (sec)		15.41^	±	0.36	14.71^^	±	0.27	14.45	±	0.19	14.06	±	0.14	14.67	±	0.48
Max Push Ups (reps)		18.40	±	9.71	33.82	±	10.77	32.25	±	10.63	29.50	±	9.04	30.00	±	11.30
Repeated Sprint Ability	RSA mean time (sec)	7.88*	±	0.58	7.43	±	0.29	7.57	±	0.21	7.43	±	0.16	7.56	±	0.36
	RSA best time (sec)	7.47	±	0.40	7.06	±	0.19	7.07	±	0.11	7.05	±	0.18	7.14	±	0.26
	RSA fatigue index %	5.54	±	1.97	5.85	±	2.45	7.08	±	2.05	6.15	±	1.53	6.19	±	2.12

^Significant different between Goalkeeper vs Defender (*p = 0.000)*, vs Midfielder *(p = 0.000)*, vs Striker *(p = 0.000)*.

^^Significant different between Defender vs Striker (*p = 0.001)*,

*Significant different between Goalkeeper vs Defender (*p = 0.013)*, vs Midfielder *(p = 0.020)*, vs Striker *(p = 0.046)*

4. DISCUSSION AND CONCLUSION

This study attempted to determine the possible differences of fitness characteristics among 3rd tier Malaysian football players with respect to specific playing position in football. Generally, the findings demonstrate goalkeeper has the highest in body fat percentages and also the highest in mean lean body weight. However, for mean body fat percentages, the finding did not achieve statistical significance. For lean body weight, goalkeeper showed statistically significant difference with midfielders. This result is expected since the goalkeepers have special requirement, responsible to keep the goalpost from conceded; that lead to limited running activities. The lesser aerobic activities during football match might be one of the reasons why the goalkeepers have greater body fat percentage (Bangsbo *et al.*, 1991). The utilization of fat as energy sources might be limited compared to other positions because the lower distance covered and the nature of the game in that positions. It was opposite with the midfielders who have optimally used fat as source of energy since the midfielders covered greater distance in football match.

The range mean of body fat percentages between four football positions in the current study was from 14.46 to 17.58 percent. This finding is slightly higher than the previous studies which range of body fat percentages is from 11.6 to 12.5 percent for professional football players (Strudwick *et al.*, 2002; Chamari *et al.*, 2005; Clark *et al.*, 2008). This finding might be slightly higher because the level intensity of plays of the subjects is lower (3rd tier of Malaysian Football League), which is different level compared to European professional football league.

Muscular power was assessed in vertical jump test, with squat jump protocols. The squat jump height, peak power and relative power were analyzed. Peak relative power is an absolute power since the different body weight will determine the differences of relative power obtained. However, in terms of performance, the highest jumping performance is better especially footballers always engage in the high ball situations to get a positional advantages during offensive and defensive tactical of plays. The current study has shown no significant difference in explosive power in terms of relative power performance in four different football positions. However, defenders demonstrate the highest in relative power performance compared to other positions. This finding might be due to the nature of the game for defender, especially centre back has to challenge aerial ball and backward jumping during crossing on set play, corner kick or during deep crossing ball from opponent (Reilly and Thomas, 2003; Bloomfield *et al.*, 2007). This result is concurrent with Sporis *et al.* (2009) who found that goalkeeper was significant difference in squat jump height with other outfield players. Studied by Arnason *et al.* (2004) found that goalkeeper has the lowest score in squat jump height. The inconsistency of other findings might be because of the different level of experience, the training status and pre-seasonal factors. Study by Wisløff *et al.* (2004) showed that there are strong correlations between maximal strength, sprinting, and vertical jumping movement. The strongest correlations demonstrated between sprinting and Vertical Jump as expected that both components are derivatives of maximal strength. However, the findings from Wisløff *et al.* (2004) were concurrent with the current study finding in which the defender has the highest vertical jumping ability and the striker has the highest sprint performance. The findings from Reilly and Thomas (2003) might support this study which found that the central defender and striker are more to engage with the jumping movement or were required to heading the trajectory ball in the air. This scenario explains why the defenders have slightly higher performance in vertical jump.

Muscular power can be defined as the muscle ability to generate as much force possible in shortest possible time. Factors that can influence the force generated depend on speed of lengthening, speed of shortening, type of muscle fibers, and number of motor units active at the same time, eccentric initial phase and impulse frequency (Behm and Sale, 1993). Two mechanisms that can develop muscular power were muscular hypertrophy and neural adaptations. So, besides the strength training alone that can improve muscular power, the neural adaptations from repeatedly performing jumping activities during training and match play were the best explanations why defenders tend to jump higher than other position in football.

The current study also evaluates maximum push up to measure muscular endurance. Defenders were the highest and goalkeepers were the lowest in mean repetitions of push up score. This finding explains that defenders always use

upper body to gain positions by using body contact, and sometimes involved in rough challenge. Muscular endurance of upper body as general seems to be important for defender to get the ball without committing any fouls (yellow or red card). Schmidtbleicher (1992) suggested that dynamics movement with few repetitions between three to seven repetitions will lead to increase of the force of development upon neural adaptations; as during football match, defender performed more skipping and shuffling and throwing movement activities (Bloomfield *et al.*, 2007). Bloomfield *et al.* (2007) stated that striker as well as defenders need to be strong as they engaged more high intensity activities of physical contact. However, this study found about 44 to 46 repetitions for both successful and unsuccessful football team in maximum push up performance than the study by Clark (2007). However, Clark (2007) agreed that certain acceptable level of muscular endurance in general is important to compete in the football match.

30 meter sprint was assessed in order to estimate speed. Researcher found that there is no statistically significant difference between positions in football for speed performance. However, the current study shows statistically significant difference in performance of agility between goalkeeper and other outfield players, and the defender versus striker. Striker has shown the best time in mean score for 30 meter maximal sprint and Illinois agility test followed by midfielder, defender and goalkeeper. This finding is concurrent with Sporis *et al.* (2009) who also found strikers that are the fastest. However, he found that defenders were the second best followed by midfielders and goalkeeper. This result is expected since the nature of the game for strikers who involved directly during attacking plays demand the striker to run faster and more agile with or without a ball. Running without a ball and make themselves open to space is part of tactics to get more room and space in the 3rd quarter of the field. Previous study also showed that strikers were having more running movement than the other outfield players (Mohr *et al.*, 2003; Bloomfield *et al.*, 2007).

All football positions require speed and agility in order to succeed. However, the mechanism of speed and agility is unnoticed. Agility can be defined as quick reaction of breaking and changing directions and accelerate again while maintaining motor control horizontal and lateral direction (Verstegen and Marcelo, 2001). Power *et al.* (1994) stated that the significant difference between first team football players and reserve team football players in two English Premier League football team in running test involves the change of direction. He also stated that in running and agility testing, deceleration factor is always being underestimated, since both rapid acceleration and deceleration are important factors during football match (Power *et al.*, 1994). Running in match play tend to curving and multi-directional, especially in attacking play. So, this might support the finding why they have significant difference in agility test.

During football match, players are demanded to sprint in maximal effort repeatedly from 4 to 6 second for every 90 seconds (Bangsbo, 1994). To assess the capability of anaerobic capacity of athletes, repeated sprint ability (RSA) was measured. RSA fatigue index (RSA percent decrement) was analyzed. Current study found that statistically there was no significant difference in RSA fatigue index. Surprisingly, midfielder showed the poorest result in RSA fatigue index and goalkeeper is the best performer. This finding is not in line with the study by Aziz *et al.* (2008) who found that striker performed better performance in RSA test. Striker covered more distance sprinting than defender and midfielder among Danish and Italian professional players (Mohr *et al.*, 2003). Striker also observed sprint more frequently, if not significantly more during football match in the elite Danish (Bangsbo *et al.*, 1991). However, since the defenders are responsible to man marking the strikers during football match play, it is suggested that in modern football, defenders must also have high ability to repeatedly sprint at high intensity. Rienzi *et al.* (2000) observed that the defender performed more backward sprinting and lateral movement and elevated 20 to 40% of energy expenditure in comparison to forward running. Cautions is advised since other studies in motion analysis showed there was no statistically significant difference in sprinting activities in all football positions (Ramsbottom *et al.*, 1988; O'Donoghue, 2002).

Moreover, today modern football demands all outfield players to all-rounded proficient in terms of technical, and aerobic fitness (Aziz *et al.*, 2008). Other explanations for the current finding are that during the repeated

sprinting, athletes depend on the capability of ATP to replenish and reuse during the football match. Wadley and Rossignol (1998) have reported that there is a strong correlation between the single best sprint and the performance decrement. It is proposed the best result shown by strikers can produce higher peak power outputs and subsequently better 'best' sprint times due to an increased ability to utilize the available ATP-CP stores. With the increased utilization and lack of recovery to allow replenishment of stores, fatigue becomes a significant factor with repeated efforts. Midfielders demonstrate the highest in RSA fatigue index; proposed that midfielders' spent more time to recover after sprinting movement. The midfielders have covered more fields with less sprinting movement during football match (Rienzi *et al.*, 2000; Mohr *et al.*, 2003). The nature of the game for midfielders shaped them to be the best and accurate in passing the game. Midfielders are the heart of the team, and usually the best possession control of the ball. Usually, attacking pattern game starts in midfield players. The good midfielders have good vision and calmly set the tempo of the game. Measuring VO^2max is a good indicator of aerobic fitness in football players. Results demonstrate that the midfielders and defenders are slightly higher in mean of estimating VO^2max compared to goalkeepers and strikers. However, there is no statistically significant difference between positions. These findings are far below than previously reported that mean VO^2max of players has evidence to be between 50 to 65 ml/kg/min (Ekblom, 1986; Bangsbo, 1994; Arnason *et al.*, 2004; Chamari *et al.*, 2005). For midfielders and defenders, the highest number of VO^2max was influenced by more distance covered of the field during the football match (Reilly and Thomas, 1976; Ekblom, 1986; Van and Boutmans, 1988; Bangsbo *et al.*, 1991; Rienzi *et al.*, 2000; Mohr *et al.*, 2003).

As explained before, midfielders are the engine of the team, contribute for both attacking and defensive play. Moreover, midfielders cover greater distance during match play compared to defender and striker. During attacking phase, the midfielders collect the ball from middle field and take the ball to the opponent half, whereas the defenders shift slightly higher to support midfielder. Strikers usually move forward and wait the ball in the penalty area. During defensive play, when the opponent gets the ball, the midfielders usually will track back to own half, and sometimes try to compete and battle the ball in the middle field, whereas the strikers just make a short run at low intensity and the defenders will wait the opponent to attack the ball (Sporis *et al.*, 2009). It is not surprisingly to find that goalkeeper has the lowest VO^2max in this study. As expected, goalkeeper only covers a small amount of distance, approximately four kilometers (Bangsbo *et al.*, 1991). However, the lower overall VO^2max data compared to previous studies might be because of the subjects of the current study who were in pre-season training and lower level of play (3^{rd} tier in Malaysian Football League). In conclusion, this study shows general similarities among members of the team. The findings show differences in parameters which were strictly at descriptive level; as inferential statistical methods failed to find significant difference in all mentioned parameters except weight, lean body weight, agility performance and anaerobic in terms of mean score of professional football players according to specific playing position. These characteristics are likely to influence the selection and training of players, although it is not clear whether this reflects self-selection, selection by coaches, clubs or other officials, or combination of both.

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REFERENCES

Arnason, A., S.B. Sigurdsson, A. Gudmundsson and L. Engebretsen, 2004. Physical fitness, injuries, and team performance in soccer. Medicine Science Sports Exercise, 36(2): 278-285.

Aziz, A.R., M.H. Mukherjee and K.C. Chia, 2008. The validity of the running repeated sprint ability test among playing positions and level of competitiveness in trained soccer players. International Journal Sport Medicine, 29(10): 833-838.

Bangsbo, J., 1994. Energy demands in competitive soccer. Journal Sports Science, 12: S5-S12.

Bangsbo, J., 1994. Fitness training in football: A scientific approach. Bagsværd: HO Storm.

Bangsbo, J., F.I. Marcello and P. Krustrup, 2008. The yo-yo intermittent recovery test; a useful tool for evaluation of physical performance in intermittent sports. Journal of Sports Medicine, 38(1): 37-51. *View at Google Scholar | View at Publisher*

Bangsbo, J., L. Norregaard and F. Thorso, 1991. Activity profile of competition soccer. Canadian Journal of Sports Science, 16(2): 110-116. *View at Google Scholar*

Behm, D.G. and D.G. Sale, 1993. Velocity specificity of resistance training. Journal Sport Medicine, 15(6): 374-388. *View at Google Scholar | View at Publisher*

Bloomfield, J., G.K. Jonnson, R. Polman, K. Haulahan and P. O'Donoghue, 2005. Temporal pattern analysis and its applicability in soccer. Journal of Sport Science and Medicine, 6: 63-70.

Bloomfield, J., P. Remco and O. Peter, 2007. Physical demands of different positions in FA premier league soccer. Journal of Sports Science and Medicine, 6(1): 63-70. *View at Google Scholar*

Chamari, K., C.I. Moussa and L. Boussaidi, 2005. Appropriate of aerobic capacity: Allometric scaling in adult and young soccer players. British Journal Sports Medicine, 39(2): 97-101.

Clark, A.N., M. Andrew, R. Edwards, M. Hugh and J.B. Ronald, 2008. Season-to-season variations of physiological fitness within a squad of professional male soccer players. Journal of Sports Science and Medicine, 7(1): 157-165. *View at Google Scholar*

Clark, J.R., 2007. Higher log position is not associated with better physical fitness in professional soccer teams in South Africa. South African Journal Sport Medicine, 19(2): 40-45. *View at Google Scholar | View at Publisher*

Di Salvo, V. and F. Pigozzi, 1998. Physical training of football players based on their positional roles in the team. Effects on performance-related factors. Journal of Sports Medicine and Physical Fitness, 38(4): 294-297. *View at Google Scholar*

Ekblom, B., 1986. Applied physiology of soccer. Journal Sports Medicine, 3(1): 50-60. *View at Google Scholar | View at Publisher*

Hachana, Y., H. Chaabène, M.A. Nabli, A. Attia, J. Moualhi, N. Farhat and M. Elloumi, 2013. Test-retest reliability, criterion-related validity, and minimal detectable change of the illinois agility test in male team sport athletes. Journal of Strength and Conditioning Research, 27(10): 2752–2759. *View at Google Scholar | View at Publisher*

Mohr, M., P. Krustrup and J. Bangsbo, 2003. Match performance of high standard soccer players with special reference to development of fatigue. Journal Sports Science, 21(7): 519-528. *View at Google Scholar | View at Publisher*

O'Donoghue, P.G., 2002. Time motion analysis of work rate in english FA premier league soccer. International Journal Performance Analysis Sport, 2(1): 36-43. *View at Google Scholar*

Power, K.T.D., D.G.M. Joe and D.C. Treasure, 1994. Differences in fitness and psychological markers as function of playing level and positions in two english premier league football club. Science and football 4th Edn., Edited by J M Waterhouse, D S Minors, M E Waterhouse, T Reilly, and G Atkinson. London: Oxford University Press.

Ramsbottom, R., J. Brewer and C. William, 1988. A progressive shuttle run test to estimate oxygen uptake. British Journal Sport Medicine, 22(4): 141-144. *View at Google Scholar | View at Publisher*

Reilly, T., 1997. Energetic of high-intensity exercise (Soccer) with particular reference to fatigue. Journal of Sports Sciences, 15(3): 257-263. *View at Google Scholar | View at Publisher*

Reilly, T. and V. Thomas, 1976. A motion analysis of work-rate in different positional roles in professional football match-play. Journal Human Movement Study, 2(2): 87-97. *View at Google Scholar*

Reilly, T. and V. Thomas, 2003. Science and soccer. 2nd Edn., London: Routledge.

Rienzi, E., B. Drust and T. Reilly, 2000. Investigation of anthropometric and work-rate profiles of elite South American international soccer players. Journal Sports Medicine Physical Fitness, 40(2): 162-169.

Sayers, S.P.D.V., E.A. Harackiewicz, P.N. Harman, Frykman and M.T. Rosenstein, 1999. Cross-validation of three jump power equations. Medicine Science Sports Exercice, 31(4): 572–577. *View at Google Scholar | View at Publisher*

Schmidtbleicher, D., 1992. Training for power event. In: Komi PV, editor. Strength and power in sport. London: Blackwell Scientific Publications. pp: 381–95.

Siri, W.E., 1961. Body compositions from fluid spaces and density: Analysis of methods. In: Techniques for measuring body composition, Edited by Brozek, J & Henschel, A. Washinton, DC: National Academy of Science. pp: 223-224.

Sporis, G., I. Jukic, S.M. Ostojic and D. Milanovic, 2009. Fitness profiling in soccer: Physical and physiologic characteristics of elite players. Journal Strength Conditioning Research, 23(7): 1947–1953. *View at Google Scholar | View at Publisher*

Strudwick, A., T. Reilly and D. Doran, 2002. Anthropometric and fitness profiles of elite players in two football codes. Journal of Sports Medicine and Physical Fitness, 42(2): 239-244. *View at Google Scholar*

Van, G.D. and J. Boutmans, 1988. The physiological load imposed in soccer players during real match-play. In: Reilly T, Lees A, Davids K, et al., editors. Science and football. London: E&FN. pp: 51-59.

Verstegen, M. and B. Marcelo, 2001. Agility and coordination. In: Height performance sport conditioning. Champaign: Human Kinetics.

Wadley, G. and P.L. Rossignol, 1998. The relationship between repeated sprint ability and the aerobic and anaerobic energy systems. Journal of Science and Medicine in Sport, 1(2): 100-110. *View at Google Scholar | View at Publisher*

Wisløff, U., C. Castagna, J. Helgerud, R. Jones and J. Hoff, 2004. Strong correlation of maximal squat strength with sprint performance and vertical jump height in elite soccer players. British Journal Sports Medicine, 38(3): 285–288. *View at Google Scholar | View at Publisher*

Withers, R.T., N.P. Craig, P.L. Bourdon and K.L. Norton, 1987. Relative body fat & anthropometrics predictions of body density of male athletes. European Journal Applied Physiology, 56(2): 191-200. *View at Google Scholar | View at Publisher*

BIBLIOGRAPHY

International Society for the Advancement of Kinanthropometry, 2001. International standards for anthropometric assessment. South Africa: Potchefstroom University for CHE.