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STUDY ON ATTRACTIVENESS AND EFFICIENCY OF SPECIFIC MEANS TO AQUAGYM AND AQUAFITNESS

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Abstract: *Aquagym and aquafitnes are very efficient ways to increase effort capacity, primarily due to unstable environment that requires an active participation of all muscle groups in an attempt to perform different movements for maintaining the balance and also because of exercising through superior physical indexes aiming amplitude, mobility, flexibility and strength.*

The complexity and attractiveness of these specific means to aquagym and aquafitness is completed by the beneficial effects of exercise, which led to the increase of the number of such programs, especially in the framework of carried out activities at swimming pools ,spas and rehabilitation centers. To boost the general physical condition, specific means adapted to aquatic environment can also be used such as: complex coordinated free exercises, flexibility, and some swimming exercises that besides the physiological effects, strengthen joints by increasing the muscle flexibility of the body.

Key words: *aquagym, means of action, attractiveness, efficiency, players.*

1. Introduction

Aquagym and aquafitness fit into the modern trends of physical exercise practice by combining various simple systems and adjusted complex to the positive environmental influences of the aquatic environment. The means used have beneficial effects on heart and cardiovascular system, as blood circulation is dynamized and blood vessels troubles regain their flexibility, considering that the human body submerged in water can lose up to 80% of its weight, the mechanical

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work done by specific means to aquafitness and aquagym is much more efficient and also improves respiratory capacity.

2. Theoretical Considerations

To increase the efficiency, the complexity and the attractiveness of the exercises, aquafitness uses a wide range of materials such as: different dumbbell weights starting from 1 kg palmweights of different forms that develop arm strength, ankle sand bags that develop leg muscles and increase endurance.

Also for lower body we can practise exercises used in athletics such as running and walking alternatives and jumping complex, with varied indices, using the water's resistance while moving, these exercises optimizing the physical effort.

To increase the general physical condition can also be used some specific means adapted to aquatic environment such as complex coordinated free exercises, flexibility, and swimming exercises that besides the physiological effects, strengthen joints increasing muscle flexibility of the entire body. Dosage and volume of specific means depend on: learning objectives, physiological peculiarities of performers, age, sex, and the effort difference will be given by the number of repetitions, the movement frequency and amplitude. The exercises can be done using water resistance and/or using different equipment and material that create overload, efficient in muscle growth.

The movements performed are similar to those practised with the free body, except that the water's resistance against it is much larger than the one created in the air which significantly increases muscle toning, the blood oxygenation and also the calories burning at a rapid pace. The lesson is based on a muscle warming up made after a series of movements which repeat the gymnastics movements of the free body (water walking, jumping) followed by free or objects complex exercises made to increase exercise capacity and ends with stretching or gymnastics exercises for body recovery after effort.

3. Material, method

Among force development procedures which can adapt to the aquafitness method we can mention the following:

- ***The process in the circuit*** is used both in physical education and in sports training; it involves alternative strain of the muscle groups at different stations. The circuit has an effect on both morpho-functional indices and on the cardiovascular system through an individualized work. The circuit is a variant of rigorous standardized work during which selected and combined exercises in a well-articulated structure are repeated in a constant or interrupted way. The exercises in the circuit are performed either on front or group activity and must be so arranged that they should not engage successively the muscles of same body segment.

Training circuit designed by Sova (1993) in the aquatic program activities is based on cardio workout, efficiently combining exercises for developing strength with

specific means to aerobics. Thus, on a single muscle group we generally work with materials and objects about 30-60 seconds, after which aerobic exercises are run between 1-3 minutes. After the aerobic interval we further act on other muscle groups etc, until all the targeted muscle groups are worked within a period of about 20-40 min.

- ***Plyometrical procedure*** includes a series of jumps and it is based on the mechanical work of the muscles in concentric-eccentric mode. The program begins with an easy type of exercise and advances with an exigent one. It can run the same type of jumps, initially at a certain pace and then increase it, or combined jumping with an emphasis on amplitude and frequency in a dose imposed by the coach. This type of training is mainly used for sportsmen who have a good physical condition and are keen on jumping.

After T.O.Bompa 2002, p323, the plyometrical movement is based on the intrinsic muscle stretch reflex. The main goal of the stretch reflex is to monitor the degree to which muscles can stretch and in order to prevent excessive stretching, as to achieve a leap requires a lot of force to propel the body upward. The plyometrical exercise is based on the rapid action of the body to reach the required force of the movement.

Plyometrical exercises engage complex neuronal mechanisms. The plyometrical training causes muscle and nerve changes that facilitate and improve the execution of more rapid and powerful movements. Force equals mass multiplied by acceleration F = mx a. A greater force is needed to decelerate the body faster and to shorten the damping phase, hence the derived equation: Average damping force = body mass x speed change / damping time.

This equation shows that sportsmen who want to achieve a short damping time must generate a higher average force. High-intensity pliometric exercises, such as depth jumps or counter movement determine a higher intramuscular tension /strain, which engage more neuromuscular units for the movement performance or for withstanding the attraction force.

- ***Stretching in water*** is another way to increase the exercise capacity that can be done in the aquatic environment with the same efficiency as on land. Aquastreching supposes the development of some techniques sets that aim to muscle stretching and promote joint mobility, enjoying the qualities of massage and hydrostatic pressure exerted by the aquatic environment, using traditional means of stretching. To improve the stretching program both passive and active techniques are used as well as the proprioceptive neuromuscular influence.

In aquafitnness and aquagym a wide range of means of action specific to sports and sports fields is used, some of which we believe are relevant:

Steps and walking variations in slightly shallow water are performed using a burdened abdominal belt and different walking versions at a fast enough pace to create the overload necessary to obtain the cardio-respiratory benefits. Using multiple

walking versions works all muscle groups of the lower body, which is higher due to relatively small water depth ranging from 1.10 - 1.30 m, which opposes resistance to a greater movement. Arms while walking can describe different movements.

Jogging in slightly shallow water - Sova (1993) defines this program which is based on specific running options and not only, with or without load, static or moving. The jogging program is done after a preliminary warming up and a cardio-respiratory adjustment and will be preceded by toning and stretching. Running in water with sand bags of different weights to the ankles; in this situation frequency is somewhat burdened, or low and in case of no burdened jogging, they may be required a varied tempo to optimize the effort.

Among running variants we can mention the following: normal, back, knees up, swinging the leg backwards, step jump, added step, cross step, sharpening back and forth, etc. Also practising athletics means we can use both the launched and the accelerated running in place and a certain distance. Specific swimming exercises tailored to aquagym include arm and leg exercises specific to swimming procedures and other customized exercises.

Aquafitness and aquagym's positive effects:

- increase exercise capacity by overcoming water resistance by specific means to fitness
- taking advantage of floating, the spine and joints relax
- reduction of gravity encourages muscle relaxation and neuromuscular axes are less excited
- the body weight is reduced
- the muscles are toned without the risks of injuries or of bad posture
- improve the balance perception
- muscle suppleness/flexibility growth
- quantitative reduction of lactic acid that accumulates after intense aerobic workouts
- stimulate blood flow and increase respiratory capacity
- effectively train the cardiovascular system, involving all the muscles in movement
- mental relaxation due to water "placebo" effect
- exercises done in water with the same intensity as those done on the ground consume 1 to 2 kcal / min plus (Darby and Yaekle, 2000)
- hydrostatic pressure acting on the joints which they stabilize
- water massage that is performed on the body has a refreshing and relaxing effect.

Features of specific effort to aquafitness exercises

Heart rate in water Heart (FCL) (Carlos J. Sanchez Colado, J. Vidal, J. Antonio Moreno Murcia, 2000). Heart rate in water is considered a very important indicator of effort, supplemented by the maximum volume of oxygen values, indicate the level of aerobic force, they can also be used interchangeably. This assessment is very complex and in some places is made by specialists in medicine (Edward 1996).

In the aquatic environment different physical conditions are present, compared with terrestrial ones, because it is known that performing the same exercise in water

with the same parametres, produces a decrease in heart rate work.

Studies in this regard and the evidence of this are not very conclusive, there are some theories quoted by Sova (1993) which justify the change in heart rate through the following: heat dissipation, partial pressure, gravitation, diving reflex. There is research showing that the beneficial effects obtained through water training are comparable with those obtained in terrestrial exercises (Hoeges et al 1992; Mender 1995 and Chossek Windhorst 1988). Many authors have measured heart rate reduction results in the aquatic environment, between 17 p / m (Windhorst and Chossek 1988) and 10 p / m (Hoeger et al 1992), including Linde (1989) who found that the biological benefits were similar when FC in water was 13% lower than on land.

Therefore to obtain an optimal zone of activity in aquatic environment FC effort exercise must be 10.17 p / m lower.

For a correct approach to the type and amount of aerobic exercises, we use "an area of work or working heart rate range" (Sova 1993, Edward 1996), between 60-90% of the maximum heart rate index (ICM) of a person (Mark 1990).

To determine this area of activity the Karvoven formula is used:

FCL =% mechanical work intensity/100x (ICM - resting FC) + FC at rest.

ICM is equal to 220 - the performer's age and FC at rest, they should be tested under rest conditions.

Effort Index (EEP), is considered the most obvious indicator of the effort intensity, it is his own perception that the subject has of it, (Sova 1993, Edward 1996).

Table No. 1.

EEP effort indices in the aquatic environment (adapted from Borg and Harre 1998)

Effort FC	**Selfperception**	**% VO2 Max**
70 p/m	very, very low intensity training	25%
90 p/m	very low training	30%
110 p/m	Low enough	40%
130 p/m	Almost intensive	50%
150 p/m	Intensive	75%
170 p/m	Very intensivee	anaerob
190 p/m	Very, very intensive	collapse

In conclusion, in aquatic activities the effort is properly ranging between "somewhat intensive/hard- intensive/ hard" that is between 130-150 pulse / min.

Respiratory heart rate (Colado Carlos J. Sanchez, J. Vidal, J. Antonio Moreno Murcia, 2000). This indicates orientatively the intensity of the exerted effort, because before exercising more intensively a stronger ventilation is needed in order to meet the demand for O2 completely. It matters how many times one inspires in a minute or in fractions of it, in association with FC at that moment to know the degree of intensity and the length of time to work.

Normally the breathing rate and quality are observed, which can give a clear reference to the level of effort of the performer; it must be continuous, slightly faster than the one made at rest, which indicates that the intensity maintained during aerobic exercises is adequate.

4. The aim and hypothesis of the study

The aim of the study was to assess the attractiveness and efficiency of specific means to aquafitness and aquagym.

The hypothesis of the study started from the assumption that the efficiency of specific means to aquafitness and aquagym depend on the attractiveness degree.

5. Organizing research

The study was conducted at the Olympic swimming pool in Brasov, in the beginners pool which is between 1.10 to 1, 30m deep, with a 20 m long and 10m wide. The study subjects consisted of a total of 36 players, junior I and junior II handball team junior club of the Golden Kids Brasov.

The period during which the study was conducted was September 2010 - December 2010.

In the study we used the questionnaire method, which aimed to identify the order, the classification of the means used in aquafitness and aquagym lessons according to the attractiveness and the efficiency . The evaluation consisted of providing 1-10 points depending on preference, attractiveness and efficiency of key processes and specific methods to aquagym and aquafitness

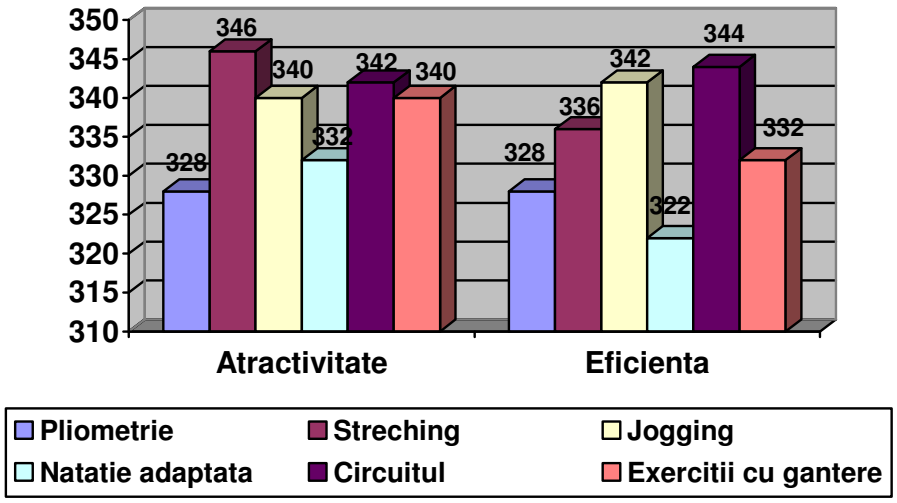
6. Results of the study

Table No.2

Centralization of the study results

Methodological procedures	Attractiveness Degree	Efficiency degree
Plyometrics	328	328
Streching	346	336
Jogging	340	342
Tailored swimming	332	322
Circuit	342	344
Dumbbells exercises	340	332

Chart no.1 The results on the attractiveness of methodical processes specific to aquagym



6. Conclusions

The research hypothesis was confirmed. The sample group of subjects homogeneously assessed the attractiveness degree of specific means action in aquafitness and aquagym according to their efficiency.

The most attractive exercises were considered those specific to stretching, jogging, swimming tailored and dumbbells exercises, and the least attractive were the plyometrical ones and those organized under the form of circuits.

Regarding the degree of efficiency, the study sample group components found that the high efficiency exercises are those specific to jogging and those organized as circuits, and the low efficiency exercises were considered those adapted from swimming.

The study results allow a reconsideration of the contents of aquagym and aquafitness programs, where an important role will be to take into account the subjects' preferences, their needs and the degree of efficiency depending on the peculiarities of each group of subjects.

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