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Methods of supporting training and post-exercise recovery in women practising fitness and men practising bodybuilding

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Abstract

Introduction. The aim of this study was to characterize physiotherapeutic methods applied in supporting training and biological regeneration of amateur athletes (women practising fitness and men practising bodybuilding).

Materials and methods. 115 participated in the survey, 45 women practising fitness and 70 men practising bodybuilding. The author's survey constituted the study tool. Differences were calculated using the chi-squared and t-Student test for independent groups, assuming $p \leq 0.05$ as the minimum significance level.

Results. Regular use of physiotherapy treatments supporting trainings and post-exercise regeneration was declared by 48 (42%) of the studied athletes (44% women 40% men). Regular perform of stretching exercises was declared by The most frequently used treatment indicated by women and men was sauna. Regular perform of stretching exercises after training was declared by 68 (59%) of the studied people. The most examined amateur athletes (66%) declared using diet supplementary (51% women and 75% men). The most frequently used dietary supplement were vitamins and minerals in women and proteins in men

Conclusions. Less than 50% examined amateur athletes use physiotherapeutic support of training regularly. Application of physiotherapeutic support of training in amateur sports should be promoted by coaches, physiotherapist and medical staff. The most frequently used physiotherapeutic treatments are the ones which are easily accessible (sauna, massage). Nonetheless, their effectiveness has been scientifically proven.

Keywords: post-exercise recovery, amateur athletes, dietary supplementation, massage, sauna

Introduction

Physical effort causes numerous changes in muscular tissue. They include among others fatigue,

damages to muscle fibers, inflammatory changes, pain during physical effort, as well as after it [1-4]. Physical fatigue of muscles is a physiological defensive reaction of the body, preventing muscular cell damage and formation of harmful products of metabolism. Reasons for fatigue depend on intensity and duration of physical effort. They can be divided into two groups: muscular (peripheral fatigue) and depending on the central nervous system (central fatigue) [1, 5, 6].

There are practical means of pedagogical, psychological and biomedical influence used in the biological renovation. They have a very broad spectrum of activity. The most numerous and diverse group are physiotherapeutic treatments [7-11]. Their selection cannot be accidental. The planning and programming of the biological renovation should be individualised and well-thought-out. It should be suited for the training cycle, coordinated with the realized training, and supplement it while preparing to the start in a competition [5, 6, 12]

Bodily injuries are an undesirable effect of sports or health training, may be a result of immediate sports competition, excessive bodily effort, improperly performed training or the lack of optimal post-exercise recovery [1]. Injuries may therefore be due to excessive strain, willingness to obtain the best results, mismatch between training intensity and age and health status of players or a too early return to training after a contracted injury. Another factors influencing bodily injuries include inaccurate warm-up (or the lack thereof), incorrect performance of exercises or their excessive difficulty, lack of protection, faulty sports equipment, facilities inaccurate to the exigencies of training performed, atmospheric conditions or behaviour of supporters [13-15].

The aim of this study was to present the methods of supporting sports training in amateur sportsmen – women practising fitness and men practising bodybuilding.

Material and methods

The study involved 115 volunteer aged eighteen to thirty-five. There were 45 women and 70 men. The survey was conducted on members of Warsaw fitness clubs. Women attended in fitness classes (aerobic, step-aerobic, fat-burning). Men practised strength training (bodybuilding method). Detailed biometric characteristics are presented in Table 1. On the basis of an initial interview, persons in good current health and minimum one-year training experience were qualified.

Table 1. Characteristics of examined people

Group	Age [years]	Body mass [kg]	Body height [cm]	BMI [kg/m ²]	Training experience [years]	Frequency of sessions [n/week]
Women (n=45)	26.29 ±4.74	59.98 ±5.91	166.40 ±4.15	21.67 ±2.04	2.38 ±1.98	2.64 ±1.05
Men (n=70)	25.54 ±4.96	87.66 ±12.94	179.24 ±6.61	26.97 ±3.57	4.92 ±3.32	3.38 ±0.63

The author's survey constituted the study tool. The first part included biometric data and the implemented training. The second part – the type and frequency of applied treatment and complementary exercises, post-exercise regeneration, number and characteristics of injuries and consequences of potential injuries [16].

Standard statistical tools were used to develop the study – an arithmetic mean and standard deviations. Dependencies between features were determined using the Pearson correlation. Differences between particular data were calculated using the chi-squared and t-Student tests

for independent groups. The minimum significance level was assumed at the level of $p \leq 0.05$. The calculations were made in MS Excel and Statistica 10 software.

Results

Regular use of physiotherapeutic treatments supporting training and post-exercise recovery was declared by 48 (42%) of the studied people (44% women, 40% men) (Table 2). The most frequently used treatment indicated by women and men was sauna. Among the people using physiotherapeutic treatments 80% women and 88% men declared a regular use of the Finnish or Roman sauna. The second most frequently applied method was supplementary (compensation) exercises and massage (classic, Swedish). The hydromassage and cryotherapy (cryostimulation) were used less frequently. There were no significant differences between women and men in the types of physiotherapeutic methods (Table 3).

The most examined amateur athletes (66%) declared using diet supplementary (51% women and 75% men). The most frequently used dietary supplement were vitamins and minerals in women and proteins in men (Table 4). There were significant differences between women and men in the types of dietary supplements using to support sports training.

Regular perform of stretching exercises after training was declared by 68 (59%) of the studied amateur athletes (71% women, 51% men), but only 44 (38%) people do stretching after all sessions (Table 5).

Table 2. Using the methods supporting sports training

Group	Physiotherapeutic methods	Dietary supplementation
Women (n=45)	20 (44%)	23 (51%)
Men (n=70)	28 (40%)	53 (75%)

Table 3. Types of physiotherapeutic methods

Group	Sauna	Supplementary exercises	Massage	Hydromassage	Cryotherapy
Women (n=20)	16 (80%)	13 (65%)	8 (40%)	2 (10%)	0
Men (n=28)	25 (89%)	11 (39%)	12 (43%)	3 (11%)	6 (21%)
Chi-square Test	$\chi^2 = 8.08; p = 0.087$				

Table 4. Types of dietary supplements

Group	Proteins	Carbohydrates	Vitamins and minerals	Others
Women (n=23)	8 (35%)	8 (35%)	22 (96%)	1 (4%)
Men (n=53)	43 (81%)	27 (51%)	13 (25%)	15 (28%)
Chi-square Test	$\chi^2 = 28.06; p < 0.001$			

Table 5. Frequency of stretching exercises

Group	Stretching exercises – occasionally	Stretching exercises after all sessions
Women (n=45)	32 (71%)	23 (51%)
Men (n=70)	36 (51%)	21 (30%)

Almost half of examined people declared almost one injury connected with sport (46%) and chronic pain in the musculoskeletal system (49%). Injuries and pain more often concerned men than women (Table 6). Men declared more injuries per person, but women declared longer treatment time. The differences were not significant (Table 7).

Table 6. Occurrence of injuries and chronic pain

Group	Injuries	Chronic pain
Women (n=45)	14 (31%)	13 (29%)
Men (n=70)	39 (56%)	44 (62%)

Table 7. Number of injuries and treatment time

Group	Number of injuries [per person]	Injury treatment time [month]
Women (n=45)	0.71 ±1.24	3.82 ±1.65
Men (n=70)	1.06 ±0.78	3.17 ±2.22
differences	NS	NS

NS – non significant

Discomfort or pain during exercises were declared by 58% injured person. Discomfort or pain during everyday activities were declared by 23% injured athletes. These ailments concerned more often women than men (Table 8).

Table 8. Consequences of injuries

Group	Discomfort / pain during exercise	Discomfort / pain everyday
Women (n=14)	10 (71%)	4 (29%)
Men (n=39)	21 (54%)	8 (28%)

Discussion

In modern sport (professional and amateur) the objective of biological regeneration is restoring psychophysical efficiency of athletes through cooperation with the training program, optimization of resting processes, prevention and decreasing consequences musculoskeletal injuries, as well as assisting in post-traumatic rehabilitation [13-15]. Cooperation with the training program is manifested by formulation of a special set of measures constituting biological regeneration (educational, psychological, medical and biological) and physiotherapeutic treatments which complement the training process [5, 6, 17].

The assessment of effects of various forms of physiotherapeutic methods in supporting training and post-exercise regeneration is an issue frequently discussed in scientific literature. The physiotherapeutic treatment most frequently used by examined athletes was sauna. It was listed as one of the most common treatment of biological regeneration. According to some authors using the Finnish sauna increases capacity for physical work and improves human psychoemotional possibilities [18, 19]. Effects of sauna were studied among athletes. It was proven that using a sauna after training decreases and delays fatigue [17]. Tyka et al. [20] argued that regular treatments in a sauna can increase abilities to carry out long-term efforts.

The application of massage in post-exercise regeneration was discussed most frequently [9, 21, 22]. Its effectiveness was confirmed regarding the reduction of post-exercise muscle pain – quicker regeneration and smaller pain of tired muscles of the massaged limbs were observed [9, 23, 24]. Some studies do not confirm positive effects of massage applied after physical effort [25, 26]. Undoubtedly this phenomenon requires further scientific exploration.

Application of supplementary exercises (stretching and compensation exercises) by athletes mostly aims at alleviating negative consequences of the implemented training (e.g. asymmetry, muscle imbalance) and injury prevention. Prophylactic programs should be aimed at exercises improving postural control, endurance and trunk muscle strength, as well as neuromuscular control of the kinematic chains of the lower limbs. Applying preventive programs, patterns of movement should be formed and attention should be paid to the quality and technique of movements [27, 28]. Effectiveness of preventive exercises was studied among professional athletes. In each case the implemented program brought positive effects in the form of less injuries and improved patterns of movement [29-32].

Training in all sports disciplines results in numerous changes in the human body. Not all of them positively impact human health. Modern methods applied in physiotherapy can help alleviate negative consequences of the implemented training. Undoubtedly physical activity has beneficial effects for health [33-35]. However application of physiotherapeutic support can not only improve sports results, but mostly the health status of athletes.

Conclusions

1. Less than 50% examined amateur athletes use physiotherapeutic support of training regularly. Application of physiotherapeutic support of training in amateur sports should be promoted by coaches, physiotherapist and medical staff.
2. The most frequently used physiotherapeutic treatments are the ones which are easily accessible (sauna, massage). Nonetheless, their effectiveness has been scientifically proven.
3. The results obtained in this work may constitute a basis for continuing research with the participation of various groups of subjects (other disciplines) and using more advanced technologies and research tools.

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