

Theories & Applications, the International Edition

Printed Version : (ISSN 2090-5262)

Online Version : (ISSN 2090-5270)

November 2014, Volume 4, No. 3 Pages (1 - 8)

The Relationship between the Physical Forming With Some Physical Abilities and the Standard of Skillful Performance for Ping Pong Juniors.**Dr. Walid Mahmoud Mohamed Awad Shenawi**

Lecturer Department of Games Faculty of Physical Education - Monofia University, Egypt.

Abstract

This research aims to identify This differences among the ping Pong juniors for three groups (High level – Medium level – Low level) in forming bodies and physical abilities according to the skillful performance. The relationship between body forming (Weight – length (height) – width – surrounding – Skin thickness) and physical abilities (Speed – elasticity – accuracy – matching – speed force) and the skillful performance (Sending – kicking – hits – stopping) for ping Pong junior. The researcher used the descriptive approach on the 78 junior of 12 - 15 years, were divided into three groups (High level – Medium level – Low level), each group of (26) emerging, in according will the level of skills in the performance for ping Pong. Was the most important results There are statistically differences between the three groups (High level – Medium level – Low level) according to the skillful performance in the ping pong in on the measurements of the body forming as the differences were between group the high level group and the medium level and the low level for high level group but between the and medium level in all the body forming measurements. There are statistically differences between the three groups (High level – Medium level – Low level) according to the skillful performance in all tests for the physical abilities, as the statistically differences between the high level group and the Medium level and the low level for the high level but incase of the Medium level and the low level the differences were for the Medium level in all physical abilities tests. There is a statistically relationship between the body forming measurements and the physical abilities and the skillful performance skill level in the High level and low level and the low level group and the relationship wasn't guiding statisti cally for the low level.

Key words: *The body configuration- physical abilities- the level of performance skills in ping Pong*

Introduction

The physical measurement are considered of the individual characteristics which related to achieving the high sports levels as every sport activity has its requirements which distinct it from other activities, As they referred that dividing specifics into three main types such as biological specifics which include the individual genetic qualities and growing indicators and accordingly the time age and the biological age and the physical measurements and qualities for the juniors. (11: 20)

Karpovech Sining 2001 indicates that the morphological characteristics have a great importance in sports activity performance and this importance is logical because the players perform motions with their bodies which differ in size from individual to another which lead to differences in performing the sports motions and there is a relation between the morphological characteristics and the sports achieving and every sport need specific requirements. (20: 152)

William Sprin 1999 has assured that the body building and forming it are so important that we can say that the suitable choice for the player from the body measures help in exceeding in the international competitions. Having a good command and learning the basic skills in ping Pong are the main causes winning because they can't achieve any planned duty, attacking or defensive, without a good command on the world are concerned to this game internationally as they

know that elevation the skillful performance which plays a basic vole during competitions in which the player has to perform in all different situations required in the game to reach the best results with economizing effort as the success of any player depends on his ability to perform these skills with exceeding and with less mistakes and less effort.

The researcher has noticed that there are bold and great differences in the level of the skillful performance for juniors of ping Pong what related to the bad choice of the juniors according to the physical requirements but after checking a lot of research by the researcher he noticed that these studies are rare what made the researcher do this study to try to know the relationship between the body structure and physical abilities and the level of the skillful performance for ping Pong juniors.

Research objectives

This research aims at recognizing:

- 1- This differences among the ping Pong juniors for three groups (High level – Medium level – Low level) in forming bodies and physical abilities according to the skillful performance.
- 2- The relationship between body forming (Weight – length (height) – width – surrounding – Skin thickness) and physical abilities (Speed – elasticity – accuracy – matching – speed force) and the skillful

performance (Sending - kicking- hits- stopping) for ping Pong junior.

Research hypothesis:

- 1- There are statistical differences among the ping Pong juniors for the three groups (High level – Medium level – Low level) in body forming and physical abilities according to the skillful performance level for the high level group.
- 2- There is statistical guiding relationship between the body forming and physical abilities and the skillful performance level for the ping Pong junior.

The research (Procedures) steps:

The curriculum and the research sample:

The researcher used the descriptive curriculum on a sample use on purpose from the educational areas juniors in the

united Arab emirates (UAE) who took parting the national competition in ping Pong and they are members in country federation for ping Pong in 2012/2013 from 12 to 15 years old their number were 90 juniors but 12 persons were dismissed 50 the number became 78 juniors divided into 3 groups 26 each. The first group is of high level the second group is of medium level the third group is of low level, a caroling to the performance in ping Pong.

The basic study:

It was done on the research sample (High level – Medium level – Low level) in the period from 3/3 to 5/4/2012 on the preparatory school students. Every group consisted of 26 juniors and the comparison was for measuring the body forming and physical abilities.

Statistical methods:

The researcher used the SPSS 15.0, statistical program for data processing

Table (1)
The analysis The analysis of three research groups (High level -Mid-level - Low level)
in measurements of the body configuration **N=26**

Variables		Difference resources	Squares Total	Degrees of freedom	Mean-Square	(F) Value	
	Body weight	In Groups	25.19	2	12.59	6.92*	
		Between groups	136.50	75	1.82		
Lengths	Total length	In Groups	25.86	2	12.93	7.43*	
		Between groups	130.50	75	1.74		
	Arm length	In Groups	45.99	2	23.00	10.55*	
		Between groups	163.50	75	2.18		
	Upper arm length	In Groups	14.43	2	7.21	5.19*	
		Between groups	104.25	75	1.39		
	Forearm length	In Groups	15.58	2	7.79	4.81*	
		Between groups	121.50	75	1.62		
	Hand length	In Groups	50.79	2	25.39	6.79*	
		Between groups	280.50	75	3.74		
	Torso length	In Groups	29.17	2	14.59	6.66*	
		Between groups	164.25	75	2.19		
	Leg length	In Groups	33.86	2	16.93	5.92*	
		Between groups	214.50	75	2.86		
	Thigh length	In Groups	24.62	2	12.31	8.67*	
		Between groups	106.50	75	1.42		
	Shank length	In Groups	36.07	2	18.04	10.19*	
		Between groups	132.75	75	1.77		
	Foot length	In Groups	52.66	2	26.32	7.48*	
		Between groups	264.00	75	3.52		
	Perimeter	Chest perimeter	In Groups	53.94	2	26.97	10.92*
			Between groups	185.25	75	2.47	
		Belly perimeter	In Groups	38.64	2	19.32	6.64*
			Between groups	218.25	75	2.91	
Upper arm perimeter		In Groups	12.37	2	6.19	5.38*	
		Between groups	86.25	75	1.15		
forearm perimeter		In Groups	42.32	2	21.16	4.56*	
		Between groups	34.80	75	4.64		
Thigh perimeter		In Groups	43.72	2	21.86	7.92*	
		Between groups	207.00	75	2.76		
Shank perimeter		In Groups	27.69	2	13.85	5.43*	
		Between groups					

Variables		Difference resources	Squares Total	Degrees of freedom	Mean-Square	(F) Value		
Widths	Shoulders width	Between groups	191.25	75	2.55	6.31*		
		In Groups	43.03	2	21.52			
	Chest width	Between groups	255.75	75	3.41			
		In Groups	50.01	2	25.01			
	pelvis width	Between groups	222.75	75	2.97		8.42*	
		In Groups	20.91	2	10.45			
	Foot width	Between groups	99.75	75	1.33	7.86*		
		In Groups	29.08	2	14.54			
	Fat thickness	Skin thickness	Between groups	184.50	75	2.46	5.91*	
			In Groups	53.81	2	26.90		
		Measuring humerus and elbow (contraction)	Between groups	238.50	75	3.18		8.46*
			In Groups	25.24	2	12.62		
Measuring humerus and elbow (expansion)		Between groups	192.00	75	2.56	4.93*		
		In Groups	80.29	2	40.14			
Measuring the knee (contraction)		Between groups	306.00	75	4.08	9.84*		
		In Groups	44.46	2	22.23			
Measuring the knee (expansion)		Between groups	164.25	75	2.19	10.15*		
		In Groups	24.17	2	12.08			
			Between groups	136.50	75	1.82	6.64*	

* Significance level 0.05 = 2.13

Table (2)
Significant differences between the averages of three research groups
(High level -Mid-level - Low level) in measurements of the body configuration

Variables	Group	mean	The differences between the averages			L.S.D
			1	2	3	
Weight	High level	43.52		1.52*	7.29*	1.06
	Medium level	45.04			5.77*	
	Low level	50.81				
Total length	High level	143.74		3.17*	5.13*	1.18
	Medium level	140.57			1.96*	
	Low level	138.61				
Arm length	High level	80.34		2.22*	3.34*	0.97
	Medium level	78.12			1.12*	
	Low level	77.00				
Upper arm length	High level	31.00		1.34*	3.96*	1.06
	Medium level	29.66			2.62*	
	Low level	27.04				
Forearm length	High level	30.66		2.53*	4.66*	1.44
	Medium level	28.13			2.13*	
	Low level	26.00				
Hand length	High level	17.32		2.11*	2.75*	0.52
	Medium level	15.21			0.64*	
	Low level	14.57				
Torso length	High level	37.91		2.09*	3.91*	1.37*
	Medium level	35.82			1.82*	
	Low level	34.00				
Leg length	High level	89.11		13.97*	16.96*	1.42
	Medium level	75.14			2.99*	
	Low level	72.15				
Thigh length	High level	42.43		2.18*	4.27*	1.78
	Medium level	40.55			2.09*	
	Low level	38.46				
Shank length	High level	49.62		2.11*	4.80*	1.63
	Medium level	47.51			2.69*	

Variables	Group	mean	The differences between the averages			L.S.D
			1	2	3	
Foot length	Low level	44.82				0.56
	High level	24.31		0.79*	3.13*	
	Medium level	23.52			2.34*	
Chest	Low level	21.18				1.73
	High level	60.41		1.85*	4.99*	
	Medium level	58.56			3.14*	
Belly	Low level	55.42				2.43
	High level	52.98		4.33*	8.44*	
	Medium level	57.31			4.11*	
humerus	Low level	28.61				1.14
	High level	24.44		2.88*	4.17*	
	Medium level	27.32			1.29*	
Forearm	Low level	25.21				1.33
	High level	21.37		2.09*	3.84*	
	Medium level	23.46			1.75*	
Thigh	Low level	48.00				0.92
	High level	42.37		4.45*	5.63*	
	Medium level	46.82			1.18*	
Shank periphery	Low level	32.56				1.34
	High level	26.58		3.42*	5.98*	
	Medium level	30.00			2.56*	
Shoulders width	Low level	42.32				0.55
	High level	45.12		2.12*	2.80*	
	Medium level	43.00			0.68*	
Chest width	Low level	24.18				1.13
	High level	29.11		3.11*	4.93*	
	Medium level	26.00			1.82*	
Pelvis width	Low level	132.00				2.31
	High level	121.73		6.27*	10.27*	
	Medium level	128.00			4.00*	
Foot width	Low level	13.56				0.57
	High level	11.32		0.68*	2.24*	
	Medium level	12.00			1.56*	
Skin thickness	Low level	5.26				0.42
	High level	4.01		0.51*	1.25*	
	Medium level	4.52			0.74*	
Measuring for summits humerus and elbow (contraction)	Low level	7.00				0.38
	High level	5.50		0.50*	1.50*	
	Medium level	6.00			1.00*	
Measuring for summits humerus and elbow (expansion)	Low level	7.32				0.64
	High level	5.00		1.51*	2.32*	
	Medium level	6.51			0.81*	
Measuring the knee bits (contraction)	Low level	8.76				0.77
	High level	6.04		0.96*	2.72*	
	Medium level	7.00			1.76*	
Measuring the knee bits (expansion)	Low level	4.48				0.92
	High level	5.17		1.05*	2.61*	
	Medium level	6.22			1.56*	

As it shown in table (1) there are statistical differences among the three groups (High level – Medium level – Low level) in all measurements for the body forming. En table (2) there are statistical differences between the high level group and the medium level and the low level for the high level

in all measurements in the body forming and the researcher due this to the variables importance in body forming for the performance level.

As the body forming is very important when it requires the sport for body motion horizontally or vertically in space and

through the body forming and calculating the portion of its components we can get real data for the healthy and physical state because the body components are considered the basic elements to the physical fitness. when we reach accurate body components it can share well in choice an classification. (2 : 97)

Weight is an important element in the sports activity and plays an important in all sports activities. Weight increasing may be needed in some sports activities and it may be a block in same other activities length is not less important

than weight because limbs should be matched together for acquiring the nervy muscular matching in all activities.(14: 52,53)

Lamp 1994 indicates that the sports person should own an ideal body to be able to practice the socialized activity. (22: 15) Nehad Abraham 1985 indicates that length is important and can't be ignored but its important to give a due care to it if we want to achieve the high levels in different sports activities. (17: 32)

Table (3)
Analysis of variance between the three research groups in physical abilities Tests N = 26

Variables	Difference resources	Squares Total	Degrees of freedom	Mean-Square	Value (F)
Running in place 15 seconds	In Groups	23.55	2	11.77	4.99*
	Between groups	177.00	75	2.36	
Folding body from standing	In Groups	57.92	2	28.96	8.25*
	Between groups	263.25	75	3.51	
Shuttle running 5 × 5 m	In Groups	37.03	2	18.52	7.62*
	Between groups	182.25	75	2.43	
Shooting medical ball 1.5 kg	In Groups	28.06	2	14.03	5.48*
	Between groups	162.00	75	2.56	
Shooting a square 30 seconds	In Groups	39.45	2	19.72	10.78*
	Between groups	137.25	75	1.83	
Hand shooting on interfering circles	In Groups	59.46	2	29.73	9.32*
	Between groups	239.25	75	3.19	

Table (4)
Significant differences between the averages of the three research groups (High level -Mid-level - Low level) in physical abilities Tests

Variables	Group	mean	The differences between the averages			L.S.D
			1	2	3	
Running in place 15 seconds	High level	27.91		2.25*	3.48*	1.08
	Medium level	25.66			1.23*	
	Low level	24.43				
Folding body from standing	High level	9.36		3.24*	5.15*	1.24
	Medium level	6.12			1.91*	
	Low level	4.21				
Shuttle running 5×5 m	High level	10.22		2.09*	4.34*	1.81
	Medium level	12.31			2.25*	
	Low level	14.56				
Shooting medical ball 1.5 kg	High level	4.62		1.35*	2.01*	0.51
	Medium level	3.27			0.66*	
	Low level	2.61				
Shooting at a square 30 seconds	High level	25.59		3.13*	5.41*	1.92
	Medium level	22.46			2.28*	
	Low level	20.18				
Hand shooting on interfering circles	High level	20.73		2.91*	6.17*	2.13
	Medium level	17.82			3.26*	
	Low level	14.56				

From table (3) There are statistical differences among the research 3 groups (High level – Medium level – Low level) in the whole ability tests and from table (4) statistical differences among the high level group and the medium level and the low level for the medium in all physical abilities tests and the researcher see that the sports activities especially ping pong requires some physical abilities as endurance and the body should contain some fat which doesn't block the player to practice the activity which at the sometime a resource for energy within the body that increaser the fat acid in blood the existence of muscle glycogen which helps reduce tiring and continuing of the skillful performance as the ping pong player's performance is characterized by aped and using the body intensely so all this requires that the player of the ping pong must be of a good body.

The sports training regularly for a long time causes functional changes and morphological changes to the player's body as studies proved the changes in the motional system such as horizontal sector for bones and increasing the skeleton block of muscles. (6: 152)

Physical fitness means that anybody should have an ideal body in all its parts and according to the practiced activity during exerting an effort so there should be matching between the length of the whole body and the length of its parts. (3: 62)

And confirms Joncon & Nelson 1980 that muscle strength reflects the overall fitness as they are the only component of fitness. (18: 21)

The speed of transfer and the speed of motions depend on the functions of the control nervous system which in its height at the age of 14. (8: 131)

Jim Bush indicates that the exceeding speed is an important advantage that should be connected to the high matching for

the back and front legs to achieve the best performance mixed with speed and the motional timing. (19: 38)

There isn't any evidence for the flexibility as a general quality in the human body so using a test that measures one joint can't give a logical evidence for the elasticity characteristics in anybody. (4: 212)

There is no doubt that the individual who has a sufficient flexibility is less injured in the sports activity in general and flexibility is considered a basic component to perform the whole motions and the sports skills in different way. (19: 314)

Flexibility and aren't considered from the physical fitness but they are considered from the compound matching abilities and the difference between the physical and the matching abilities is that the former is bounded to the necessary reactions to generate energy and making use of this energy but the latter by nervous processes and reactions for controlling. (1: 96)

The element of agility is in the motional performance and flexibility affects the development of the elements of strength, speed and agility and flexibility is one of the important qualities for the motional performance qualitatively or quantitatively and it also forms with the rest of the physical performance components such as muscle force, speed and endurance and agility are the basics up on which set up the acquiring of the emotional and skillful performance. (12: 318)

This achieves the first hypothesis rightness as "There are statistical difference between the ping pong juniors for the three groups (High level – Medium level – Low level) in the body forming and physical abilities according to the standard of skillful performance for the high level group".

Table (5)

Correlation between the measurements of the physical configuration of physical abilities and the level of skill performance of the three research groups

Variables	High level		Medium level		Low level	
	abilities	skills	abilities	skills	abilities	skills
Body weight	0.892*	0.831*	0.801*	0.786*	0.435*	0.196*
Lengths	0.901*	0.862*	0.822*	0.799*	0.321*	0.201*
Symptoms	0.877*	0.843*	0.815*	0.803*	0.241*	0.169*
Body contour	0.8629*	0.851*	0.799*	0.746*	0.168*	0.245*
Thickness of skin folds	0.895*	0.834*	0.822*	0.806*	0.167*	0.122*

From the results of table (5) we can see there is a statistical relationship between the measurements of the body forming and the physical abilities and the skillful performance for the high level and the low level groups, and the researcher sees that the body contour there is a relation between weight and length, If the body contour less, whenever the lighter weight. Is because Ahmed khater and Ali Elbek 1996 indicated that

their increase in the body contour and its endings may due to increase in weight for length. (3: 121), and this matches with Mohamed Sobhy Hassanein 1995 That there is a relation ship between the muscle strength and the weight and the length of the player (13), This is matching with Said Kamal Taha 1992 the sports activities can reduce the harmful fats and increase the useful fats when the fats are

reduced then the player is of a high efficiency and this is matching with studies by Mona Mahmoued 1998 as there is aversive relationship between the fats and the muscles strength. (16: 132)

The researcher sees that if muscles increase and fats decrease the useful, They lead to the player is of high efficiency fit as Morehouse and Miller 2001 say that the fitness of any one which affect positively the performance (Fats free body) and some affect negatively the performance (Fats increased body). (23: 147)

Esam Abd Elkhalek 1999 sees that there is a relation between the body forming for the player and the ability to high levels, and every sport activity has its morphological characteristics that should be noticed on choosing the players for different activities (7: 33-34)

Mohamed Sobhy Hassanein 1997 assures that weight is on important element in the sport activity and plays a very important role in most sports activity and weight in creasing may be needed in some sports activities and may be abed element in some other activities. (14: 52- 53)

Esam Abd Elkhalek 1999 indicates that there is a relation between the body components and the high levels should be taken in wind during choice. (7: 33)

Williams and Speryn 1999 indicates that the international levels can't be achieved but by the sports man who have special bases that suit the sport activity which is practiced and in all activities it's proved that there is a relationship between the body characteristics and the sports levee which the player achieved. (5: 137)

Ahmed khater and Ali Elbek 1996 indicate that the exceeding in the sports activity in practicing sports activity isn't connected with the body measurements individually but there is an important factor that is the relationships which connect these measurements together such as weight, length of the body and there is a relationship between achieving the sports levels and the body forming.(3: 50)

Nehad Ebrahim sees that length is one of the important factors in many sports activities and it plays a big and effective role in the individual sports. (17: 32)

The results of this study is matching with results of the study by Knudson and et al 1997 in the existence of a connective relationship between age, length and weight fats, running utmost some muscle strength tests and body weigh without fats which reflects the importance of the strength and muscle block in the success of the competitors (21), The results of Kamal Darwish 1983 study in the existence of a relationship between the fist strength and the shoulders, arm, chest. (11), Mohamed Abd Elaziz studies 1986 show that there is aversive relationship between weight and the arm, chest, ordinary, exhale, inhale, and 100 meter running. (15)

The results of this study is different with the results of this study is different with the results of Coha Milanovic 1998 that there isn't any relations between the anthropometric

measurements In the javelin with the resulting of throwing for the anthropometric measurements. (25)

This achieves the second hypothesis that "There is a relationship statistical guide between the body forming and physical abilities and the skillful performance level for the ping pong juniors conclusions and recommendations".

Conclusions:

- 1- There are statistically differences between the three groups (High level – Medium level – Low level) according to the skillful performance in the ping pong in on the measurements of the body forming as the differences were between group the high level group and the medium level and the low level for high level group but between the and medium level in all the body forming measurements.
- 2- There are statistically differences between the three groups (High level – Medium level – Low level) according to the skillful performance in all tests for the physical abilities, as the statistically differences between the high level group and the Medium level and the low level for the high level but in case of the Medium level and the low level the differences were for the Medium level in all physical abilities tests.
- 3- There is a statistically relationship between the body forming measurements and the physical abilities and the skillful performance skill level in the High level and low level and the low level group and the relationship wasn't guiding statistically for the low level.

Recommendations:

- 1- Using the body forming measurements and the physical ability reached by the choice of the applicants for the ping pong in the UAE because they have apositive effect on the skillful performance.
- 2- Making tables for the special levels and the which were reached in the current research as they maybe amean in the choice, classification, directing, evaluating amd prediction.
- 3- Looking after the applicants and the advanced physically who were chosen to practice the ping pong to achieve the high benefit from this sport.

References:

- 1- Abul Ela Ahmed Abdel Fattah, Ahmed Omar Ruby: the selection of talented people in the field of sports, the world of books, Cairo, 1986.
- 2- Abu Ela Ahmed Abdel Fattah, Ahmed Nasr Radwan debt: Physiology of fitness, the Arab Thought House, Cairo, 1993.
- 3- Ahmed Mohammed Khater, Ali Fahmi pick: measurement in the field of sports, Knowledge

- House, Fourth Edition, Modern Book House, Cairo, 1996.
- 4- Usama Kamel salary: motor development, the Arab Thought House, Cairo, 1990.
 - 5- El-Sayed Abdel-Maksoud: Theories of sports training, training and physiology of the force, the center of the book for publication, Cairo, 1997.
 - 6- Saad Kamal Taha: Sports and biological principles, Knowledge House, Cairo, 1992.
 - 7- Essam El-Din Abdel-Khalek: sports training - theories and applications, University Library, 9th floor, Alexandria, 1999.
 - 8- Essam Mohammed Amin: a say in how to search for and develop sporting talent, the first scientific conference for Studies and Research of Physical Education, Faculty of Physical Education for Boys in Alexandria, Helwan University, 1981.
 - 9- Alaa addin Elewa: Health in the field of sports, facility knowledge, Alexandria, 1998.
 - 10- Kamal El Din Darwish: The relationship between morphological measurements and some special physical elements of the Egyptian national team handball, studies and research in physical education and recreation, Faculty of Physical Education for Boys in Cairo, Helwan University, 1983.
 - 11- Kamal El Din Darwish, Aboul-Ela Abdel Fattah, Mohamed Sobhi Hassanein: "determining the levels of physical abilities and motor skills in players individual new entrants centers Youth training Sporting", the Supreme Council for Youth and Sports, the General Secretariat for Research Sports, Cairo, 1985.
 - 12- Mohamed Hassan Allawi, Mohamed Nasr Radwan: Technical skills and psychological tests in the sports field, Darragh Arab Thought, Cairo, 1987.
 - 13- Mohamed Sobhy Hassanein: objects sports heroes patterns of both sexes, Arab Thought House, Cairo, 1995.
 - 14- Mohamed Sobhi Hassanein: Measurement and Evaluation in Physical Education and Sports, the first part, the Arab Thought House, Cairo, 1997.
 - 15- Mohamed Abdul Aziz Khazal: determine the relative importance of physical measurements as some requirements of individual sports activities for people with higher levels, Unpublished Master Thesis, Faculty of Physical Education for Girls in Alexandria, 1986.
 - 16- Mona Mahmoud Ahmed: battery status and physical tests anthropometric for junior table tennis stage age group of 9-12 years, Unpublished Master Thesis, Faculty of Physical Education in Port Said, Suez Canal University, 1998.
 - 17- Nihad Ibrahim Agami: study of the relationship between speed and transitional scoring opportunities in football for juniors under 19 years old, in Cairo, Unpublished Master Thesis, Faculty of Physical Education for Boys in Cairo, Helwan University, 1985.
 - 18- Jensen, C.R. and Nelson, C.: Measurement in physical Education and Athletics, Macmillan Publishing company, Inc., New york,1980.
 - 19- Jim bush with Don: Dynamic Track and field Allym and Bacon, Inc., Boston, London, Syden, Toronto, 1998.
 - 20- Karpovich, P.V & Sining W.E: Physiology Muscular activity, 7th ed W.P. Saunders comp, 2001.
 - 21- Knudson, Jlane Frederick, and Ed. Parker: Background of the Pentathlon, Track and Filed Quarterly Review Volume 70 Summer, 1997.
 - 22- Lamb, D.R : Physiology of Exercise , responses and adaptations, Macmillan publishing Co. Inc., New York, USA. 1994.
 - 23- Morehouse, L.W Miller, A.T: Physiology of Exercise saiat Louis, 6th, Maosby Company, 2001.
 - 24- Williams, J.C.P & Speryn P.N.: Sports Medicine, 2nd ed. Britain, Edward Company 1999.
 - 25- <http://ww.31im.com>

