Comparison Study for Physical Quality Performance and Body composition Between Elite-Normal Junior Swimmers.

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Abstract:

The aim of the study was to assess the Body composition and fitness between elite and normal junior swimmers. Methods The data was collected from randomly selected (100 mal) sport healthy swimmers in Egypt in 2019.The variables consist of 22 items during three testes "Swimming, Fitness and Physiological and Anthropometrical testes". Control value for each parameter was calculated as an average value mean and standard deviation ±SD. The level used for accepting significance was *P < 0.05 and **P<0.001 Results The relative changes were calculated for each subject, an individual mean value and skewness between elite swimmers and normal swimmers for all parameters. it was a different significant for elite swimmers in most of parameters vital capacity between elite and normal junior Swimmers for elite Swimmers (P=5.07) with a Correlation for 100 m freestyle (0.4608-**), in Body Mass(P=2.82) with a Correlation (0.5726-**), in Pull up (P=1.46), with a Correlation (0.232-*).vertical jump(P=2.86**) with a Correlation (0.2675-*). available test of 4×50m /10 sec (P=5.57**) with a Correlation (0.4583**).400m Run (P=3.71**)with a Correlation (0.3275**).10:20 Swim sprint (P=3.10**)with a Correlation (0.4061**).25:50 Swim sprint (P=7.78**)with a Correlation for 100 m freestyle (0.6045**). Grab/Track Start 15 m(P=2.41*) with a Correlation (0.3222**). Core Flexibility (P=4.12**) with a Correlation (0.4343-**). Core Flexibility (P=4.12**) with a Correlation (0.4343-**). Flexibility front Foot (P=2.74**) and Agility(P=2.15*) for the elite junior swimmers. Discussion**.** in Total and Specific Contribution Ratio: first Sprint (S), second Lead Body Mass (LBM), Third Reaction time (RT), fourth Core Flexibility (CF), fifth vital capacity (VC), sixth Shoulder Flexibility (SF).in a correlation for the 100 m freestyle time record. Conclusions. Common assessments of Body composition and specific physical fitness in elite swimmers explain more variance in competition performance than Normal swimmers, as well as for 100 m events. These findings highlight the need to empirically assess testing

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regimens and suggest new tests in physical fitness and Anthropometrical characteristics.
Keywords: Body composition, swimming fitness,100 freestyle, junior Swimmers.

Introduction

Swimming is one of the most interesting areas for testing sports anthropologists, primarily because of the specific conditions of the environment and its influence, or the observed relationship between the form and its function. Characteristics of the material the swim bodies have a great influence on the level of manifestation of a whole range of specific characteristics swimmer. As one of the valid measures for the assessment of physical fitness and physicality (Krivokapic, D. (2007). In swimming, a multitude of physical, physiological, biomechanical and psychological parameters influence performance. While body composition is believed to be an important contributor to performance in swimming, with some coaches placing a strong emphasis on it during the training preparation phase, previous research is limited and inconclusive (Shephard, M. E (2014). Recently, interest in the composition of the human body has been significantly growing with emphasis on maintaining a good ratio of components such as fat mass and lean body mass including muscle mass and water. (McArdle, W.D.; Katch, F.I, 2014), (Malá, L.; Zahálka,2017)In physical fitness, body composition is used to describe the percentages of fat, bone, water and muscle in human bodies.[1] Because muscular tissue takes up less space in the body than fat tissue, body composition, as well as weight, determines leanness. (composition of the body 2016), (Body Composition Tests. 2015). In competitive sport the knowledge of body tissue proportions is essential to determine the morphological characteristics of an athlete. The opportunity for excellence in sport practice depends on this very information. (Hulmi, J.J. 2017)**.** Body Composition and Athletes, it is said that "body fat, not weight" is the best measure of health and fitness; thus, body composition assessment should be an integral part of each athletes' physical fitness profile regardless of body weight. (Pallavi Dave2016) .Body composition is considered as an ideal parameter for fitness

analysis and is acquiring much more significance in estimating the fitness levels among individuals in sports and those eager to sustain exceptional physical fitness. (Subhedar R, 2015). The primary objective of this research was to assess the impact of Body composition and specific fitness in record of 100 swimming between elite - normal Junior swimmers. It was assumed that the primary objective of the experiment would be attained by answering the following questions: Will the body composition cause changes in record swimming and What is the significance of changes in physical fitness testes in comparison to the elite-normal Swimmer, that contribute in swim record. It is assumed that the knowing of body composition and specific physical fitness will induce beneficial changes in swim record.

Aim:

Our aim was to measure the effect of Contribute the Body composition and specific physical fitness, on the short distance swimming as 100 m freestyle swim record.

Material and Methods

Subjects

100 healthy swimmers junior sport volunteered for the study in (January 2019) Group (A) Elite Swimmers Group (B) Normal Swimmers. subject were 13.36 ± 1.07 years of age, height 157.77 ± 10.14m and weight 47.36 ± 9.97kg. The subjects have at least 6.32 ± 2.36 experience record in Swimming all subjects trained on Swim America program in short distance swimming pools. All subjects were clinically healthy and had no history of recent infection disease, asthma or cardiorespiratory disorders. Onward, all of them gave their written consent and the local ethics committee approved the study protocol. All subjects were assessed for the anthropometric measures required for the calculation of body composition variables (Matiegka, 1921), (Masanovic, B. (2018).

Protocol

Swimming test:4×50m/10 sec,400m Run,10:20 Swim sprint,25:50 Swim sprint, Grab/Track Start 15 m. **Fitness tests :**Pull up, vertical jump, shoulder Flexibility horizontal, shoulder Flexibility Vertical, Core Flexibility, Flexibility front Foot, Flexibility Back Foot, Flexibility Side Foot,

Flexibility Side Foot, Flexibility Outside Foot, Agility, Coordination, Balance.

Physiological and Anthropometrical testes: Absolute vital capacity, Relative vital capacity, Percent of Body Fat, Body Mass, Lead Body Mass.

Data analysis

The data obtained in the research were processed using the application statistics program SPSS 20.0 adjusted for the use on personal computers A control value for each parameter was calculated as an average value mean and standard deviation ±SD, Skewness, a correlation, and Specific Contribution Ratio between two group and the characteristics from Physical fitness, Physiological and Anthropometrical and Swimming testes for elite Swimmers and normal Swimmers. The level used for accepting significance was *P<0.05 and **P<0.001.

Table (1)
Characteristics of 90 subjects

Characteristics	Means± SD	Mean	Skewness
Age(year)	13.36 ± 1.07	13	0.08
Height (cm)	157.77 ± 10.14	157.25	0.14
Weight (kg)	47.36 ± 9.97	47	1.01
Experience (Year)	6.32 ± 2.36	6	0.03
100 m Freestyle Record(sec)	67.84 ± 6.01	67	1.05
Absolute vital capacity(mml)	2998.89 ± 605.5	2950	0.35
Relative vital capacity (mml/kg)	64.58 ± 13.23	63.62	0.69
Percent of Body Fat (%)	26.56 ± 6.35	26	0.32
Body Mass(kg)	12.71 ± 4.41	12.59	0.50
Lead Body Mass(kg)	34.57 ± 7.40	33.410	1.10

Data are means ± SD, n=90. Skewness between (+3, -3).

Results

Table (2)
Characteristics of Fitness, Physiological and Anthropometrical

No	Variables	Elite Swimmer N=20	Normal Swimmer N=20	T- test	Correlation 100 m freestyle
		Means±SD	Means±SD		
1	Absolute vital capacity(mml)	3452.38±539.09	2659.09±487.61	5.07**	0.4608-**
2	Relative vital capacity(mml/kg)	62.11±8.48	65.17±14.64	0.84	0.0862
3	Percent of Body Fat (%)	23.9±4.66	27.54±5.61	2.31*	0.179
4	Body Mass(kg)	11.53±3.35	13.31±3.03	2.82*	0.5726-**
5	Lead Body Mass (kg)	42.33±5.46	29.64±4.53	8.30**	0.1853-
6	Pull up (n)	5.52±2.82	4.22±2.991	1.46	0.232-*
7	vertical jump (cm)	42.47±5.63	37.27±6.26	2.86**	0.2675-*
8	4×50m /10 sec (sec)	113.95±11.40	161.81±20.35	5.57**	0.4583**
9	400m Run(sec)	298±23.12	327.59±28.78	3.71**	0.3275**
10	10:20 Swim sprint(sec)	8.28±0.808	9.56±1.75	3.10**	0.4061**
11	25:50 Swim sprint (sec)	27.95±1.20	33.71±3.24	7.78**	0.6045**
12	Grab/Track Start 15 m(sec)	8.82±0.805	9.79±1.69	2.41*	0.3222**
13	Shoulder Flexibility horizontal (cm)	43.09±10.88	44.27±11.16	0.350	0.0307
14	Shoulder Flexibility Vertical (cm)	54.61±8.45	50.31±11.80	1.37	0.1696-
15	Core Flexibility (cm)	72.61±7.36	58.86±13.73	4.12**	0.4343-**
16	Flexibility front Foot (cm)	67.95±5.06	58.85±14.39	2.74**	0.2992
17	Flexibility Back Foot(cm)	28.47±3.62	25.18±5.32	2.36*	0.1418-

FollowTable (2)
Characteristics of Fitness, Physiological and Anthropometrical

No	Variables	Elite Swimmer N=20	Normal Swimmer N=20	T-test	Correlation 100 m freestyle
		Means±SD	Means±SD		
18	Flexibility Side Foot(cm)	50.90±7.71	54.81±10.58	1.38	0.2139
19	Flexibility Outside Foot(cm)	51.38±6.15	52.90±7.64	0.72	0.071
20	Agility(cm)	11.68±0.56	12.09±0.68	2.15*	0.1714
21	Coordination (sec)	5.50±0.707	5.86±1.121	1.25	0.1368
22	Balance(sec)	10.14±5.24	10.01±4.27	0.09	0.0954

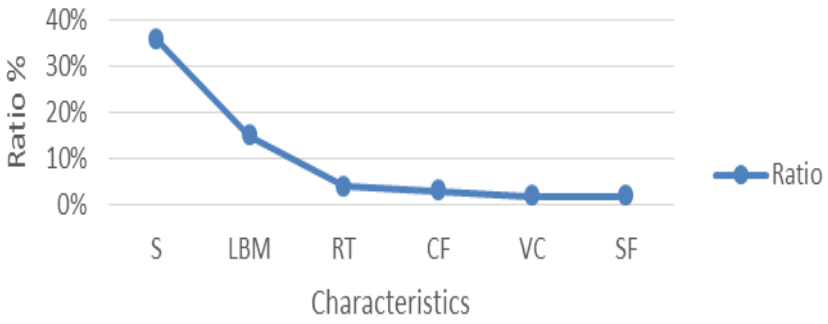
Data are means ± SD, n=90 Significantly different from * P<0.05, **p<0.01

Table (3)
Contribution Ratio Characteristics for Subject

Step	Constant	Standard error	df	F value	Characteristics						Total Contribution Ratio	Specific Contribution Ratio
					S	LBM	RT	CF	VC	SF		
1	35.50	4.81	89	50.68	1.037						36%	36%
2	54.77	4.24	88	45.92	0.789	0.334					51%	15%
3	46.05	4.09	87	35.24	0.768	0.307	0.924				55%	4%
4	52.95	3.97	86	29.71	0.705	0.268	0.902	0.091			58%	3%
5	54.89	3.87	85	25.97	0.710	0.180	0.921	0.086	0.001		60%	2%
6	49.84	3.89	84	23.31	0.749	0.156	1.037	0.1292	0.002	0.1001	62%	2%

Contribution Ratio: Sprint (S), Lead Body Mass (LBM), Reaction time (RT), Core Flexibility (CF), vital capacity (VC), Shoulder Flexibility (SF).

Fig.1. Contribution Ratio Characteristics for Subject



Discussion

According to the results of statistical analysis, Table (2) showed a significant difference in variable Absolute vital capacity between elite and normal junior Swimmers for elite Swimmers (P=5.07) with a significant Correlation for 100 m freestyle (r=0.4608-**), Showed a significant difference in Body Mass(P=2.82) with a Correlation for 100 m freestyle (r=0.5726-**). Th e importance of body composition in sport performance is a primary concern in creating athletes' profiles as well as conditioning programs throughout a season at all levels of competition (Silvestre et al., 2006), in that describing anthropometric characteristics and body compositions of athletes and detecting possible differences in relation to competition levels may give coaches a better working knowledge of the studied groups of athletes. Showed a significant difference for elite junior swimmers in Pull up (P=1.46), with a significant Correlation for 100 m freestyle (r=0.232-*).vertical jump(P=2.86**) with a significant Correlation for 100 m freestyle (r=0.2675-*). Vertical jump score of athletes could be predicted by %Fat which is related to the work performed during vertical jump (Davis DS, Briscope 2003). available test of 4×50m /10 sec (P=5.57**) with a significant Correlation for 100 m freestyle (r=0.4583**).400m

Run (P=3.71**)with a significant Correlation (r=0.3275**).10:20 Swim sprint (P=3.10**)with a Correlation (r=0.4061**).25:50 Swim sprint (P=7.78**)with a Correlation for 100 m freestyle (r=0.6045**). Grab/Track Start 15 m(P=2.41*) with a Correlation (r=0.3222**). Core Flexibility (P=4.12**) with a significant Correlation for 100 m freestyle (r=0.4343-**). Core Flexibility (P=4.12**) with a significant Correlation (r=0.4343-**). The core muscles are essential for swimmers because they use the whole body to transfer the forces. If there is lack of core stability the muscles can't transfer the force from the hands to the legs (Weston et al., 2015; Crowley, Harrison & Lyons, 2017). Flexibility front Foot (P=2.74**) and Agility(P=2.15*) for the elite swimmers. Body composition can affect strength and agility (Massuça & Fragoso, 2011), whereas body mass can influence an athlete's speed, endurance, and power, it is well known that excessive fat mass compromises the physical performance (Nikolaidis & Vassilios-Karydis, 2011), The main findings of the present study indicate that high level of body fat effects of fitness level for players(Halasi, S., & Lepes, J. (2012). Also, it's no significant showed in other variables but its record high means numbers for elite junior swimmers than normal junior swimmers. Training power characteristics may become more important than training strength characteristics. Training at faster velocities during pull-ups may a critical factor in improving junior swimming performance. Also, Sprint and power during the upper and lower body testes important for successful sprint swimmer performance (Pérez-Olea et al). The relative and absolute strength in upper body correlated to both 50m and 400m freestyle and could therefore strengthen the importance of upper body strength in sprint and middle distance as previous researchers has stated. The upper body strength is the best predictor of time in 50m.The result in the current study showed in Table (3) the Contribution Ratio Characteristics for elite Swimmers effect in time of 100

m in next two ratio Total Contribution Ratio and Specific Contribution Ratio the first ratio Sprint (S=1.037) with Total Contribution Ratio (TCR=36%), Specific Contribution Ratio (SCR=36%).Second ratio Sprint (S=0.789), Lead Body Mass (LBM=0.334) with Total Contribution Ratio (TCR=51%), Specific Contribution Ratio (SCR=15%). Third ratio Sprint (S=0.768), Lead Body Mass (LBM=0.307), Reaction time (RT=0.924) with Total Contribution Ratio (TCR=55%), Specific Contribution Ratio (SCR=4%). fourth ratio Sprint (S=0.705), Lead Body Mass (LBM=0.268), Reaction time (RT=0.902), Core Flexibility (CF=0.091) with Total Contribution Ratio (TCR=58%), Specific Contribution Ratio (SCR=3%). fifth ratio Sprint (S=0.710), Lead Body Mass (LBM=0.180), Reaction time (RT=0.921), Core Flexibility (CF=0.086), vital capacity (VC=0.001) with Total Contribution Ratio (TCR=60%), Specific Contribution Ratio (SCR=2%). sixth ratio Sprint (S=0.749), Lead Body Mass (LBM=0.156), Reaction time (RT=1.037), Core Flexibility (CF=0.1292), vital capacity (VC=0.002), Shoulder Flexibility (SF=0.1001) with Total Contribution Ratio (TCR=62%), Specific Contribution Ratio (SCR=2%).When the swimmer gets fatigued the sense of where the shoulder is and proprioception is reduced. By implementing strength training mainly in the external rotators of the shoulder the proprioception in the humeral head develops and will in turn enhance the stroke length and rate (Matthews et al., 2017).

Conclusion

The physical testes and Body composition had a high correlation to the time in 100m freestyle swim, which supports previous literature and underlines the importance body fitness and 100m freestyle swim performance. Coaches must interest of anthropometrical and fitness testes for the junior swimmers. also recommend advanced research on individualized body composition analysis of both male and female junior

and adult swimmers with differences in swimming techniques.

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