

**Selim Alili***Tetovo, Macedonia*

## **TECHNIQUE AND METHODOLOGY OF TRAINING IN SWIMMING CRAWL**

### **1. INTRODUCTION**

As a father of modern crawl is considered Australia. The main feature of this mode of swimming is that with every stroke by hands, is followed by a stroke down with the opposite leg which was bent in the knee joint. Today in the world, at the top swimmers in the disciplines of crawl, depending on the number of leg's movements on a hands' movements cycle are applied the following variants: double stroke, four stroke and six stroke technique of crawl. The crawl is the fastest discipline and therefore is a favorite way of swimming and watching. Intermittent movements by arms and legs also allow it to be the most economical, and is certainly considered that the crawl is a swimming foundation and if is mastered well, is also very easy and quick to master and other sports' swimming ways. At today's swimming competitions crawl is most common in the following disciplines: 100, 200 and 400 meters in men's and women's competition, 4x200 m crawl in men's and women's competition, and the last sections of the 4 x100m mixed relay, 200 and 400 meters mixed, individually in men's and women's competition. The most important process in the sports' training is the very training of non swimmers. The purpose of the training for non swimmers is to prepare the child for independent and safe staying in the water, the adoption of motor habits, aiming for the water to become a healthy and pleasant environment to the child. The methodology of training (learning) and the content of the process differ from author to author, from country to country, and is influenced by various factors as: the climate, economic and social life. Also the terminology of the training process for non swimmers is different, so for the same process we have a school for non swimmers and swimming training. The main similarity is that the training by the pedagogical process is a transfer of the skill of teachers towards students who are non swimmers in order to be prepared for independent and safe staying in the water. In sports, the training of non swimmers is one of the main segments of sports' techniques in swimming, because the swimmers learn the basic movements by any further movement of swimming disciplines.

### **2. HEAD AND BODY POSTURE**

Crawl uses a body which is completely stretched on the surface of the water, at a breaststroke swimming position and is close to the horizontal position. Most of the body, chest and shoulder girdle with the head lies higher above the water, while the smaller part, hips and legs are deeper positioned in the water. The head is turned facing in the water, and the chin is slightly away from the chest. The position of the body and head, are depended on the speed of swimming. If the speed is higher, the upper body

and head occupy a higher position, as is the case among the sprinters, and if speed is less, then the body is closer to the horizontal position, which is often found in swimmers of medium and long tracks. During swimming, the intermittent hand's movements cause slight but rhythmically turning left and right, around the longitudinal axis. This rotation is not harmful, rather helps the stroke to be performed by optimum trajectory and with minimal opposition to remove the hand from the water and be transferred through the air. The biggest turning body aside, occurs at the time of inhalation of air. The rotation character depends on the variant of the technique that is applied, as well as the individual characteristics, and decreases if the speed increases.

### **3. MOVEMENTS OF THE LEGS**

In modern versions of crawl, the leg's movements provide balance of the body, facilitating its proper posture and position, and have an important role in maintaining proper coordination. These movements are continuous and consecutive in direction up and down, and in fact represent a sequence of movements beginning in the hip joint, and then are successively transferred to the lower legs and feet. So when e.g. the lower leg and foot end down, the thigh starts a movement upwards, and vice versa. Each movement with one leg up and down can be divided conditionally into two phases: preparatory (up- down) and basic or propulsive (up-down).

#### **3.1. Preparatory phase**

At this stage, the leg perform down-up movements, and begins when the leg is completely straight and the foot is in the furthest, lowest position below the water surface. From that position till the longitudinal axis of the body, leg moves in relaxed and straight way, with the foot in maximum plantar flexion and turned inwards. When the leg moving up gets to the longitudinal axis of the body, begins to bends, first at the hip's joint at the same time the upper knee starts to move down, and bending at the knee joint, the lower leg's and foot's movement continues upward. The movement of the leg in the preparatory phase ends when the foot is stretched and bent inwards, occupies the highest position, but is still below the water surface.

#### **3.2. Propulsive phase**

At this stage, the leg performs up -down movement, and begins from the moment when the foot has reached the highest position below the water surface, when the angle that make up the thigh and the body is 165-170 degrees, and the angle that make up the thigh and lower leg is 130 - 140 degrees. At that point, the thigh is already moving down in the same direction pulling along the lower leg and foot. Followed by vigorously stretching of the leg in the knee joint, in which the lower leg and foot move back and down. The movement of the leg at the propulsive phase ends when the leg is completely straight at the knee joint , and the foot occupies the lowest position. In those moments the foot on the opposite leg is in the highest position. The footwork at the 'double stroke' and 'six stroke' variant of the crawl technique are rationally consistent, if in its movement up and down, with feet we pass around the longitudinal axis of

the body and when one is in the highest, the other should be located in the lowest position. In some variants of the ‘double stroke’ crawl, is not rare to find legs completely stretched and relaxed, performing easy movements up and down, while in others, these movements are performed strongly and vigorously especially in back down ones. In most variants of the ‘four stroke’ crawl, legs perform crossed movements and when one easily moves up, the other along the diagonal moves downwards and inwards, so that around the longitudinal axis they shortly cross each other. After a cross-stroke, the leg moves up and performs propulsive movement downwards. These crossed movements appear only when one swims in full coordination.

#### 4. HAND MOVEMENTS

Movements with hands in crawl are successive and uninterrupted, and a new stroke is transmitted through the air. The arms ‘movements are bearers of the main propulsion, while all other movements (legs, body and head), have secondary or helpers’ role. According to the work effects, the strokes by hands can be divided into two parts: basic or propulsive and preparatory or retropulsive. The propulsive part includes phases: intake, traction and pushing off the water, while in the retropulsive part are phases: hands’ getting in, getting out of the water and transferring the hand through the air.

##### 4.1. The hands’ getting in the water

A hand enters the water at a sharp angle, first the palm with outstretched fingers, and then successively forearm, elbow and upper arm, forward, in front of the head and around the longitudinal axis of the body or in the width of the shoulders. In addition, the palm is bent down and back, and some swimmers and little bit aside allowing to maintain the necessary high standing of the elbow joint. Entering of the hand in the water coincides with the rotation of the body around the longitudinal axis in the opposite side, which is caused by the completion of the stroke in the water with the opposite hand. So at the moment when the fingers touches the water, the slope of the body on the opposite side is about 10 - 30 degrees, and in the moment when the arm with the entire length is in the water, the slope was equal to 0 degrees. From the proper entry of the hand into the water are conditioned all subsequent stages, particularly those in propulsive part of the stroke.



##### 4.2. Water intake

With this phase starts the propulsive part of the stroke, in which after the hand with the entire length will enter the water, relies on it which provides a body balance and what is most important, ‘it requires water opposition’.



This stage is more visible in the ‘six stroke’ variant of crawl where the hand firstly is stretched at its maximum in the joint of the elbow, while at the ‘two stroke’ and ‘four stroke’ coordination, where there is no stretching of the hand, it is unremarkable. Then, the hand moves forward and down, while actively relies on the water.

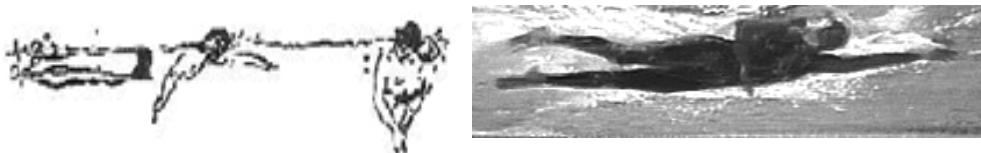
#### 4.3. Pulling water

Dragging the water is carried out with stress of the arm rolling (forearm and palm), inside and bending the joint of the elbow. During the towing, the palm and the forearm move down, inwards to the longitudinal axis of the body and back to the uniform bent trajectory. For the drag to be effectively carried out, it is necessary the palm and forearm to move faster than the elbow, which lags in the movement thus creating a so-called ‘active elbow’, unlike the so-called ‘passive elbow’, (when the elbow moves faster than the palm) which in turn prevents the efficient movement. This phase ends when the arm reaches an angle of 90 degrees towards the water surface, or below the line of shoulders.



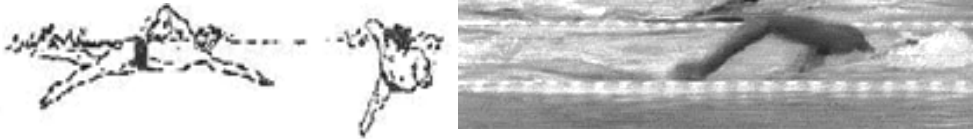
#### 4.4. Pushing off the water

The pushing off the water begins with vigorously stretching out the arm at the joint of the elbow, when it is sharpest and depending on the individual peculiarities and applied variant of crawl, ranges between 90 and 120 degrees. This means that the forearm and palm continue moving along a bent trajectory, under the body and pelvis, strongly pushing off the water by the palm’s getting away from the longitudinal axis of the body. The primary movement of the arm from the forward position towards back, is merged with moderate turning of the arm back and aside, which keeps the bent trajectory. At the core of this movement are involved the muscles of the shoulder girdle and the back, and at the end of the pushing off, also actively participate the extensors of the forearm.



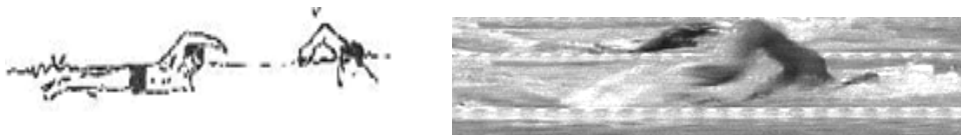
#### 4.5. Removing the arm from the water

It is necessary, the arm removal of the water to be performed with minimal opposition. First above the water appears the elbow and the palm is last to left the water, when it is turned facing palm upwards. The movement should be vigorous but without the stressed jolt, because it coincides with the upwards movement of the same side hip and turning the body on the opposite side.



#### 4.6. Transferring the hand over the water

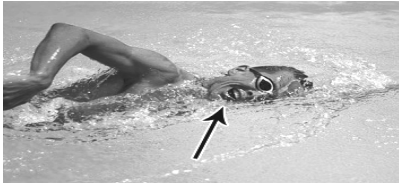
The transferring of the hand over the water is performed at the moment when the opposite arm is in the phase of capture and pulling the water and in a certain way helps its efficiency. The transfer must not be performed either very slow or very fast, but its speed should be gradually increased before the hand gets into the water.



The transferring of the hand over the water has many variants and depends on the variant of the technique of swimming, but the common feature of all modern varieties of crawl is that the arm is transferred with high standing the elbow's joint. In the 'six stroke' variant the arm is evenly transferred over the water forward, bent in the elbow's joint at angle of 80-100 degrees, with relaxed muscles of the arm and shoulder girdle, while the palm moves over the surface of the water near the body, and the elbow is almost over the body. In the 'double stroke' and 'four stroke', the arm over the water is transferred more vigorously, by a swing and from aside simultaneously and moderately arched and fixed in the elbow joint, which allows an entry of the hand in the water at a sharp angle.

#### 4.7. Breathing

Breathing is closely related to the arm's movements. Inhalation and exhalation of air is performed easily and not enforced as, inhalation through a wide open mouth and exhalation through the nose and mouth (more pronounced through the nose).

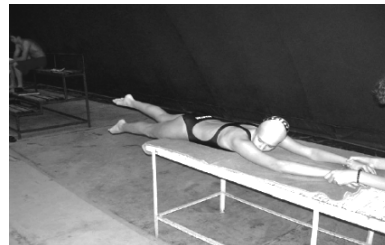
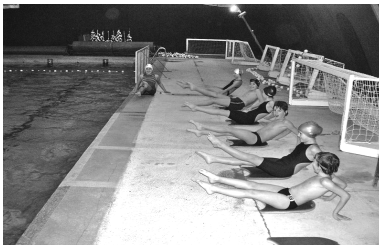


The head starts spinning aside when the opposite arm enters the water, and the inhalation of air is carried out when the other arm gets out of the water and is at the beginning of the arm's transmission through the air (actually at the side of this hand one does the inhalation). After the inhalation, in the second half of transferring hand through the air, the head along with the shoulder girdle, are steadily returning to the initial position, with the person's face in the water. Then after a little air retention, begins the air exhalation that must be even and continuous, until the next inhalation. On each full cycle with hands (right-left) is performed an inhalation and exhalation and then the inhalation is done only on one side, but swimmers usually breathe on both sides, and it is performed after each third stroke (cycle and a half).

## 5. FOOTWORK TRAINING DRILLS

On the land

1. In standing position, best on some elevated ground, make leg's back and forth movements, while the movement is made from the hip with the foot relaxed and curled inwards.
2. In sitting position in front of hands, legs are raised from the body and in that position make movements up and down.
3. Positioned on the breasts, preferably with free legs, in this position, make movements up and down.

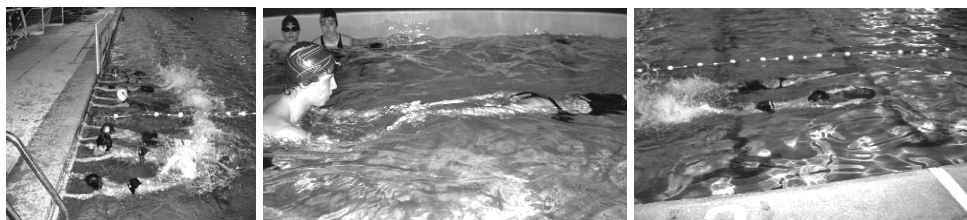


In the water

1. Attached with hands on the edge of the pool, in the chest position, with an eye on that feet should stay below the surface of the water. This exercise can be performed and associated with breathing (exhalation in the water)

2. The leg's movements using co-worker, who gets the hands of the person who makes the drill and easily moves back with and without breathing.

3. Movements with legs when the arms are outstretched and are accompanied with an utility instrument. The exercise is performed related to breathing.



### 5.1 Exercises for training the arm's movements

On the land

1. Make a bent and a small standing astride, make individual movements with the arms, then in the same position ,successive arm movements associated with inhalation imitation.

In the water

1. Standing on the bottom in small apart stance, make individual and then alternating arm movements, associated with breathing, and inhale at the moment when the arm gets out of the water.

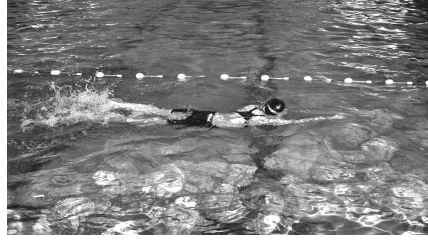
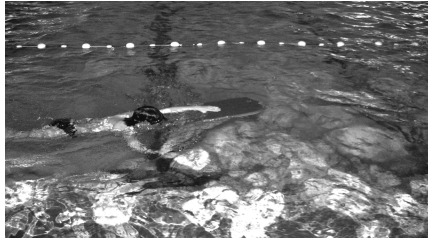
2. With the help of coworker that holds the legs of the one that exercises, make alternating hand movements associated with breathing.

3. Alternating arm movements associated with breathing, while the legs are fitted with a device which is between them.

### 5.2. Training exercises for coordination

1. With a device that is held by one hand, make alternating leg movements and individual arm movements, associated with breathing.

2. 'The arm awaits the arm'. This exercise is successfully played if after the push up from the bottom, first start with leg movements when the hands are extended forward with the face in the water. Then if you start with a right hand stroke at the end of the stroke take a breath, while in the meantime the left arm remains outstretched while the right arm gets into the water. After a brief pause, the same thing is repeated. In this exercise must not appear a footwork break.



### 5.3. Exercises for improving technique

1. Swimming in coordination with a little shovels on the hands and an instrument between the legs.

2. Swimming in coordination with pointed high elbow position when the hand is passed through the air and the hand's entering in the water at the shoulder's height. These rows are performed without retaining with emphasized push out.

3. Swimming near the pool's wall. Swimmer swims in the vicinity of the wall, so that when the swimmer passes the hand through the air, so to avoid a hit on the wall, must have a pointed bending of the arm at the elbow.



## 6. CONCLUSION

From everything stated above we can conclude that the crawl is the fastest discipline and therefore is a favorite way of swimming and watching on the big competitions. Intermittent movements with arms and legs allow it also to be the most economical, and crawl certainly is believed to be the foundation of swimming and if it is learned well, it is very easy and quickly to master all the other sports ways of swimming. Basically every discipline and technique in swimming is lying in a horizontal position on the surface of the water. We learned that the breathing technique of the crawl is most complex of all other techniques, but is not overly complicated for the children not to master. If one masters this difficult element, then there will be a positive transfer also in learning and acquiring the breathing techniques of other disciplines. As far as the functioning of the body's vital system, the crawl technique is most rational, because



in those conditions, and the child's body is most prepared for adoption of new motor knowledge and skills.

#### LITERATURE

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#### TECHNIQUE AND METHODOLOGY OF TRAINING IN SWIMMING CRAWL

*The paper shows the technique and methodology training crawl swimming. Developed: the position of the head and body, footwork, hand movements, exercises for training footwork training drills and exercises for improving coordination technique on dry land and in water. Stated that accomplishes this swimmer swimming technique allows fast and is the fastest discipline. Therefore we can say that it is a favorite way of swimming and a pleasure to watch on the big stage.*

**Key words:** *crawl technique, exercises, training.*