

## SOME BIO KINEMATIC VARIABLES AND ITS RELATIONSHIP WITH ACHIEVEMENT 25 M FREE STYLE SWIMMING

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### **Abstract**

This work aimed to elicitation the speed of swimming computing the time of performance divided on the distance.

Therefore, the speed meaning their achievement and thereafter understanding the relationship between kinematic variables and achievement that lead to final focused recommendations using descriptive method, samples of sixty students were selected intentionally from fourth year, school of physical education, Duhok with good performance in swimming.

Scientific observation, questionnaire, test, analysis, and measurement were used for data collection, certification of the scientific observation was carried out by two camera one above and other under the water inside glass box closed and tritely placed in front of the performance (10 m in the middle of race).

The best photos transferred to laptop for application Maxtraq program for kinetic analysis.

Results revealed non – significant correlation between some biokinetic variables with achievement i.e weakness of sampling technique. Free-style swimming requires body's extension through extending of hips which showed significant correlation with achievement. Comparable correlation of elbow with achievement means necessity of hand extension to pull more water. However, increasing of leg extension when the right arm enter the water lead to less resistance on the body. Once the right arm enter water, the left hand must gradually extending under water until approach to full extension beside the hip. Thus, inverse considerable correlation resulted between left forearm with horizontal line of body

**Key Words:**-Bio Kinematics, Achievement, free style, swimming.

### 1. INTRODUCTION

The swimming sport are pretty exercised rights in all stages of our life, does not belong to age, a certain swimming water sports popularity is of great significance in the construction of various aspects of a person's life (human and social). Thus the sport of swimming occupies a prominent place among all other sports, because they move all the muscles of the body and its development and strengthens heart and lung.

The importance of swimming shows in our time clearly because of the urgent need for the exercise of human sporting activities in order to compensate for the shortfall that occurred in the physical infrastructure through technological development in the provision of services after the emergence of a lot of diseases in modern era" ( Ayyash , 1989, 13).

Freestyle first place among the types of swimming in terms of speed and the number of its activities in the Olympic program" ( Ayyash , 1989 ,89), which embodies clearly through scientific studies of this swimming.

**The level of swim for students of the University of Dohuk is not clear since the lack of swim tournaments and therefore did not know the level of students performance.**

Objective of this study was identifying some of bio Kinematics variables for free style swimming (25)m and Understand their relationship to the free pool (25 m) accomplishment.

#### **Materials and Methods:-**

Descriptive method used for intentional sampling that included sixty male students in fourth year in the college of Physical Education, University of Dohuk , selection of the final samples (six student) that constitute 10% of the original community , description and the statistical parameters values for tested samples showed in (Table 1) .

Table (1) Shows the values of the statistical parameters sample specifications,

Statistical Names chronological	weight / Newton	Mass ( kg )	leg length	Length Arm (Cm)	the total length ( cm )	Life training by years	age by Years
Zia Noman	750	75	44	79	184	8	23
Peer Omid	800	80	44	79	185	10	25
Exhale Mamend	720	72	43	73	181	9	27
Carzan Mohammed	860	86	46	78	185	16	27
Finoar Kheireddine	780	78	43	72	180	7	26
Jkrkouhin Ghazi	630	63	41	71	170	10	23
mean	757.67	75.67	43.5	75.33	180.83	10	25.17
Standard deviation	71.34	7.13	1.5	3.39	5.12	2.88	1.67
Coefficient sprains	-0.56	-0.56	0	-0.08	-1.77	1.71	-0.36

An experiment conducted on Wednesday (26-1-2013) ( 12:00 ) pm, the experiment 's main in the swimming pool School of Physical Education at the University of Dohuk each samples has been giving one attempt and photographed by video film distance (5m)at within a total of( 25m ) two camera were fixed vertically on the player 's level and gymnast's body parts considered as drawing measurement.

The bio **Kinematic** variables determined by experts selected variables depended on the outcome of 60-100%swimmers movement were chopped using special program to sectioning video film for analyzing with Maxtraq program, following **Kinematic**: (head angle, shoulder joint angle left and right, the elbow joint angle left and right, wrist joint angle left and right, Angle hip right and left, knee joint angle left and right, ankle angle left and right, angle of the hummers, crank angle, thigh angle, angle leg, torso angle, the removal of the body gravity center, displacement between the shoulders, Time Motion i.e the time between two images at the moment when enter the right arm and, the moment when enter the left arm, total time for completion of the moment to give the go - ahead to the moment of the player arrival to the end, entire(total) speed of performance derived by dividing the total distance by the total time of the performance, Speed of body's gravity center is the speed of the body's gravity center between two (pictures) and computed dividing the distance of body's gravity center between two (images) on the time between two ( pictures ), the speed of arm / arm speed between two ( pictures ) computed dividing the distance between the point of entry the right arm in the water and the point of entry left arm in water time between two ( pictures ), removing of body's gravity center / is the connecting line between two points of body's gravity center between two ( pictures ), dislodge arm / are the connecting line between the point of entering the right palm and the left palm entering point water, total distance of the race, kineatic path of the body's gravity center.

Statistical methods included: -Standard deviation, Simple correlation

(excel)and (SPSS) programs were applied for data processing .

## 2. RESULTS

Table (2) Shows circles and standard deviations and the value of (t) calculated and tabular value margin of error for a sample search for Angle joints of the body

stages Variables	entering the water left arm				entering right arm of the water			
	error rate	correlatio n	deviatio n	mean	error rate	correlat ion	deviatio n	mean
Angle right shoulder	0.43	-0.40	9.07	15.98	0.26	-0.55	11.83	176.68

angle left shoulder	0.10	0.72	15.59	199.33	0.98	-0.01	16.73	20.40
annex angle right	0.52	-0.33	28.23	108.50	0.13	0.69	4.77	172.30
annex angle left	0.05 **	0.80	10.66	171.51	0.85	-0.09	47.90	138.88
right wrist angle	0.40	0.42	15.07	181.48	0.70	-0.20	16.71	171.73
left wrist angle	0.65	0.24	12.16	172.38	0.56	0.30	24.90	173.01
right hip angle	0.87	-0.08	33.48	151.36	0.06**	0.80	17.50	147.41
left hip angle	0.70	-0.20	15.14	158.88	0.09	-.073	16.45	138.90
angle right knee	0.07	0.20	33.39	152.73	0.55	0.31	22.17	118.10
left knee angle	0.77	-0.15	30.80	155.63	0.64	0.24	25.75	145.20
Ankle right angle	0.73	0.17	12.10	144.13	0.89	-0.07	27.90	147.70
left ankle angle	0.50	-0.34	17.79	146.43	0.64	0.25	26.66	160.16

Results in Table (2) showed non-significant correlation between achievement in free - swimming and angles of body joints in tow moment of entering the right and left hand for most variables in except of : -

1-The angle of right hip at a moment of entering right arm ,since mean was ( 147.41 ) S.D = ( 17.50 ) r = (0.80) significant, and error rate = (0.005) F.D=( 5) and tabular (r) = ( 0.75) .

2-Angle of left elbow at moment of entering left arm into the water , results mean = (171.51 ) S.D = ( 10.66 ) and r = (0.80) at (0.05) tabula (r) = 0.75 a relationship significant correlation.

Table (3) Circles show the results of calculations and standard deviations and simple correlation and the error rate for parts of the body angles to the research sample

Stages Variables	entering the water left arm				Entering the water wright arm			
	error rate	correlation	deviation	mean	error rate	correlation	deviation	mean
leg right corner	0.80	-0.13	13.27	10.83	0.06	-0.19	39.72	50.51
angle left leg	0.20	0.60	10.19	16.55	0.12	-0.30	11.09	17.63
angle right thigh	0.53	-0.32	20.49	21.56	0.66	-0.52	20.32	37.05

angle of the left thigh	0.91	-0.06	9.23	12.36	0.04 **	-0.16	10.65	17.80
Angle of the humerus right	0.30	-0.50	4.85	14.76	0.78	-0.27	3.84	5.88
angle of the left humerus	0.42	0.41	4.19	11.66	0.42	0.21	27.70	25.31
angle right forearm	0.37	0.45	17.47	63.45	0.46	-0.22	2.44	5.80
Left forearm angle	0.70	0.20-	7.44	8.96	0.00 **	-0.11	39.52	50.35
head angle	0.43	-0.40	14.34	17.51	0.20	0.60	9.63	12.27
Torso angle	0.33	0.48	2.57	5.08	0.64	0.33	3.89	4.83

Data represented in Table 3 showed that r.values between right arm entering to water was the arithmetic mean =( 17.80 ) S.D = ( 10.65 ) r = ( -0.16 ) error rate=( 0.039 ) when the D.F = 5 and the value of tabular (r) = 0.75, where the literatures confirmed that the body must be horizontal as much as possible through high speed of repeated movements of the lower limbs and reduction of strikes capacity of legs ( Ayyash, 1989 ,91).

Al Catt (1999) demonstrated that legs must be straight , to close up with no hardening, and the thigh consider standing pivot of legs movement. The latter also reported that the crawl over bend of knee are the most common mistakes in swimming that lead to increasing of thigh angle and the speed affect negatively.

Table (4) Shows variables bio Kinematics between the moment you enter the right arm of the water and the moment you enter the water left arm

	Stages variables	Statistical Description			
		Error rate	correlation	deviation	mean
1	Displacement of center of mass	0.66	-0.23	0.09	0.60
2	offset between the palm of the left and keeping the right	0.99	0.001s	0.14	0.51
3	is the first time	0.30	0.50	0.38	1.77
4	the time of the second image	0.38	0.44	0.47	2.40
5	time between the two images	0.89	0.06	0.14	0.63
6	speed ( central of mass )	0.54	-0.31	0.28	1.00
7	speed arm	0.80	-0.12	0.29	0.83
8	total distance	o	0	0.00	25
9	total time	0.00 **	-0.99	1.74	20.98

10	overall speed	0.00 **	1	0.10	1.19
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\* Each value in the field is equal to or less significance (0.05) is significant

Data of Table (4) showed that non-significant correlation between most of the variables except of total time of achievement, since the Mean = (20.98) S.D= (1.74)  $r = (- 0.99)$  error rate = (0.00), Therefore, high adversely correlation were achieved i.e reduction of performance time lead to increasing of achievement(speed)where speed = Distance/time

### 3. DISCUSSIONS :

Where the technique freestyle requires that the body is horizontal on the abdomen so that the shoulders higher than the level of the seat which is located beneath the surface of the water immediately and the body is in free-swimming in the course of the hand and Afloat as much as possible (Hassan and others, 2006, 106.), must also reduce passive resistance along the introductions to the body by reducing the degree of the angle between the longitudinal axis of the body and the level of the water surface, note that the degree of this angle connecting distance to be accomplished ( Ayyash, 1989, 91) and confirms that Muhammad Ali that the fall of the two legs , which leads to increased resistance is one of the common mistakes swim free ( cat , 2000 ,113) , and this was clearly the existence of a significant positive correlation between the angle of the hip and achievement.

Where the technique freestyle requires to start one arm dragging with the staying of elbow enter straightly followed by flex of second arm Flexure and raise elbow Thus,when the arm enter water at a point in front of the body with parallel line to the longitudinal axis of body,The arm path horizontally and vertically toward the longitudinal axis of the body ( Ayyash, 1989 ,98), report confirmed that of the most common mistakes in the process of entering the arm to the water are attempting to enter the arm and the elbow , two high ( cat, 2000, 114). Thereafter,when one of the arms of stressed, the other arm inter to water with the shoulder extension ( pick- and others , 1998,60).

Left crank angle at the moment when right arm enter the water resulted Mean ( 50.35 ) , S.D = ( 39.52 )  $r = (- 0.11 )$  error rate = ( 0.009) at 5 F.D and Tabulator (  $r$  )=( 0.75) revealed that the arm movement in the water (s)shape ( Hassan and others , 2006, 111.). Ayyash, confirmed beginning of the dragging movement elbow joint form 120 degree whereas the angle of the forearm and the upper surface is up to 30 degree ( Ayyash , 1989, 95.). worthily, the most common mistakes in the arm movement at a moment of tensely and push is no ( cat , 1999 ,115.)

### 4. CONCLUSIONS :

- The absence of a significant correlation conclusions of some bio Kinematics variables caused by weakness in the sampling technique, since the sample included students of the fourth year not club players.
- Free-swimming need to extension of body through the hip , which correlated a significantly with achievement.
- 1- A significant correlation of elbow with achievement, this indicate necessity of arm's extending at a moment of entering the water for help to pull more water(achieve more distance).
- 2- Increasing of legs extending at a moment of entering right arm the water, lead to reduction of resistance on the body and thereafter, increase of achievement.
- 3- At the moment of entering the right arm in the water left arm must extend gradually beneath the water until reaches semi full extension beside the hip and this what a significant adverse correlation between left forearm and the horizontal line .
- 4- Less time increase.

### 5. REFERENCES:

1. Abdul Hamid, Joumana Mohammed (2009). the sport of swimming , 1st edition , Future Publishing House , Amman
2. Ali, Adel Abdul Basir (2004). Analysis bio kinematics of the movements of the human body
3. Ayyash , Faisal Rashid ( 1989 ) . The sport of swimming, the House of Wisdom, Baghdad.
4. Baik , Ali and others( 1998). Recent trends in learn to swim (crawl - back), Knowledge facility in Alexandria.
5. Cat, Muhammad Ali (1999). The scientific principles of the pool, the Arab Center for Publishing, Cairo.
6. Hassan, Mekdad Mr. Jaafar and others (2006). the modern Olympic swimming , Zaki Office for printing, Baghdad
7. Omar, Hussein Rahman Merdanoabd , Iyad ( 2011 ) . bio kinematics in athletic movements , Najaf Press
8. Samurai, Fouad Tawfik (1982). Bio kinematics, Baghdad.

### Annexes

#### 1-Track motor of center of mass

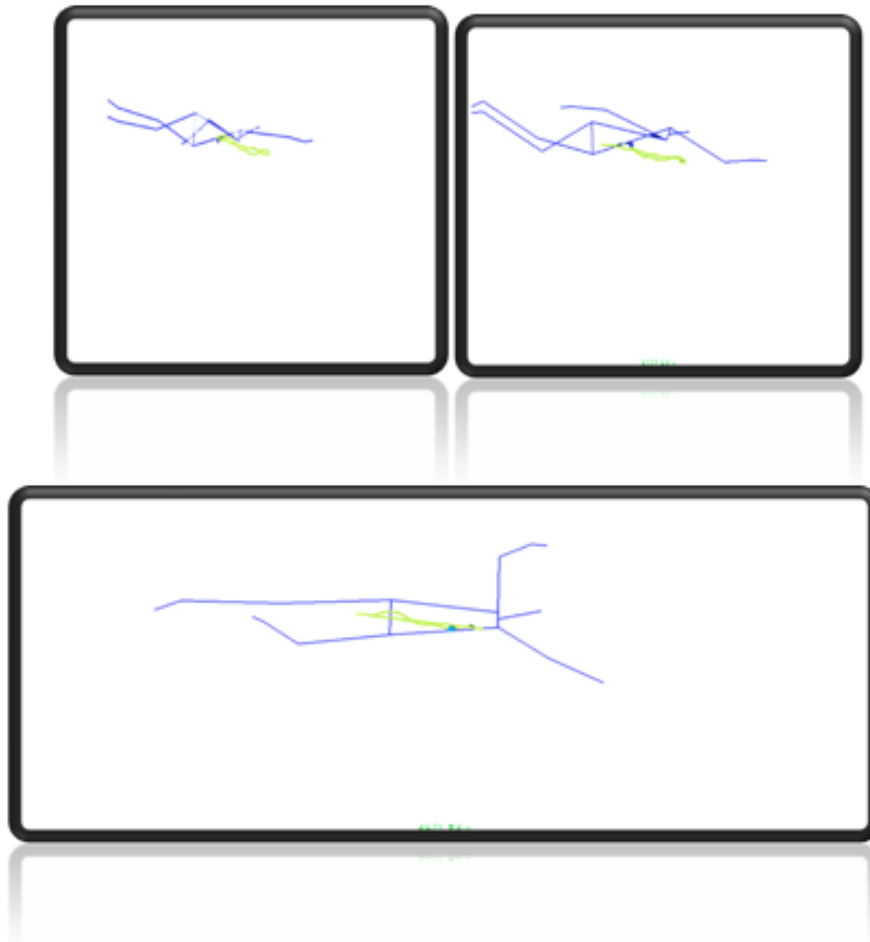


Figure -1-shows the path center of mass

#### 2-Track motor to hand

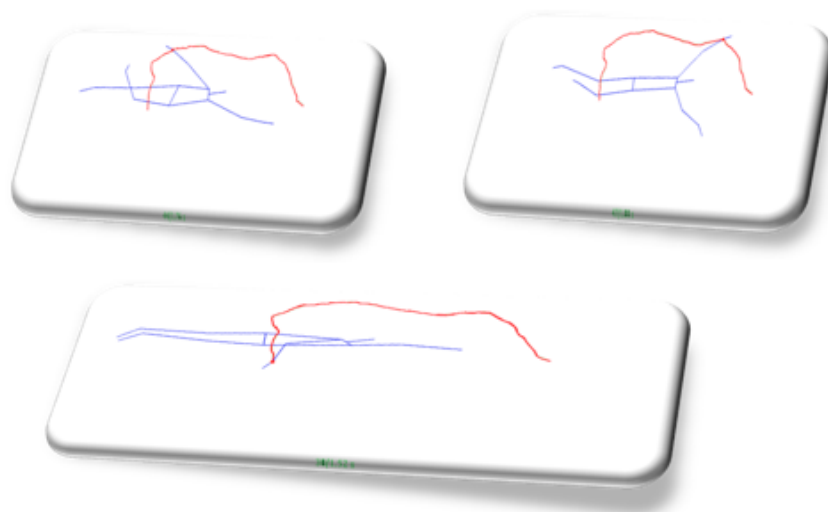


Figure -2- shows the path to hand