

Effect of

**Training Program**

**Using the Aquatic Medium**

**TO DEVELOP SOME PHYSICAL  
CHARACTERS SPECIFIC FOR**

**Squash**

**NASCENT**

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### ***Introduction and Research Problem***

*Our society witnesses today a wide range renaissance in different fields and this renaissance is based on scientific research and purposeful objective study, the scientific and technological development we see now in different fields of life is considered the main cause that makes man struggles for matching with this amazing development, during this era we live the different scientific and practical aspects of life are characterized by fast development, continuous progress and innovative knowledge that are focused on everything to which man reached of hypothesis and sequential scientific facts, so both researchers see that the physical characters play an important role and they are considered one of the most important*

*preparation for any sport activity, also they affect the skillful performance positively achieving the research aims and balanced integration among different preparation aspects.*

*Aquatic trainings are considered one of the recent and common training methods currently as the aquatic physical fitness trainings are considered one of the favored training shapes and they don't need swimming skills and anybody has the desire in practicing the aquatic training can find the place to perform the aquatic physical fitness trainings. (4:10)*

Process of subjection of man body and its internal vital systems to physical burden is considered one of the objective methods that lead to phenomenon of adaptation, and training phenomenon within various circumstances and natural circumstances "training during hot weather, training at heights, training under water, training during cold weather" is considered one of the most important methods that aim to induce change in the physical and functional level and awaking the sense of need to the nature and enjoy outdoors leading to satisfy the incentive for competition with self or others or the nature. (8:37,38).

Awareness by the importance of benefits and values of aquatic trainings increased and spread as it's considered one of the recent methods all over the world. As the aquatic trainings work as preventive medicine and physical therapy facing many of injury cases or rehabilitation after injury or surgery, or general fitness for health, loss weight, thinness and raising physical fitness level. (5:1)

Binkley-Helen adds that the training inside the aquatic medium is beneficial in increasing the musculature power;

also it affects the specific physical abilities. (14:4).

Both of Khairia El-Sokkary and Mohamed Brekaa, refer that water is considered excellent medium for general, specific physical fitness and rehabilitation and treatment because it supports movement also it decreases pains during movement for individuals of advanced sport levels through preparation stages of the training season, and decreasing pressures on the body that are resulted from practicing competition and experimental activities and its benefits are gaining power, tolerance and increasing flexibility specially joints flexibility and development of movemental range. (5:9,14)

Both of Ritchie et al, Rogers, Ma and Poehlman agree that aquatic trainings where the body faces great resistance from the water as they are considered as a way to resist the working muscles for strengthening legs' movements and enhancement of the power that is considered one of the primitive aims for tolerance development. (15:27) (16:67) (17:252)

Squash game is considered one of the games that require high physical ef-

fort according to what characterizes it of effort made it one of the heaviest activities at all so the physical preparation became one of the most important winning keys for players, scientists' opinions are multiple about the applications of specific physical characters at squash game, an Wael El-Sayed Ibrahim Kandil sees that it's according to the relative importance (breathing circular tolerance – power – thinness – flexibility – accuracy – speed – ability). (11:17)

Also Alan Marion Devid whose classification agrees with the opinion of both researchers where evaluation of the specific characters, refers to the classification which is:

Very important characters (breathing circular tolerance – fast reaction – accuracy – harmony – thinness)

Important characters (musculature tolerance – ability – flexibility)

Beneficial characters (maximum power). (13:45)

Trainings of gaining physical fitness are considered the most interesting and incentive of recovery when water relief and its fresh dynamics are added as soon as the individual accustomed to the new sense or unusual to move within the aquatic medium so the trainings gives relief and safe feelings and achieving the optimal mixing between pleasure, effective training and relief and it can't be felt on the ground as the aquatic trainings relieves the whole weight burden and prevents injuries that may occur because of crashing and away pressure from body joints as

it activates blood circulation, training effort burden increase and burning more of calories an achieving fast and effective harmony through water resistance, and aquatic trainings had an effect on many professional players due to their using with the purpose of fast recovery from injuries and enhance their physical adaptation and the statistics of playgrounds' injuries showed that most individuals can tolerate the very sever training best in water. (1:53)

Through theoretical readings and associated studies we find that water represents one third of man's weight that allows for great chance for muscles' strengthening and joints' movement without stress, and this is affirmed by sport medicine researches for athletics rehabilitation and also non athletics, that aquatic trainings help weak muscles to move when the body floats on water also the water resistance for movement works as moderate type of resistance trainings leading to recovery of the body to its vitality after cases of general weakness.

According to the nature of violent preparation for physical characters specific for squash activity especially with nascent specially during long preparation periods, also it's known that activity practice is performed in different conditions and some of these conditions may have great and unusual effect on the body and when the outer temperature is higher than skin temperature 32 degree the body begins decreasing its temperature by increasing the activity of thyroid gland.

It's shown previously that the current research is a new scientific trial to recognize training method using the aquatic medium which is suitable to some extent for the nature of young age stages which requires attraction and attention factors toward the training by interesting and competition method which leads to non leakage of boring in the hearts of players and their taking of specific training practice for specialized sport activity. Also this research works to make greater number of players participate and their prevention from injuries they may expose to during land trainings, also satisfaction tendency for adventure and discovering physical and psychological limits of the body and develop its abilities providing freedom and innovation of daily life style and feeling of the participants by vitality, and this what made both researchers to use training within aquatic medium as an alternative for used traditional trainings in development some of special physical characters for squash nascent.

### **Research Aims:**

1- Designing training using aquatic medium to develop some special physical characters to develop the nascent's abilities and facilitate training.

2- Recognizing effect of using program within aquatic medium on some special physical characters for study variables.

### **Research Hypotheses:**

1- Aquatic training program using affects development of some physical characters under study.

2- There are differences of statistical significance between before and after measurement for good of after measurement of study sample.

### **Research Terms:**

#### **1- Special Physical Characters:**

"Physical efficacy facing physical, skillful, planning, organic and psychological requirements of the game". (7:197)

#### **2- Aquatic Medium:**

"It's medium different in its characters from air as the player's body parts are immersed inside the water which is either swimming pool or river or sea of calm water, the player performs all movements by both arms, legs and trunk inside the water". (Procedural Definition)

### **Previous Studies:**

1- Yehia Saleh Yehia El-Motaimy (2009) (12) studied topic of "effect of training program mix of land and aquatic media to improve the level of some physical fitness factors and some functional variables at football deaf players" and this study aimed to recognize the effect of mixed training program to improve some physical fitness factors (tolerance, musculature power, speed, thinness, and flexibility) and functional variables (relief pulse, number of breath times, systolic and diastolic blood pressure, and skin folds thickness) on the study sample of (14) players, they are distributed in two groups: group of training within land medium and they

are (7) in number and group of mixed training (land and aquatic) and they are (7) in number and the period of suggested training program was 10 weeks by 3 training units weekly, as the experimental group is trained two days within the land medium with control group and one day within the aquatic medium. While the control group trains three units within the land medium, and the results referred to the improvement of the level of physical fitness and functional factors between before and after measurements in all variables under study for good of after measurement of training group (mix training), and the researcher recommends by application of suggested mix training program and land program through training and preparation stages, for their positive results on the physical and functional variables, and performance of comparative studies between the two media but by increasing number of training units of aquatic medium as one of training types in development of some physical fitness and functional factors as the aquatic medium has psychological and functional advantages.

2- Tamer Mohamed Talaat Othman (2006) (3) performed a study of title "effect of suggested aquatic training program to develop some factors of physical fitness specific for boxing nascents" and this study aimed to design aquatic program and recognizing its effect in specific physical characters, and research sample reached (20) boxers

during stage of one year (16:14) randomly, and experimental curriculum using is done for two groups experimental & control, and the most important results were that the training aquatic program affects specific physical characters positively and avoiding injuries of sample individuals.

3- Wesam Refaat Mahmoud Yehia (2006) (10) performed a study of title "effect of training program using the aquatic medium on improvement of level of performance of some main skills for volleyball girls nascents" and this study aimed to design aquatic program and its effect on some specific physical abilities and also on some main skills, and she used the experimental curriculum within sample of (38) nascents and used tools like references analysis, tests, questionnaire and she reached to occurrence of improvement of specific physical fitness level and also some game skills may occur.

4- And Esam El-Din Mohamed Abdel Razek (2005) (6) performed a study under title "effect of using trainings in the aquatic medium on some specific physical fitness factors for football players" aiming to design an aquatic training program and recognizing its application on a sample of (30) players at El-Santa Club and they are divided into two groups control and experimental using the experimental curriculum, and the results referred to improvement of the physical variables also there must

be benefit from the aquatic medium characteristics when raising the physical fitness rates or treatment and rehabilitation for athletics.

5- Mostafa Ibrahim Yousef (2001) (9) conducted a study of title "effect of suggested training program using the resistance of aquatic medium on the skillful performance level for Kata players at Karaté sport" and the research sample is chosen of (10:16) players and their ages were from (10-12) years old using the experimental curriculum and the most important results the effect of suggested program on physical characteristics specially of the training group.

6- Binkley (1997) (14) conducted study of title "aquatic trainings and their effect on improvement of musculature power and tolerance of American ladies of African origin" the study aimed to raise increase level of musculature power by the aquatic medium and the researcher used the experimental curriculum and the research sample reached (10) ladies of average age (70) years and the program time is (10) weeks and the most important results that the aquatic training improves the musculature power and tolerance with maintaining heart beats of American ladies.

7- Vresfinx (1991) (19) conducted a study of "aquatic sports as a means to prepare the basic stage students of swimming" and the study aimed to what extent the effect of aquatic sports as an effective means in preparation

of students to learn swimming, and the most important results that the aquatic sports helped greatly to overcome fearing of swimming learning, and improve the performance level.

8- Steers & Hoger (1990) (18) conducted a study under title of "physical fitness by aquatic sports" the study aimed to improvement of physical fitness by training within the aquatic medium and the sample composed of youth for 6 weeks and the experimental curriculum is used, the study results that the aquatic trainings affect positively on blood circulation, muscles and flexibility in addition to interesting factor and protection of the players from injuries.

## **Research Procedures:**

### ***Research Curriculum:***

Both researchers used the experimental curriculum for appropriateness the nature of this study, by using the experimental designing for one group using before and after measurement.

### ***Research Sample:***

Study sample was chosen of squash players at Sport Heliopolis Club (12) players of ages ranged from (11:14) years with average (11.9) years, also the sample of the survey included (6) players outside the research sample and from the main community of the study so the research community reached (18) players, and the sample is chosen intentionally.

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**Table (1)**

*Sample Individuals Harmony of Growth Variables  
 Reflection Coefficient of Growth Variables  
 (age – height – weight – experimental age)*

(N = 12)

Growth Variables	Measurement Unit	C	R2	±A	L
Height	cm	160.5	160	4.83	+0.31
Weight	kgm	49.67	48.5	4.77	+0.74
Age	Year	12.9	13	0.90	-0.33
Experimental Age	Year	6.5	7	1.08	-1.39

C = Arithmetic Average  
 R2 = Average

±A = Standard Deviation  
 L = Value of Reflection Coefficient

**Table (2)**

*Reflection Coefficient of Research Sample of Physical Variables*

(N = 12)

Physical variables	Measurement Unit	C	R2	±A	L
Oblique prostration with arms' flexion	Frequency	20.33	19.5	4.96	0.50
50 meters running	Second	8.18	8.14	0.76	0.16
1500 meters running	Minute	8.22	8.21	1.56	0.02
Forward trunk flexion from lengthwise setting	cm	11.67	10.5	5.04	0.69
Shuttle running	Frequency	9.17	9.25	0.86	-0.28
Right fist power	kgm	29.58	28	6.73	0.070
Left fist power	kgm	24.25	24.5	4.25	0.18

C = Arithmetic Average  
 R2 = Average

±A = Standard Deviation  
 L = Value of Reflection Coefficient

It's shown from table (2) that reflection coefficients of physical variables ranged between (-0.69:0.28) meaning

they are restricted between ±3 referring to harmony of sample individuals' variables.

## Data Collection Tools:

- 1- Restameter (to measure height)
- 2- Medical scale (for weight measurement)
- 3- Dynamometer (for fist power measurement)
- 4- Standard tape
- 5- Stop watch
- 6- Funnels and tools
- 7- Questionnaire forms for experts' opinions about:

**First:** a- Program time

b- Number of units

c- Time of each unit

**Second:** a- Used tests in before and after measurement and its appropriateness to measure every character.

b- Recognizing validity of used tests in aquatic medium and its appropriateness to measure every character.

c- Used tests in aquatic medium aiming to ration the aquatic program.

## Study Conducting Steps:

### (First) Survey

#### 1- Frank Calculation:

Frank is calculated in aquatic medium tests by arbitrators after administration of frank calculation forms to check tests frank within aquatic medium.

#### 2- Steadiness Calculation:

To calculate the steadiness coefficient of physical characteristics tests inside the aquatic medium both researchers used method of tests application and retest a sample of 6 players from research community and not from the sample under study of Sport Heliopolis Club Nascents on Thursday 23/5/2012, and after 3 days the second application is performed on Saturday 26/5/2012 and table (3) shows correlation coefficient between first and second application.

**Table (3)**

**Correlation Coefficient between First & Second Applications  
In Specific Physical Characteristics Tests inside Water** (N = 6)

	Used tests within aquatic medium	Measurement unit	First application		Second application		Value of "r" correlation coefficient
			M	A	M	A	
1	Running in place (1 minute) with kneesrising	Frequency	32.33	2.16	34.17	1.72	0.84
2	Backward circling of arms under water complete circle (1 minute)	Frequency	47.83	2.86	49	2.28	0.98
3	Holding iron ruler under water	cm	25.83	1.94	26.83	1.94	0.94
4	Running opposite sign (30 seconds)	Frequency	1.83	0.75	2.33	1.03	0.86
5	Wide jumping from steadiness	cm	134.16	11.58	137.33	11.14	0.99
6	Running between obstacles in circular form	second	26.33	1.75	28	2.09	0.76

It's shown from table (3) that value ( $r$ ) is more than (0.55) at significance level (0.5) referring to presence of correlative relationship of statistical significance between first and second applications in collection of specific physical characteristics that refers to tests steadiness.

#### **Before Measurements:**

- Before measurements were done in land physical tests on Wednesday 30/5/2012.

- Before measurements were done in specific physical tests within aquatic medium on Thursday 31/5/2012.

#### **Main Study:**

##### **Suggested Aquatic Program:**

1- **Objective: Improvement** of specific physical characteristics for squash nascent using aquatic medium

##### **2- Training program characteristics:**

The program took two months (8 weeks) including three training units every week and every unit took time (90) minutes.

The program included various group of different physical trainings within aquatic medium which is suitable for achieving the purpose of the program and appropriates growth for sample individuals and they are circles and swinging of both legs and arms and trunk.

##### **3- Bases of program establishment:**

Different principles of sport training are considered while establishment of the program of training burden degradation that doesn't prejudice the general objective of the program and consideration of the age stage of the

sample and energy production systems in programs and units establishment appropriating different preparation methods for training according to every stage and its objectives.

##### **4- Training burden rationing:**

Through training principles the researcher used trainings range between (70:85%) of severe intensity and performance frequencies reached between (8:16) frequencies and number of groups (4:8) groups and interval rest reached (2:4) minutes between frequencies and (6:10) minutes between groups.

Working on the program start is determined after different measurements with the most intensity in the used trainings aiming to know the numbers of every player and rationing the training burdens of the program through these numbers.

The program is applied in the period from Saturday 2/6/2012 to Wednesday 25/7/2012 of (24) training units which is the period of the program. Annex (1), annex (2)

##### **After Measurements:**

After measurements were done for land physical tests on Thursday 26/7/2012. And after measurements were done in specific physical tests within aquatic medium on Friday 27/7/2012.

##### **Statistical Treatments:**

Both researchers used the following statistical treatments: arithmetic average – standard deviation – average – reflection coefficient – Pearson correlation coefficient – (T) tests for differences significances.

## Results Review & Discussion:

### (First) Results Review:

**Table (4)**

*Differences Significance between Before & After Measurement  
In Physical Tests outside Aquatic Medium for Research Sample (N = 12)*

Tests	Before Measurement		After Measurement		(T) Value
	C	±A	C	±A	
1- Musculature tolerance (oblique prostration from standing) (1 minute)	24.67	5.05	33.67	4.91	14.06*
2- Ability (wide jumping from steadiness)	1.79	0.32	1.89	0.16	3.33*
3- Fitness (orthogonal running)	16.57	0.87	14.87	1.14	13.07*
4- fast reaction (Nelson with both arms)	17.25	2.30	15.17	1.75	2.74*

Table (T) value at level (0.5) = 1.812 an it's shown from table (4) presence of statistical differences of significance as the calculated (T) value ranged from (2.74-14.06) an it is more than table (T) value.

**Table (5)**

*Differences Significance between Before & After Measurements  
In Physical Characteristics Tests within Aquatic Medium  
for Research Sample (N = 12)*

	Used tests within aquatic medium	Measurement unit	First application		Second application		Value of "T"
			M	A	M	A	
1	Running in place (1 minute) with knees rising	Frequency	32.25	2.38	38.42	3.12	11.86
2	Backward circling of arms under water (1 minute)	Frequency	45.08	3.87	49.42	4.03	8.54
3	Holding iron ruler under water	cm	25.67	2.84	21.67	2.90	10.8
4	Running opposite sign (30 seconds)	number	2.42	0.67	1.58	0.51	10.5
5	Wide jumping from steadiness	cm	128.75	7.65	140.33	6.90	12.31
6	Running between obstacles in circular form	second	26.17	3.3	22	2.52	11.27

It's shown from table (5) that calculated (T) value is more than table (T) value at significance level (0.05) referring to presence of differences of statistical significance between before and after measurements for good of after measurement in research variables.

**(Second) Results Discussion:**

It's shown from table (4) presence of differences of statistical significance between before and after measurements for specific physical performance variables as calculated (T) value was more than table (T) value at level (0.05) of physical characteristics referring to improvement of performance level of these characteristics due to application of aquatic medium as resistant medium to movement, that agrees with opinion of both Khairia Ahmed & Brekaa (5), Wesam Mahmoud (10), that the aquatic medium works to improve the musculature tolerance rhythmically because squash game is of the games that lead to musculature arrhythmic for corresponded musculature groups because using the stick with one hand without the other, specially with young ages, also the ability variable is mix of maximum power an maximum speed and improvement rate requires high effort to reach to the best levels of performance and working within aquatic medium may not achieve high rates of improvement of maximum power or maximum speed curve, this confirms occurrence of balanced comprehensive development for squash players safely.

Table (5) of differences significance between before and after measurements in specific physical characteristics within the aquatic medium for research sample, shows that there is observed improvement in the research variables for good of after measurement as in case of running in place test to test the musculature tolerance as the calculated (T) value reached 11.86 and it's more than

table (T) value at level (0.05) referring to that this character can be measured within and outside the aquatic medium an there is correlation between player's improvement in test application inside and outside the water as the musculature working of both legs usually is performed using large musculature group that requires overcoming greater resistance of aquatic medium so improvement rate is more in musculature burden of legs, also it's shown presence of improvement in test of backward circling of arms under the water (1 minute) as calculated (T) value 8.54 and it's greater value than the table (T) value at level (0.05) referring to improvement of musculature tolerance generally and musculature tolerance improvement of arms specially an if aquatic medium using in improvement of arms performance is lesser than legs as the arms face lesser resistance than legs due to small sized musculature groups forming the shoulder an arms which is observed in the method of long distances swimming as the swimmer depends on arms blows more than legs because they are small musculature groups face lesser resistance then legs within the aquatic medium which agrees with both Yehia Saleh (12), Beinkly (14).

Table (5) shows occurrence of differences of statistical significance between before and after measurements for goo of after measurement in fast reaction variable under water, musculature ability and fitness as the calculated (T) value was more than table (T) value at level of (0.05) referring to improvement of aquatic program application, and the

water is considered natural environment and training inside the aquatic medium is affecting an effective method to increase numbers and types of available trainings for the player, so when moving arms or legs inside the water they face great resistance and can be used to strengthen the muscles and increasing the movemental range of the joint, and works as a medium calls for feeling with relax and makes the body weight free as water mass is heavier than air mass, also water resistance increase works to raise the player's efficacy physically, skillfully, mentally, socially and psychologically. This agrees with opinion of Tamer Talaat (3), Esam El-Din Mohamed (6), and Stears & Hoger (18).

From the previous it's shown that the specific physical preparation program using the aquatic medium that led to improvement of specific physical characteristics for squash nascents effectively, interesting and safely that agrees with the research objectives and achieves its hypotheses and is considered a solution for the problem facing trainers in dealing with category of young ages in long physical preparation program, as the aquatic medium is characterized by stimulating the incentive for training and push to competition with self and others and decreases tension, worry, and boring degrees by which the nascents feel.

### **Conclusions and Recommendations**

#### **First: Conclusions:**

- 1- *Supposed aquatic training program to develop some specific physical characteristics affects positively on those characteristics.*
- 2- *Development of level of specific physical characteristics leading to raise the performance efficacy of nascents without injuries occurrence.*
- 3- *The nontraditional programs help interesting, joy, competition and players' attraction using atypical methods, and improve the training physical existence percents.*

#### **Second: Recommendations:**

- 1- *Necessity of interesting in aquatic medium programs in dealing with nascents in long preparation programs.*
- 2- *Working on the research about other physical variables that can be developed by aquatic medium and share in performance development in different ages and levels.*
- 3- *Experimentation of using the aquatic medium on other more advanced samples to judge to what extent they are suitable for nascents categories.*
- 3- *Application of physical preparation using the aquatic medium shares as attractive and interesting factor leading to the competition and maintaining the players from injuries during preparation period.*

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