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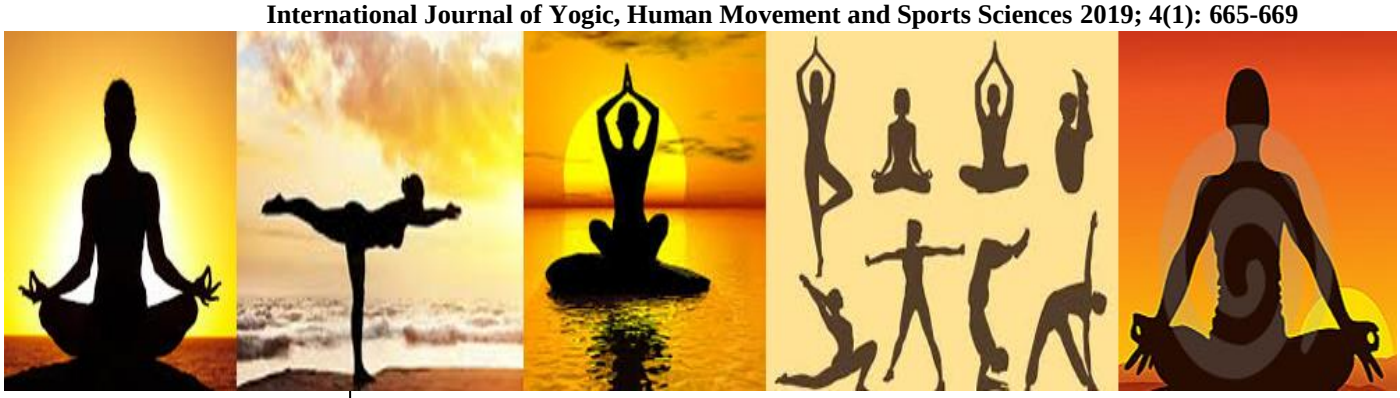

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Anthropometric and physiological profile of badminton players of Uttrakhand

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Abstract
The purpose of this study was to describe structural and functional characteristics of badminton players of Uttarakhand and to evaluate their different physical and physiological profiles. Four men's badminton teams participated in the study and competed in the professional School State Badminton Championship of Uttarakhand. Physiological measurements were taken of 20 players during the School State Badminton Championship. Standing Height (169.183±5.224cms), Upper Leg Length (38.067±3.3083cms), Biacromial Breadth (39.517±3.3115cms), Upper Arm Length (33.067±2.1774cms), Arm circumference (26.417±2.669cms), Thigh circumference (42.667±4.107cms), Elbow Breadth (6.087±0.318cms). In addition Max. Insp. Breath Holding (44±11.39 sec), Max. Exp. Pressure (518.65±82.64 ltr/min), Cardiovascular Endurance (1299.16±161.42 mtr), Heart Rate (Resting) (68.8±5.19 BPM.

Keywords: Anthropometric, physiological

Introduction
Physiological and anthropometric profiles have been developed to describe the qualities and characteristics of elite athletes in their respective sports. Evidence indicates that many factors as different physiological and anthropometric factors might influence the badminton Players performance (Cagnoa *et al*., 2009) [7]. Badminton is a racket sport for two or four people with a temporal structure characterized by actions of short duration and high intensity. This sport has five events: men's and women's singles, men's and women's doubles, and mixed doubles, each requiring specific preparation in terms of technique, control and physical fitness. Badminton is one of the most popular sports in the world with 200 million adherents. The decision to include badminton in the 1992 Olympics Game increased participation in the game. This review focuses on the game characteristics, anthropometry, physiology, visual attributes and biomechanics of badminton. Players are generally tall, lean with an ecto-mesomorphic body type suited to the high physiological demands of a match. Indeed, a typical match characteristic is a rally time of 7s, a resting time of 15s, with an effective playing time of 31%. This sport is highly demanding, with an average heart rate of over 90% of the player's maximal heart rate. The intermittent actions during a game are demanding on both the aerobic and anaerobic systems: 60-70% on the aerobic system and about 30% on the anaerobic system, with greater demand on the alactic metabolism with respect to the lactic anaerobic metabolism. The shuttlecock has an atypical trajectory and the players perform specific movements such as lunging and jumping, and powerful strokes using a specific pattern of movement. Lastly, badminton players are visually fit, picking up accurate visual information in a short time. Knowledge of badminton can help to improve coaching and badminton skills. Badminton is a type of strength-power sport demanding high levels of both anaerobicand flexibility capacities for successful performance. Badminton requires explosive speed, strength, flexibility together with balance on badminton court. Elevated anaerobic capacity, muscle resistance and strength, explosive power, flexi-bility and agility are the most important factors needed to achieve success in badminton competitions. The physiological and anthropometric profiles of badminton can be used in evaluating for talent identification and these traits can be important for coaches at all levels (Russel, 1987) [17]. To our knowledge, fitness and anthropometric data available on basdminton is rare and incomplete. Therefore, the purpose of this study was to determine anthropometric and physiological profiles of male badminton players of Uttrakhand.

1.1 Limitation of Research
The researcher will provide insights into the effects of the different factors like emotional, attitudes, training and diet schedule of the badminton players which may affect the badminton players and their performance levels. The impact of the geographical variations is also included in the research analysis process.

1.2 Delimitation of Research
The most basic requirement for a player to acquire a place in the Uttarakhand state fixed status is that the badminton player must be below 17 years (Khoza, Helberg & Meyer, 2016). The other criterion that is required by the badminton player is that the badminton player must be from Uttarakhand state.

2. Objective of Te Study
The purpose of the study was to find out the Anthropometrical and Physiological profile of badminton players of Uttrakhand.

3. Method
The selected sample consisted of 20 professional male badminton players of Uttrakhand. All participants were members of semi-finalist team of the School State Badminton Championship2018-19 held at Augustyamuni in Rudraprayag district of Uttrakhand between22 October to 25 October 2019. Measurements took place during the competition of the season. All of the Badminton playersread and signed a written informed consent prior to participation and also were made familiar with the procedures and possible risks. All the Coaches, Managers and coordinator has approved the research protocol.

Testing Procedures: Standing height was measured without shoes using a stadiometer to the nearest 0.1, upper leg length, upper arm length and biacromial breadth was measured through big sliding calliper, elbow breadth was measured through small calliper, length was measured in centimetre nearest 0.1 cm is recorded for each player. Arm circumference and upper leg circumference was measured through measuring tape. All of the measurements were obtained from the left side of the body (Claessens 1999) [9]. After the anthropometric measurements, the badminton players completed the experimental tests in different sessions. Maximal inspiratory breath holding was estimated through taking full inspiration, the nose was pinched with a nose clip and simultaneously a stop watch was started (Khoza, Helberg & Meyer, 2016). The player was instructed to prevent any sort of air leakage through mouth. The stop watch was stopped at the moment when the player opened his mouth. The time duration at which the layer had kept his mouth and nose shut and held his breadth was the actual time of the maximal inspiratory breath holding of the player which was recorded by using the stop watch. The Maximal Expiratory pressure was measured through Peak flow meter in which the player is supposed to take a deep breath such that the lungs get filled with all the air. Then the inhaled breath is to hold and a mouthpiece is placed in the mouth amid the teeth. The lips are to be closed around the mouthpiece. The placement of the tongue must not be against or inside the hole of the mouthpiece. The mouthpiece is to blown out by the player with utmost strength and all exhale all the air that was filled inside the lungs. The mouthpiece is to be blown out as hard and as fast as possible to the maximum length in a single blow. The first blow of air by the player is the most important that is measured (John, Dhillon, Syam, Prabhakar, Behera & Singh, 2016). The duration of the blow however has no effects and implications on the test and the results. The player needs to repeat the test two more times. The results of which will be recorded to examine the best performance of the player. Resting Heart rate was assessed by redial artery in which the players were asked to be in the in supine position for at least 15 to 20 minutes before recording to resting pulse rate. After the resting pulse rate of the players were recorded. For this the tester kept his finger tips on the redial artery of the player and finally it was converted in minutes form (B/M) (Jin, Wang, Fang, Di, Ye, Xu & Rao, 2017). The resting pulse rate was recorded in terms of number of pulse per minute. Cardiovascular endurance was measured through six minute run test in which the markers are placed at set intervals around the track so that the measuring of the distance gets completed. The participating players are asked to run for 6 minutes and the total distance covered by them in this duration of run is recorded (Jacobs & Greliche, 2017). Walking is also permitted but the players must try to push themselves to the maximum levels and keep running for the full duration of time. The test is repeated for two more times. The results of which will be recorded to examine the best performance of the player. All of the athletes completed the study protocol and each badminton player was asked to try as hard as possible. Verbal encouragement was provided during the testing procedure. All of the measurements were taken by the same experienced investigator who was assisted by two recorders. Statistical analysis the information was entered into an Excel spread sheet and then transferred to an SPSS file (Version 20) for all descriptive statistics. The results are reported as means and standard deviations (SD).

4. Results with Discussion
Anthropometric and physiological characteristics of the Iranian gymnasts are presented in Table 1 and 2, respectively. The description and analysis of top level players include the study of human size, shape, proportion, composition, and gross motor function, which can be called anthropometry, is a reference in relating sports performance and body structure (Bourgois *et al*., 2000) [5]. In fact, one of the challenges facing coaches and athletes is to understand the physiological and anthropometrical factors contributing to success in competitions (Mirzaei *et al*., 2009) [16]. Badminton is a physically demanding sport requiring well-developed anaerobic qualities and the performances of most badminton players correlate highly with their body power, flexibility and balance (Bradshaw, 2010) [6]. In addition, there is no published information that characterizes the anthropometric and fitness profile of Uttrakhand badminton. Thus, in the current study we assessed the anthropometric and Physiological characteristics of Uttrakhand badminton players.

Table 1: The participant descriptive data and physiological parameters

	Mean	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Max. insp. breath holding	37.95	8.432	.108	.512	-1.272	.992
Max. exp. pressure	547.00	74.840	-.287	.512	-.547	.992
Card. vas. Endurance	1282.50	147.144	.066	.512	-1.596	.992
Heart rate (resting)	68.15	3.937	-.044	.512	-.482	.992

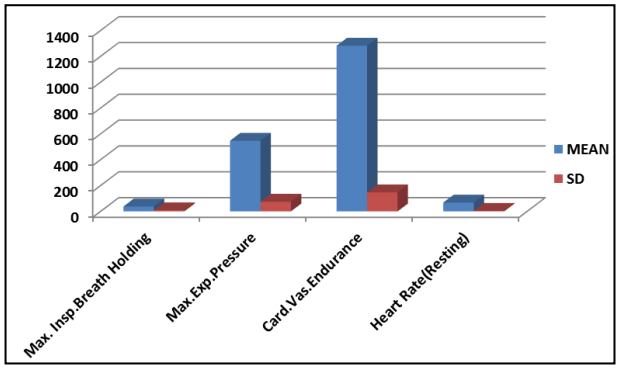

Fig 1: Table 1 describe the detailed statistics of male badminton players in relation with physiological variable,

Table 1 describe the detailed statistics of male badminton players in relation with physiological variable, where mean, range, standard deviation, skewess and kurtosis are presented.
The result of the finding showed the mean and standard deviation values of physiological variable of all the badminton players were: Max. Insp. Breath Holding (44±11.39 sec), Max. Exp. Pressure (518.65±82.64 ltr/min), Cardiovascular Endurance (1299.16±161.42 mtr), Heart Rate (Resting) (68.8±5.19 BPM) The minimum and maximum values for physiological variable were: Max. Insp. Breath Holding (25; 60 sec), Max. Exp. Pressure (400; 700 ltr/min), Cardiovascular Endurance (1000; 1600 mtr), Heart Rate (Resting) (59; 80 BPM)
When skewness was calculated performance score like Max. Exp. Pressure, Cardiovascular Endurance with values 0.183, 0.509,0.231 were found positively skewed from the normal distribution. This positive skewness indicates that the concentration of above said variables were above the median and were unevenly scattered within the normal curve
But in the variable Heart Rate (Resting) the calculated skewness value was -0.089. This indicates that the concentration of scores are below the median and below the normal curve. Thus shows negative skewnwss in this variable.
Kurtosis was calculated for performance and selected physiological variable for Max. Inspiratory Breath Holding, cardiovascular endurance and Heart Rate (Resting).Mav. Insp. Breath holding, Max. Exp. Pressure, Cardiovascular Endurance and Resting Heart rate with values -0.837,-0.687,-0.878,-0.744 respectively were found to be less than tabulated kurtosis values 0.263, indicates leptokurtic tendency from the normal curve. This indicates that some of the players have better physiological measure than the normal distribution

Table 2: The Participant Descriptive Data and Anthropometric Parameters

Descriptive Statistics						
	Mean	**Std. Deviation**	**Skewness**		**Kurtosis**	
	Statistic	**Statistic**	**Statistic**	**Std. Error**	**Statistic**	**Std. Error**
Standing height	170.45	6.533	-.346	.512	.184	.992
Upper leg length	37.30	2.105	.086	.512	.522	.992
Biacromail breadth	39.55	3.980	-.348	.512	.544	.992
Upper arm length	33.40	2.563	1.108	.512	.542	.992
Arm circumference	26.50	2.482	.574	.512	-.809	.992
Upper leg circumference	45.30	3.988	-.318	.512	-.581	.992
Elbow breadth	6.20	.410	1.624	.512	.699	.992

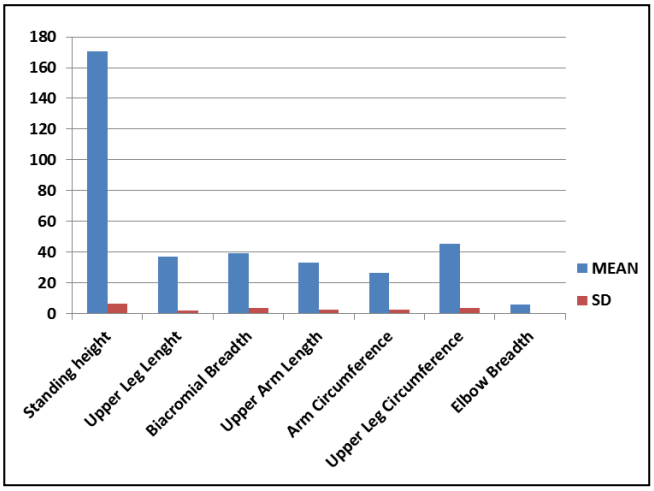

Fig 2: Table 3 describe the detailed statistics of male badminton players in relation with Anthropometrical variable,

Table 3 describe the detailed statistics of male badminton players in relation with Anthropometrical variable, where mean, range, standard deviation, skewess and kurtosis are presented.
The result of the finding showed the mean and standard deviation values of Anthropometrical variable of all the badminton players were: Standing Height (169.183± 5.224cms), Upper Leg Length (38.067±3.3083cms), Biacromial Breadth (39.517±3.3115cms), Upper Arm Length (33.067±2.1774cms), Arm circumference (26.417± 2.669cms), Thigh circumference (42.667± 4.107cms), Elbow Breadth (6.087±0.318cms).
The minimum and Maximum values for Anthropometrical variable were: Standing Height (155;182.0 cms), Upper Leg Length (33.0;50 cms), Biacromial Breadth (32.0;48 cms), Upper Arm Length (27;39 cms), Arm circumference (23;32.0 cms), Thigh circumference (36.0;52.0 cms), Elbow Breadth (5.5;6.087 cms). When skewness was calculated performance score like: Upper Leg Length,, Upper Arm Length, Arm circumference, Thigh circumference, Elbow Breadth with values 1.218,0.279,0.673,0.146,0.5389 were found positively skewed from the normal distribution and variable Standing Height and Biacromail Breadth with value -0.184,-0.323 were found negatively skewed which indicates that the concentration of the above variable were below the median and were unevenly scattered within the normal curve.
Kurtosis was calculated for performance and selected Anthropometrical variable for Standing Height, Upper Leg Length, Biacromial Breadth, Upper Arm Length, Elbow Breadth with values 0.616,1.869,0.387,1.119,1.303 respectively were found to be greater than tabulated kurtosis values 0.263, indicates platykurtic tendency from the normal curve. This indicates that some players have less anthropometric measure than the normal distribution. A leptokurtic tendency was found in Arm circumference and Thigh circumference with values-0.758,-0.742 respectively were found to be less than tabulated kurtosis value 0.263. This

indicates that some of the players have better anthropometric measures than the normal distribution.

5. Conclusion

Research in the area is still insufficient, and future studies should include detailed pro- file of these athletes. The present study is the first to be published on Uttrakhand badminton players and we hope to continue with these topics to obtain results from continent and

International badminton competitions. The current study provides baseline physiological and anthropometric data that can be used in the prescription of individual training programs for Badminton players. Our data and related studies can become the guide for talent selection and identification. In addition, the assessment of present status reveals strengths and relative weaknesses and can become the basis for the improvement of the training plan.

6. References

1. Amigóa AI, Faciaben AB, Evrard MM, Ballarini PAG, Marginet MC. Height, weight, somatotype and body composition in elite Spanish gymnasts from childhood to adulthood. Apunts Medicinade l'Esport. 2009; 161:18-28.
2. Arazi H, Faraji H, Mohammadi SM. Anthropometric and physiological profiles of elite Iranian junior rowers. Middle-East Journal of Scientific Research. 2011; 9(2):162-166.
3. Bale P, Goodway J. Performance variables associated with the competitive gymnast. Sports Medicine. 1990; 10(3):139-145.
4. Benardot D. Advanced sport nutrition. Sports requiring power and speed. Part V, Human Kinetics, 2012; 309.
5. Bourgois J, Claessens AL, Vrijens J, Philippaerts R, Renterghem BV, Thomis M *et al*. Anthropometric characteristics of elite male junior rowers. British Journal of Sports Medicine. 2000; 34:213-217.
6. Bradshaw EJ. Performance and health concepts in artistic gymnastics. 28 thInternational Symposium of Biomechanics in Sports, Marquette, Michigan, USA, Proceedings. 2010; 19(23):51-55.
7. Cagnoa AD, Baldari C, Battaglia C, Monteiro MD, Pappalardo, A, Piazza M *et al*. Factors influencing performance of competitive and amateur rhythmic gymnastics-Gender differences. Journal of Science and Medicine in Sport. 2009; 12:411-416.
8. Caldarone G, Giampetro M, Berlutie G, Leglise M, Giastella G, Mularoni M. Caractéristiques morphologiques et biotype des gymnastes. In: Petito, B., Salmela, J.H., Hoshizaki, T.B. (Eds.). World identification systems for gymnastics talent. Montreal: Sport Psyche Editions, 1987, 62-67.
9. Claessens AL. Talent detection and talent development: Kinanthropometric issues. Acta Kinesiologiae Universitatis Tartuensis. 1999; 4:47-64.
10. Classens AL, Lefevre J, Beunen G, Malina RM. The contribution of anthropometric characteristics to performance scores in elite female gymnasts. The Journal of Sports Medicine and Physical Fitness. 1999; 39:355-360.
11. Debu B, Woollacott M. Effects of gymnastics training on postural responses to stance perturbations. Journal of Motor Behavior. 1988; 20(3):273-300.
12. Faria IE, Faria EW. Relationship of the anthropometric and physical characteristics of male junior gymnasts to performance. The Journal of Sports Medicine and Physical Fitness. 1989; 29:369-378.
13. Jackson AS, Pollock ML. Generalized equations for predicting body density of women. British Journal of Nutrition. 1978; 40:497-504.
14. Klentrou P, Plyley M. Onset of puberty, menstrual frequency, and body fat in elite rhythmic gymnasts compared with normal controls. British Journal of Sports Medicine. 2003; 37:490-494.
15. Maestu J, Jurimae T, Jurimae M. Monitoring of performance and training in rowing. Sports Medicine. 2005; 35:597-617.
16. Mirzaei B, Curby DG, Rahmani nia F, Moghadsi M. Physiological profile of elite Iranian junior freestyle wrestlers. Journal of Strength and Conditioning Research. 2009; 23(8):2339-2344.
17. Russell K. Gymnastic talent from detection to perfection. In: World identification systems for gymnastic talent. Montreal: Sport Psyche Editions, Sands, 1987, 151-159.
18. WA, Jeni R. McNeal Enhancing Flexibility in Gymnastics. Technique Sands. 2000; 20:5. WA. Physical abilities profiles-1993 National TOPs testing. Technique. 1994; 14(8):15-20.
19. Sands WA. Why Gymnastics? Technique. 1999; 19(3):1-11.
20. Singh H, Rana RS, Walia SS. Effect of strength and flexibility on performance in men'sgymnastics. In: Petiot, B., Salmela, J. H., & Hoshizaki, T.B (Eds.).World identification systems for gymnastic talent. Montreal, Canada: Sport Psyche Editions, 1987, 118-121.
21. Bergh U, Thorstensson A, Sjodin B, Hulten B, Piehl K, Karlsson J. Maximal oxygen uptake and muscle fiber types in trained and untrained humans. Med. Sci. Sport Exerc. 1978; 10:151-154.
22. Biancotti PP, Caropreso A, DI Vincenzo GC, Ganzit GP, Gribaudo CG. Hematological status in a group of male athletes of different sports. J Sports Med. Phys. Fitness. 1992; 32:70-75.
23. Bolonchuk WW, Lukaski HC, SIDERS WA. The structural, functional, and nutritional adaptation of college basketball players over a season. J Sports Med. Phys. Fitness. 1991; 31:165-172.
24. Caterisano A, Patrick BT, Edenfield WL, Batson MJ. The effects of a basketball season on aerobic and strength parameters among college men: Starters vs. reserves. J. Strength Cond. Res. 1997; 11:21-24.
25. Concu A, Marcello C, Rocchietta A. After-game hemodynamic comparison between volleyball and basketball players. Med. Sport. 1992; 45:453-458.
26. Cos TiLL DL, Daniels J, Evans W, FINK W, Krahenbuhl G, Saltin B. Skeletal muscle enzymes and fibre composition in male and female athletes. J. Appt. Physiot. 1976; 40:149-154.
27. Gillam GM. Identification of anthropometric and physiological characteristics relative to participation in college basketball. NSCA J. 1985; 7:34-36.
28. Hoffman JR. Physiology of basketball. In: Basketbatt. DB. McKeag, ed. Oxford: Blackwell Science, 2003, 12-24.
29. Hoffman JR, Epstein S, Einbinder M, Weinstein I. The influence of aerobic capacity on anaerobic performance and recovery indices in basketball players. J Strength Cond. Res. 1999; 13:407-411.
30. Hoffman JR, Fry AC, Howard R, Maresh CM, Kraemer WJ. Strength, speed, and endurance changes during the course of a division I basketball season. J Appt. Sport

Sci. Res. 1991; 5:144-149.
31. Hoffman JR, Tennenbaum G, Maresh CM, Kraemer WJ. Relationship between athletic performance tests and playing time in elite college basketball players. J Strength Cond. Res. 1996; 10:67-71.
32. Jackson AS, Pollock ML. Generalized equations for predicting body density of men. Br. J Nutr. 1978; 40:497-504.
33. Komi PV, Karlsson J. Skeletal muscle fiber types, enzyme activities, and physical performance in young males and females. Acta Physiot. Scand. 1978; 103:210-218.
34. Latin RW, Berk K, Baechle T. Physical and performance characteristics of NCAA division I male basketball players. J Strength Cond. Res. 1994; 8:214-218.
35. Leger LA, Lambert J. A maximal multistage 20-m shuttle run test to predict VO j max. Eur. J Appt. Physiot. 1982; 49:1-12.
36. Mcinnes SE, Carlson JS, Jones CJ, Mckenna MJ. The physiological load imposed on basketball players during competition. J Sports Sci. 1995; 13:387-397.
37. MOORE P, Wilkinson D. A Guide to Fietd-Based Fitness Testing. London: Coachwise Ltd, 1999.
Ostojic SM, Mazic S, Dikic N. Antropomorphological characteristics of elite Serbian basketball players. Sportska Med. 2003; 3:83.
38. Parr RB, Wilmore JH, Hoover R, Bachman D, Kerlan R. Professional basketball players: Athletic profiles. Phys. Sportsmed. 1978; 6:77-84.
39. Scheller A, Rask B. A protocol for the health and fitness assessment of NBA players. Ctin. Sports Med. 1993; 12:193-205.
40. Soares J, Mendes OC, Neto CB, Matsudo VKR. Physical fitness characteristics of Brazilian national basketball team as related to game functions. In: Perspectives in Kinathropometry. J.A.P. Day, ed. Champaign, IL: Human Kinetics, 1986, 127-133.
41. Tavino LP, Bowers CJ, Archer CB. Effects of basketball on aerobic acapacity, anaerobic capacity, and body composition of male college players. J Strength Cond. Res. 1995; 9:75-77.
42. Vlltasalo J, Komi PV. Force-time characteristics and fiber composition in human leg extensor muscles. Eur. J Appl. Physiot. 1978; 40:7-15.
43. Vlltasalo JT, Rahkila P, Osterback L, Alen M. Vertical jumping height and horizontal overhead throwing velocity in young male athletes. J Sports Sci. 1992; 10:401-413.
44. Viviani F. The somatotype of medium class Italian basketball players. J Sports Med. Phys. Fitness. 1994; 34:70-75.
45. Viviani F, Casagrande G. Somatotype characteristics of Italian male basketball, soccer, and volleyball players. J Sports. Sci. 8:184. 1990.
46. Wilmore JH, Behnke AAR. An anthropometric estimation of body density and lean body weigbt in young men.