

The characteristic of intensity of the selected methodical elements of taekwon-do

Summary

Taekwon-do ITF belongs both to martial arts and sports. In the process of taekwon-do there are common methodical parts (fundamental techniques, patterns, sparring, toughening attacking and blocking tools) that constitute the basic elements of training.

In dependence on the aim of training (sports competition, practical aspects, improving fitness) there is different emphasis put on those elements. The aim of this research is to show the characteristic of effort of main methodical parts of taekwon-do, what in result will simplify planning, realization and control of the training process.

The highest level of effort (average HR=189 ± 6 of pulse rate) was recorded during a variety of sparrings). The differentiation of HR among the subjects was not significant what means that the influence of such specific effort on the subjects was very similar. During the performance of patterns the intensity of workloads appeared to be significantly lower that during sparring. The average level of HR for examined group was 138 ± 5 of pulse rate. As far as fundamental techniques and toughening exercises are concerned there were differences in average values of HR when different methodical approaches were applied. Executing attacking and blocking techniques with hands resulted in the increase of HR from 130 to 152 of pulse rate ($x=141 \pm 6$), executing kicks caused the increase from 142 to 163 of pulse rate, while the highest Hr was recorded during executing flying kicks – from 157 to 178 of pulse rate ($x= 152 \pm 6$ of pulse rate). The specific exercises connected with toughening of attacking and blocking tools resulted in the average reaction of the circulation system ($x=193 \pm 3$ of pulse rate). The achieved results are very similar to those that were achieved in hapkido and ju-jitsu. The highest ratio of correlation of HR ($r=0,47$) was recorded for kicks performed on the ground and for flying kicks further on for patterns and flying kicks ($r=0,39$). The methodical analysis completed with the record of duration and intensity of workloads enables fairly detailed assessment of the training process and comparison with planned aims that ensue from motives of practising and this in consequence increase the efficiency of training interactions.

Key words: taekwon-do, intensity of workloads, methodical analysis, adaptation

Introduction

Taekwon-do is often defined as the art of disciplining the mind by means of exercising the body. From practical point of view it is the Korean art of fighting without the use of any weapon. It is a contemporary system based on the experience of ancient Korean arts of self-defence and modern achievements of science such as psychology, physiology and biomechanics. Taekwon-do (ITF version) is both the art of self-defence and a fighting sport and it includes characteristic qualities of these two forms of fitness activity. Especially the sport aspect, as a factor that enables the confrontation of abilities and skills in 'the civilised manner', constituted from the very beginning of functioning of taekwon-do, is the very important factor of this martial art. Preparation to sport competition should vary from utilitarian exercising (ex.: army, police trainig) and take into consideration stimulation, compensation and should redeem the biological development of children that have no flair for professional sport. Those so varied functions that taekwon-do has to complete or can complete deserve a thorough methodical approach and taking into account a distant

aim of the training process. Historical knowledge based on centuries of practical experience of martial art's masters should be completed by scientific research that will include the specific and consistency of training solutions. All this should be determined by the aim and affect every action of instructors and coaches.

The process of taekwon-do training both as the art of self-defence and the fighting sport includes common methodical parts that are constant and fundamental elements of the training. We can divide them into:

- fundamental techniques (stances, shifts, blocking and attacking techniques),
- patterns (set sequences of movements that are the ideomotoric model of a fight with one or many opponents),
- sparring (ways of solving a certain situation by the use of fundamental techniques or their modifications),
- toughening of attacking and blocking tools.

In dependence on the aim of training (sport preparation, acquiring utilitarian skills, development of specific fitness) all mentioned factors are devoted different attention. So far there haven't been carried out systematic research that would allow to put sort out the knowledge about the reaction of organism on workloads of selected methodical parts of taekwon-do among students of different ages, technical proficiency, and the aim of training. Because of the fact that all four elements of taekwon-do training exemplify taekwon-do some research was undertaken to characterise the effort as a way of working out optimal models of fitness state and reaction on workloads that can help to make the process of training more efficient.

Data and methods of research

The research was carried out on the group of 30 trainees that were of varied levels of technical proficiency. Characteristics are shown in table 1. Among the subjects there were trainees whose main aim was recreation in itself (children and youth, n=15), utilitarian purpose (connected with their jobs, n=15), sportsmen (n=10). The subjects appeared to be the most different in terms of technical proficiency (cv=65%) or in terms of duration of their careers (cv=55%).

Tab. 1 Characteristics of subjects

Statistics (n=30)	Age (years)	Height (cm)	Weight (kg)	Grade/degree (pkt.)	Duration of career (years)
x ± SD	17,1 ± 1,45	172 ± 3,05	64 ± 7,83	15,2 ± 9,82	2,6 ± 1,43
min-max	14-19	168-176	53-74	3-30	1-4
cv	8,5 %	1,8 %	12,3 %	64,6 %	55 %

The effort recorded during exercises was determined on the basis of HR reaction that was obtained with the use of sport-testers and the computer program.

Results and discussion

The highest level of effort (average HR=189 ± 6 of pulse rate) was recorded during a variety of sparrings (pre-arranged, semi-free and free). Because of the peculiarity of taekwon-do, which demands the strict control of power of attacking techniques, competitors the most often perform only these techniques that are well-trained, as single and in combinations in connection with quick shifting forward, backward and sideways. Shifting, good timing and feeling of distance characterise the best competitors in particular. The average ratio of HR that was obtained during sparrings (2 x 2 minutes) is illustrated by figure 1. The results obtained in groups, in

terms of reaction on sparring, don't show major differences what means that the influence on competitors of that specific means is very similar.

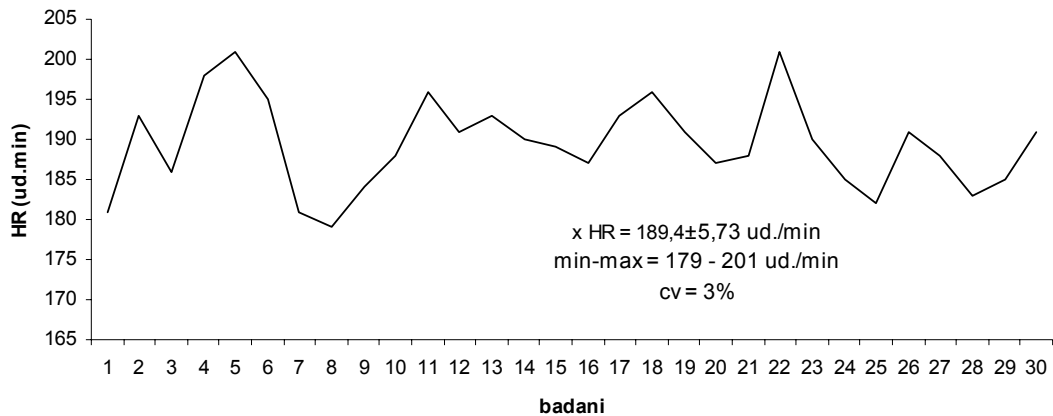


Fig. 1. The curve of average ratios of HR during taekwon-do sparring (n=30)

The differences in intensity of sparring stem not only from formal regulations of sparring but mostly depend on an opponent (his preparation, style of fighting, rank of competitions etc.) In sparring, which is identified with taekwon-do as a sport, the most often used techniques are mainly those that are spectacular and of a certain style. Performed actions are acyclic and the all-in maximal and sub-maximal effort during 2 minute round is approximately 40 seconds. Among techniques the most common are punches (av. 65%) performed in series, often as flying punches. During performing patterns the intensity of effort appeared to be considerably lower than during sparring. The average ratio of HR for the studied group was 138 ± 5 of pulse rate. In consequence with the varied level of technical proficiency only 4 basic patterns were taken into consideration. The highest average value was recorded during the performance of the third pattern – DO-SAN, which includes 24 movements and 10 different techniques. The results that have been obtained are shown in figure 2. The level of the differentiation among the subjects was inconsiderable and amounted 4%. Nonetheless it must be remembered that only 4 basic patterns were assessed and that they are not complex in terms of coordination.

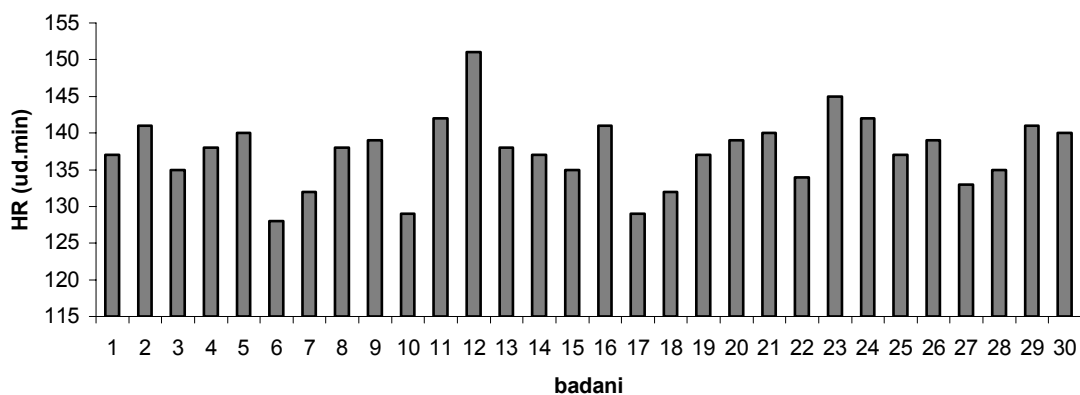


Fig. 2. The average values of HR during the performance of basic patterns

Patterns constitute the very basic means of training in all far-east martial arts. They enable individual practice and improve coordination and correct breathing during the effort. They are a kind of review of characteristic movements of this martial art. In taekwon-do they complement the ability to apply attacking and blocking strategies forbidden in sport sparring that is the most popular among trainees. Individual patterns can be connected to constitute series of movements performed without resting breaks that extends possibilities of affecting the organism. The philosophy of taekwon-do attributes to the movements of patterns specified value and symbolic meaning that refers to the past and is connected with the idea of self-improvement. During the performance of fundamental techniques and toughening in dependence on the methodical approach the average values of HR appeared to be differentiated (fig.2). Performing attacking and blocking techniques with hands caused rise in value from 130 to 152 of pulse rate ($x=141 \pm 163$ of pulse rate), with legs from 142 to 163 of pulse rate ($x=152 \pm 6$ of pulse rate), whereas the highest value of HR was recorded during the performance of flying kicks from 157 –178 of pulse rate ($x=166 \pm 7$ of pulse rate). In response to toughening exercises the average value of HR was obtained ($x=159 \pm 3$ of pulse rate) ($v=11$ of pulse rate).

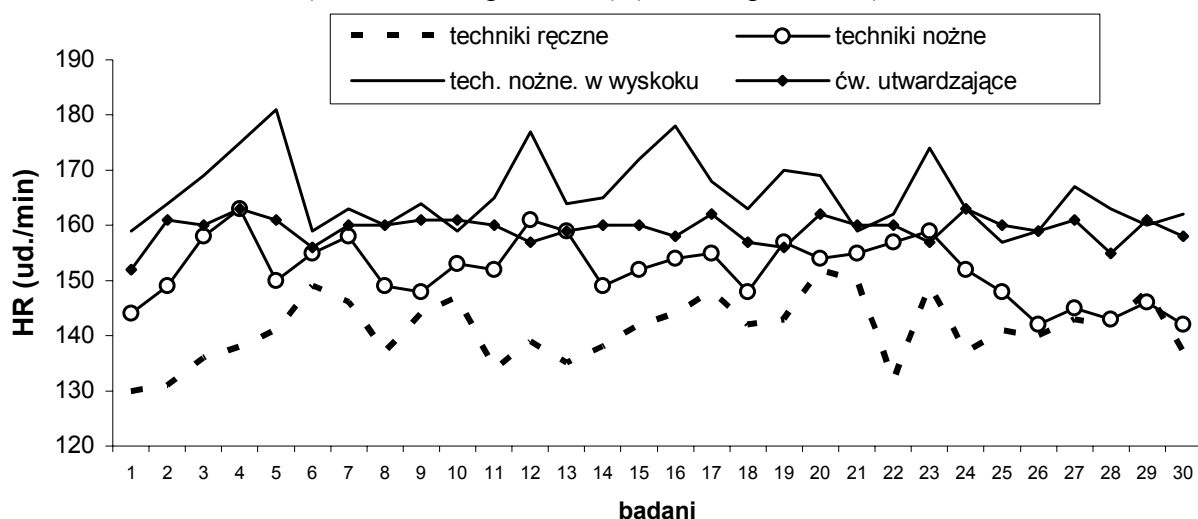


Fig. 3 The characteristics of intensity of effort during the performance of fundamental techniques and repeated punches on training tools (bags, targets, dallyon do)

The results that have been obtained are convergent with other martial arts such as ju-jitsu and hapkido, The methodical analysis of (on the basis of observation) completed with a record of duration and the intensity of workloads enables fairly detailed assessment of training work and comparison with planned aims and motives of exercising from which the aims have been ensued. This sorts the process of training and increases the efficiency of training interactions what ensures a correct direction of adaptation. In order to prompt the increase of fitness HR should reach the level of approximately 80% HR max. The knowledge of training intensity and the methodical structure of exercises enables to efficient, effective and fast fulfil of trainees' expectations. Additionally deepened knowledge concerning different aspects of taekwon-do allows to rank this martial art as the very modern means of interacting on a human. Searching for a correlation between selected means of training (tab. 2) appeared in most cases to be inconsiderable. The highest rate of a correlation was

recorded between kicks on the ground and flying kicks ($r=47$), and between patterns and flying kicks ($r=0,39$).

Tab. 2. Values of correlation ratios (r Pearson) between selected means of training

Means of training	Patterns	Hands technics	Kicks	Flying kicks	Toughening
Sparring	-0,02	-0,15	0,31	0,37	0,14
Patterns	-	-0,21	0,09	0,39	-0,02
Hands technics	-	-	0,14	0,08	0,14
Kicks	-	-	-	0,47	0,19
Flying kicks	-	-	-	-	0,11

In spite of the changeable interaction presented of presented methodical groups (fig. 4) the variations of average values of HR appeared to be statistically insignificant at a level $p \leq 0,05$. On the basis of knowledge about intensity of the selected group and the main goal of training process, duration of exercises and their inner structure, it is possible to control the volume of intensity and its character.

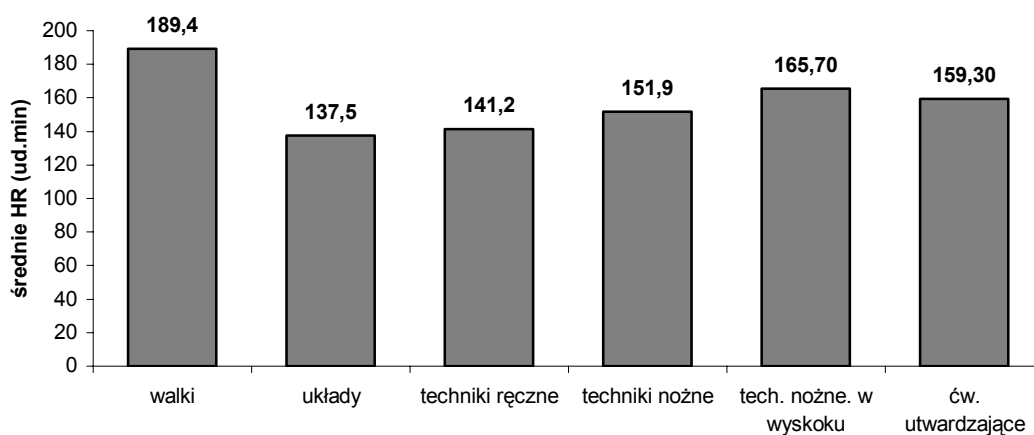


Fig. 4 The comparison of intensity of selected means of taekwon-do training (average values)

In order to simplify the analysis of training workloads in taekwon-do The Register of Groups of Training Means was formulated. It covers Sozanski's methodological approach. Distinguished methodical groups are the enlargement and complement of the register and a very practical device for trainers, who plan the process of training on the basis of effects and the control of performance. Exercising taekwon-do provides the possibility of increasing fitness in a variety of forms in a healthy way and is connected to obtaining utilitarian skills. Additionally, regulation of training process covers specific problems of the methodology of teaching and performing exercises or the physiology of effort.

Conclusions

On the basis of research the following conclusions can be drawn:

1. Fundamental means of training in taekwon-do having different structure are different in terms of intensity.
2. Sparring and flying kicks have the biggest influence on a trainee's organism and patterns created the lowest HR rate.

3. The knowledge of specification of taekwon-do and intensity of workloads enable rational training procedure.
4. Motives of exercising of taekwon-do should decide what kind of methodical means must be applied.

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