

# ASSIGNMENT OF USEFULNESS OF PHYSIOTHERAPY APPLIED TO SPORTS TRAINING IN THE CASE OF SZCZECIN SWIMMERS

Wioletta Łubkowska,<sup>1, A, B, C, D, E</sup> Jerzy Troszczyński,<sup>1, A, B</sup>  
Elżbieta Sieńko-Awierianów<sup>1, C, D, E</sup>

<sup>1</sup> Faculty of Physical Culture and Health Promotion, Szczecin University, Poland

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## Address for correspondence:

Wioletta Łubkowska PhD

Szczecin University, Faculty of Physical Culture and Health Promotion

Al. Piastów 40B, building 6, 71-065 Szczecin, Poland

E-mail: wioletta.lubkowska@univ.szczecin.pl

**Abstract.** The aim of this article is to make the assessment of physiotherapy use in the case of swimmers' regeneration. A diagnostic survey was used as the method. Opinions from the author's survey were considered and there were 30 high-class swimmers analyzed aged 15–27. The research was conducted in 2012 at the Floating Arena swimming pool in Szczecin.

100% of the surveyed swimmers benefit from regeneration after physical effort. The most common physiotherapist treatment in case of swimmers is dry classic massage – 86.7%. The water bath (63.3%), sauna bath (56.7%), whirl bath (53.3%), water jets/Scotch douche (43.3%) and hydro massages (30%) are the most common types of hydrotherapy. On the other hand, ultrasounds and cryotherapy are the least common treatments when choosing adequate types of regeneration, i.e. respectively 13.3% and 3.3%.

The biggest amount of massages is performed shortly before start – 40%. Massage in 60% cases lasts 10 minutes. In 90% of the surveyed group partial massage is being applied, whereas only 3.3% of competitors take the overall massage. In case of 80% of the swimmers, massage is regarded as completely relaxing. For 77% of them it relaxes both physically and mentally. In case of 80% of the surveyed, it is regarded as the most efficient form of biological regeneration. 60% of swimmers say it is helpful to maintain readiness to start and to overcome fever (feeling of annoyance) or apathy.

**Key words:** swimming, regeneration, physiotherapy, sport massage

## Introduction

Labour of contestants which is performed during trainings often exceeds the possibilities of a sportsman's organism. Fatigue is regarded as a state of organism which is developed during performance of physical work as well as intellectual work, and is characterized by decreased ability to work, as well as increased feeling of arduousness caused by effort and weakened ability to continue work (motivation). In case when the stable efficiency is kept, it is always accompanied by increased "physiological cost" (Kućński 2003).

Exceeded fatigue is a common complaint within hard-training sportsmen. The most probable reasons for it are: overtraining, virus diseases, digestion disturbances (not sufficient amount of carbohydrate, proteins, iron deficiency), not sufficient amount of sleep, psychological problems (among them: anxiety, depression, apathy, demotivation, irritability, inability to relax). They may result from a sportsman's ambitions or from any other sources (Brunken and Khan 2011). Overlapping of the syndromes of overtraining and Chronic Fatigue Syndrome is a certain problem (Shephard 2001; Pawlak 2013). It cannot be excluded that, in both cases, a neurotransmitter causes fatigue of the central nervous system.

In swimming as a sports discipline, the swimmer may face additional obstacles such as water resistance or water wave raised by other competitors (Łubkowska et al. 2014). The crucial matter from the point of view of bio-mechanics of swimming is the labor of both upper and lower limbs (Troup 1999). The treatment of over-trained swimmers discovered shortage of glycogen in skeleton muscles (Costill et al. 1988). General mood disturbances (anxiety, depression) examined by Mood States Profile (PSN) showed higher scores in case of overtrained swimmers (Hooper et al. 1997), as well as in case of those swimmers who accomplished a phase of intensive trainings without any symptoms of overtraining (O'Connor et al. 1991; Morgan et al. 1988).

Modernizing of training methods and introducing still bigger training burdens justify the introduction of new ways of fatigue reduction. This is secured basically by biological regeneration and specific therapeutic procedures which constitute it.

Properly applied regeneration with sportsmen gives a chance to lessen the negative results of fatigue, gives a chance to prepare for next trainings (Skalska-Izdebska et al. 2012), and prevents from sports injury.

The aim of this paper is to make the assessment of usefulness of regeneration resources applied to sports training based on the opinions of Szczecin swimmers. To achieve the aim of this article, the following research problems have been formulated:

1. What is the opinion of Szczecin swimmers on applying regeneration resources?
2. What is the influence of applied regeneration resources on sports results achieved by the competitors?

## Methods

Scientific research has been conducted in accordance with good scientific practice and ethical principles in scientific research and Higher Education (Kruk 2013).

In order to recognize investigated phenomenon and achieve fully objective range of results, the author used diagnostic survey method. The following techniques of investigation were used: analysis of documents (training diaries), observations of applied methods and resources of regeneration, interviews (conversation with two main coaches based on previously prepared questionnaire with 20 open questions), and inquiry questionnaire including 40 questions both open and closed. The questions concerned, among others, the following issues:

- sex, age, address, education level, financial status of responders,
- style of swimming, duration of trainings in years, amount of trainings daily and weekly, most significant achievements in competitors' careers, which parts of muscles are mostly overloaded,
- methods and resources of regeneration, availability, time applied, duration, frequency of applied particular methods of regeneration, methods and resources,
- pointing at certain applied methods which can help to relax the body,

- influence of applied means of regeneration on sport achievements of competitors, on reduction of tiredness, on keeping readiness to start, etc,
- usefulness of applied means of regeneration in opinion of surveyed persons,
- injuries and their types, applied regeneration after sustaining an injury.

The research was conducted with a conceptual phase in 2012. In the first stage of the investigations, the analysis of documents as well as participating observation and interviews with main trainers were made. The second stage comprised of survey research. The research covered 30 Szczecin's high-rank sports swimmers (15 women and 5 men) whose training program included regeneration. They were high-rank competitors (Olympic team competitors, national and regional team representatives) aged 15–27. Underage competitors have had parental consent for choosing regeneration methods and resources. Out of them, 23.3% (15–16 years old), 50% between 17–18 years old, 16.7% 19–20 year-olds, and the oldest competitors over 21 years old, comprised 10% of all interviewed persons. The most numerous of competitors were the youngest group between 6–10 years old – 63.4%, and 30% were between 11–15, although the least represented group was between 0 and 5 as well as over 15.

The main sports facility where the research was taken was a newly-built The Floating Arena Szczecin. It is regarded as the only facility in Poland which enables both training and regeneration complex care of competitors (Florkiewicz et al. 2011).

Surveyed competitors were training two times daily. The statistical methods were used to work out percentage specification in the paper, as well as relations between sexes and the way of applying regeneration used by competitors.

## Results

On the basis of the percentage specification analysis it is visible that 100% of swimmers benefit from bio-regeneration therapy after the physical effort. Figure 1 shows types of physical regeneration treatments which are used by Szczecin swimmers. The most common physiotherapist treatment in case of swimmers is dry classic massage – 86.7%. The water bath (63.3%), sauna bath (56.7%), whirl bath (53.3%), water jets/Scotch douche (43.3%) and hydro massages (30%) are the most common types of hydrotherapy. On the other hand, ultrasounds

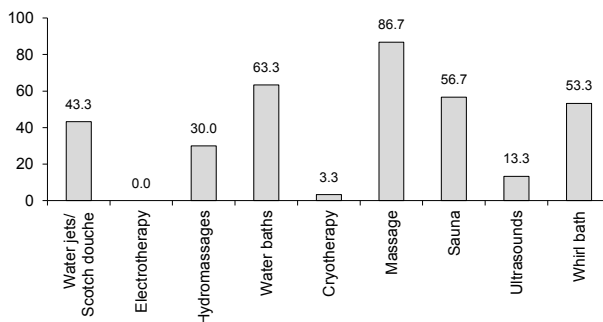


Figure 1. Physical-therapeutic treatment used during bio-regeneration procedures with Szczecin swimmers (%)

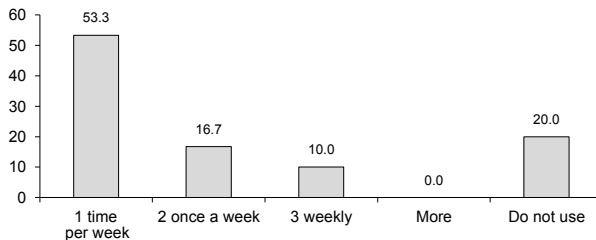
and cryotherapy are the least common treatments when choosing adequate types of regeneration, i.e. respectively 13.3% and 3.3%. In none of the cases was electrotherapy, aromatherapy, phitotherapy, barometric and magnetic massage used. No relation was found between sex of interviewees and kind of regeneration which they apply after physical effort. The most used therapeutic methods between swimmers of both sexes were massages and various hydro baths.

While analyzing availability of bio-regeneration procedures it was found that 73.3% of contestants consider massage as the most available procedure of bio-regeneration, though the rest of contestants pointed to sauna.

60% of responders say that they use massage once a week, 30% use it twice a week, only 3.3% state they benefit from it more often. There was no relevant relation found between the sex of interviewees and frequency of applying regeneration. However it may be observed that men apply more massages twice a week and more than three times a week (by %). Differences between sexes are not statistically important.

Massage in 60% cases lasts 10 minutes. In 90% of the surveyed the partial massage is applied, whereas only 3.3% of competitors take the overall massage. The biggest amount of massages is performed shortly before the start – 40%, during trainings – 33.3% and before competitions – 20%.

Figure 2 shows the usage of different water procedures by contestants: 53,3% of swimmers take part in such treatment once a week, 16,7% – twice a week, 10% – three times a week. Duration time of such water treatment for 60% of responders is 20 minutes, 10% use water baths for 10 minutes and 30 minutes.



**Figure 2.** Frequency of use of water treatment procedures during the week with Szczecin swimmers (%)

In case of 80% of swimmers, massage is considered a procedure completely relaxing and reducing fatigue after training, although 20% of the contestants do not consider it as relaxing. For 77% of them it relaxes both physically and mentally. In case of 80% of the responders massage is regarded as the best efficient form of bio-regeneration treatment. 60% of swimmers consider massage to be helpful in maintaining readiness to start, and helping to overcome fever (feeling of annoyance) or apathy.

Relation between sexes and the opinion that massages are most successful forms of regeneration is not statistically relevant. However, the differences in answers between sexes have been noticed. In case of male swimmers – (66.7%) say that massage is a kind of regeneration which quickly removes tiredness.

Only 37% of swimmers say that massages affect their sports achievements. No significant relation was found between sexes of the surveyed and the influence of massage on sports achievements. Though it may be stated that in case of women more than 46.7% regard massage as important for sports achievements. In case of men - respectively 26.7% share this opinion.

## Discussion

At present, competitive sport seeks for new solutions to achieve best results. Effective performance of a sportsman at the competitions depends mostly on the right selection and realization of training burdens (Kalczyński et al. 2006; Łubkowska and Troszczyński 2011; Siewierski et al. 2006). A success is conditioned, among other things, by the morphological structure of competitors. For this cause, their somatic features should be taken into consideration in the selection process (Pietraszewska and Jakubowski 2013). Łubkowska and Troszczyński (2013) return attention to the substantive quality of the intake and selection of swimmers. In the selection, it is necessary to take such physiologic rates as  $VO_2\text{max}$  or  $VO_2/\text{HR}$  into consideration. Role of bio-regeneration becomes more and more important. The same situation is in swimming, where junior age is under 18 years old and from 19 on we can speak about the young or senior age. Full burden is used with senior swimmers (Łubkowska and Troszczyński 2006). In this group of swimmers the overburden may occur because their training is based on specialized training. It is a restricted form of movement, similar in form to a start. Capacity of swimming covers even 20 kilometers daily (in certain periods). Realization of subsequent tasks is not possible without systematic bio-regeneration treatment of which main form is massage.

In a group of younger swimmers the trainings held are more comprehensive and directed. The burdens used do not result with overburdening of movement apparatus. On the next day, the competitor is able to perform new training tasks, of which intensity and capacity is significantly smaller than in a senior group.

Thanks to complex combination of training and biological regeneration treatment we can control better a course of training cycle, and what is most important, we can influence the improvement of achieved results (Zimmer 2004). The research among Szczecin swimmers showed that according to 63% of surveyed competitors massage does not influence their achieved sports results. Average opinion of competitors on the role and significance of massage in swimming competitors training leans onto the younger group (up to 18), which made up 73.3% of the surveyed total. This group did not have such necessity to benefit from regeneration treatment as most of the younger contestants did not mention these kind of procedures.

Hydrotherapy and massages are the most common ways of regeneration treatment (Gieremek and Dec 2007). The research showed that in the case of Szczecin swimmers also these physical therapy procedures of regeneration are the most common.

In specialists literature one can find only a few works concerning the process of bio-regeneration in swimmers, however, its positive psychological effect was observed (Hemmings et al. 2000; Robertson et al. 2004). In Starosta's opinion, an intensive massage (striking, patting, fast flattening) increases and calm massage (chafing, slow stroking) decreases stimulation of the nervous system. Their effects may be observed in a long-term application of massages.

The study of Szczecin swimmers confirmed the effectiveness of massage in the process of bio-regeneration treatment – 80% stated that massage is a procedure that relaxes them completely. The Szczecin swimmers club has one full-time employed masseur. First served are the elderly, with higher starting level competitors. The research shows that the habit of benefiting from bio-regeneration procedures should be introduced as early as possible. The ability to use the most simple regeneration procedures such as showers and various baths should be of focus among younger group of swimmers. Such exemplary model of usage of therapeutic water procedures during bio-regeneration in training microcycle with swimmers was suggested by Kipke (1985). These elements (simple means of bio-regeneration process) are cheap and at the same time very effective, and they can support the training process.

## Conclusions

Based on the collected research material, the preventive hints concerning training of swimming competitors were suggested. Rationally planned training should include the time for regeneration. It is necessary to use the broad choice of regeneration procedures. A great deal of regeneration means and procedures are not fully used in swimming. Among these methods and means there are very simple and effective ones, not burdening financially and not requiring any additional apparatus. Simple water regeneration procedures like showers and baths may be such examples. Contrast showers, warmth variable, may be applied before the training to stimulate mentally and after the training as a rain shower to reduce muscle tension. Such therapy may have a positive effect on the trainee both in physical and mental aspect. Similarly, we can use warm baths (34–37°C), which can be applied in a swimming pool with warm water and in the home bath in the evening. They give many possibilities to influence swimmer's body (relaxing the muscles, calming down the nervous system) with relatively low costs and power. Similar effects are also obtained with aromatherapy and phytotherapy. The habit of applying regeneration procedures should begin as early as possible. It will be possible after the theoretical preparation of young competitors, included in general training. High effectiveness of training process is not possible without high intellectual competitor's effort. A coach in his pedagogical activity should consider a theoretical plan of competitors' preparation.

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