From Game to Aquatic Motor Patterns

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Abstract
The aim of this work is to analyze the main assumptions to be able to offer the sports didactics proposal at the base of any swimming discipline: the environment. Any athlete, especially if young, who approaches the aquatic environment for the first time, before embarking on a didactics path aimed at the correct execution of swimming styles or any other swimming sport, must go through the stage of the environment that will be the foundation for his/her training as an athlete.

Keywords: *Aquatic Environment, Swimming, Sport Teaching, Young Athlete.*

Introduction

The aquatic environment generates an impressive amount of completely new sensations while, at the same time, the usual and reassuring "solid ground" signals are missing. The sensorimotor system is overwhelmed by a large amount of unknown information and goes into "crisis". This situation confuses the beginners, sometimes frightens them, and determines the impossibility of controlling their movement; they lose consciousness of their gestures and, since they do not perceive them adequately, they can neither control nor regulate them. Very often, for example, a child is able to perform the movements of swimming correctly out of the water, while, once in the water, he/she cannot do it anymore. The regulation of movement occurs thanks to the information that from the senses reaches the brain, which uses it to plan and refine the gesture. In the water, this information is completely modified with respect to what happens on solid ground; therefore, the beginner does not have perception patterns and movement models to move, float and breathe in this new and unusual environment, and has great difficulty in developing the typical swimming gestures. The brain, however, is predisposed to learn: the student slowly perceives and recognizes the aquatic sensations and organizes them to achieve a new balance, to learn a new way of breathing and to build increasingly effective propulsive movements. The adaptation process, in addition to allowing the beginner to overcome any fear and to "feel good" in the water, has therefore the task of promoting a perception and motor restructuring, so that he/she recognizes and correctly uses the new aquatic information to develop swimming gestures.

1. Learning Aquatic Skills

The formation and refinement of specific sensorimotor skills (aquatic skills) is therefore a long and complex task, which can be hindered by sensations of discomfort and sometimes even by real psychological problems, such as the fear of water. Gradually, however, with the formation of aquatic sensory-perceptive schemes, which are real active systems of immediate gathering and cataloging of information received from contact with water, the subject increases his/her ability to "process" these new data. The "different and special" signals (tactile, kinesthetic and vestibular) coming from the body in the water are thus recognized. The most important sensations turn into perceptions, namely into mental representations that the student uses for building and regulating movement. A good adaptation consists in the acquisition of new broad and generalized "aquatic" skills, and represents the most important prerequisite for subsequent technical learning. Initially, in the water, we perceive our own

body and the surrounding environment in a global, indistinct and confused way, and then, step by step, it all becomes clearer and more detailed; only in this second stage the student is able to organize the nervous afferences to adequately build the movement. On solid ground, breathing is something instinctive, automatic and unconscious; thus, in the water, it must be relearned in a voluntary and conscious way, until becoming a real automatism: only then it can be easily included in the propulsive movements. Throughout the first phase of learning to swim, inspiration and expiration take place exclusively through the mouth (instead of the nose, or through the mouth-nose) and the duration of inspiration is shorter (about 1/3) compared to expiration, which must be forced to overcome the resistance of the liquid. As technical refinement progresses, the nose will also be used for expiration. The postural uncertainty, the sense of envelopment, the simultaneous flow of a large number of new sensory information, partly explain the fear of water and the sense of discomfort with it, which, however, generally disappears after repeated contacts made with games and exercises. The situation gets more complex when it is more than just discomfort with water, or fearful uncertainty about a new environment. When the fear is deeply rooted, because it stems from traumatic experiences lived directly or indirectly (from stories, behaviors and attitudes of significant people, or from other causes not always easily identifiable), it represents a very difficult obstacle to overcome. Adaptation to the new environment generally occurs naturally, by performing activities; gradually, in an implicit way, perception and motor functions are modified and adapted to the water. Although adaptation is a unique process, it is (Belloch et al, 2011):

- Physical-Sensory - intended as a general adaptation to the sensations produced by the new environment and, more specifically, as overcoming the discomfort with water (especially in relation to eyes and face) until a condition of well-being is achieved;
- Psychological - aimed at controlling generalized anxiety induced by a new and unfamiliar environment, or at overcoming the specific fear of water;
- Motor - based on the acquisition of a series of perception patterns and simple basic skills on which to subsequently build swimming techniques (water motor patterns).

In the first phase, adaptation has no specific technical purpose: it serves exclusively to develop sensory adjustments and to establish a comfortable relationship with the water. It is based on implicit accommodations, that is, on the ability to get used to this element through activities: "pure" games with children and dedicated exercises with young people and adults. Even with young people, however, the initial phase of this process should not be immediately aimed at acquiring the technical gestures of swimming.

2. Developing motor patterns in the water through playful experiences

In the case of children, the best adaptation is achieved by focusing each game on a specific objective. The child, while having fun, unconsciously makes the required adaptations; if there is a strong emotional involvement, he/she focuses on the game and not on his/her fears. In fact, fear itself is overcome with playful actions, and not with explanations. Almost without realizing it, he/she opens his/her eyes and mouth, dips into the water, and so on; in a second moment, he/she will be able to do the same things consciously and without difficulty. It is also essential that the child, when in contact with water, opens his/her eyes and quickly relaxes his/her face muscles. The sensory feedback from the relaxed face muscles reaches the brain, generating a feeling of well-being. After this sensory component (but also contemporaneously), the building of the motor component of adaptation can begin. It takes longer and is made possible by a better elaboration of aquatic information, and therefore by more developed specific sensory-perceptive abilities, which are the result of the adaptation process previously carried out. It consists in the acquisition of elementary structures of movement called aquatic motor patterns. Unlike the basic solid-ground patterns, they are not

natural and hereditary forms of movement, but are fundamental aquatic skills, initially acquired in a rough form through playing (therefore implicitly), and then consciously refined. The aquatic motor patterns represent the "bricks" with which the swimming techniques can be subsequently built; they are acquired partly already in the first phase of adaptation through implicit processes (game), and then they are refined and mastered explicitly and consciously (still through the game, but of a different nature). The aquatic motor patterns, real technical preliminaries, are: head submersion, eyes and mouth opening, acquisition of static and dynamic balance in prone and supine position (floating, sliding), relaxation, and breathing education in all its manifestations. Learning and improving them constitutes the motor phase of the adaptation, the final one, after which the student is effectively ready to learn the technique. Before addressing the didactic and methodological approach of the various techniques (styles) of swimming, it is appropriate to focus attention on two structural and fundamental aspects of this discipline, such as *floating* and *breathing*. The human body is lighter than water, and this allows it to float and slide on the surface; learning to float on the chest and on the back is the first step towards achieving the most advanced technical elements of swimming. The student must link the sensation of floating to that of relaxation, which is the essential prerequisite. Basically, after being learned in a playful form, floating must be brought to a good level of conscious perception and improved with the help of the instructor. This "implicit" form of floating must be turned into a conscious, controllable and improvable motor skill, based on the student's conscious ability to relax muscles and assume correct body positions. With respect to the floating position, rather than "position" of the body it would be appropriate to speak of balance in the water as it is not a matter of assuming a position, but it is a continuous search for the best balance, which is first static (floating), and then dynamic (sliding). When floating on the chest, the head naturally rests on the water, and the eyes look down at the bottom of the pool; the arms are up, naturally extended and relaxed, and the hands are relaxed. The neck and trunk muscles should not be stiff; the legs are stretched out, joined together and relaxed with the feet extended, and the heels should emerge from the water. The instructor's interventions are directed mainly to the position of the head and to the body and limbs relaxation. To correct the position of the head, usually held high, the instructor invites the student to look down (to "look at his/her belly or costume"), or "fixes" his/her head in the correct position with his/her hands. He or she may help the student relax and stretch correctly by means of touches, manipulations, slight tractions and "shakes" that help relax the affected areas. Until the student has achieved the correct fundamental prone floating position, first at the edge of the pool and then independently, it is not appropriate to proceed with technical instruction. The learning times are extremely variable and, in addition to age, depend on the fear of water as well. As for the learning process of the new breathing mode into the water, this happens slowly and goes through a first voluntary and conscious phase, which ends with the acquisition of the new automatism. This stage is quite long; the full availability of the breathing automatism (in terms of effectiveness and efficiency), required for being able to swim successfully, can rarely be achieved before 5/6 months of practice, and many subjective differences can occur. The duration of the inspiration time (taking in air) is shorter (about 1/3) than the expiration one (blowing). While the inspiration is "light" in order not to make difficult the subsequent and indispensable total emptying of the lungs, the expiration must be forced and very substantial, in order to overcome the resistance of the water and not to leave too much residual air in the lungs; inspiration and expiration take place only with the mouth. It is important to specify that the breathing automatism on solid ground (nose/mouth breathing, 1:1 rhythm) is innate, therefore is strongly stabilized, and has a powerful interference on the learning of "aquatic breathing". This requires a long process, which must begin from the first lesson and must aim at developing the "breathing rhythm". In fact, to breathe well does not

mean to "*blow bubbles*", but to set up a mouth-to-mouth inspiration/expiration ratio, which is continuous, well distributed (3:1) and free of interruptions (apneas) between the breathing acts. With the technical evolution, the expiration phase changes: it is enhanced with the intervention of the nasal passages.

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