The effect of taekwondo training on the level of aggression

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Summary

The article focuses on the effect of taekwondo training on level of aggression.

The study took a longitudinal form – the research was conducted over three years (it started in December 2010, and it finished at the end of November 2013). At the time of the first measurement, the study was conducted on a group of 164 taekwondo students (from PUT – the Polish Taekwondo Union). After three years, the training had been continued by 63 people. For comparative purposes, the results of 25 Physical Education students of physiotherapy were used.

The study used a Buss-Perry Aggression Questionnaire (BPAQ). The results have shown the reducing impact of taekwondo training on level of aggression (statistically significant). This is a process only observable after prolonged training.

Keywords: taekwondo, aggression, martial arts, psychology

Currently, psychological knowledge is developing dynamically in different fields of sport [Dosil 2008]. Numerous studies have been carried out, with a focus on a wide variety of characteristics and qualities of the mental processes of athletes. This knowledge is relatively extensive as far as popular sports such as football or basketball are concerned (the number of records found in the database EBSCO entry "psychology" + "soccer" – 4908; football – 8141; "basketball" 5569, accessed 21.01.2016). However, there are sports which are less explored in this respect. That group includes the martial arts. In recent years, a number of studies have been carried out on the psychological aspects of training in martial arts [Sterkowicz, Blecharz 1996; Sterkowicz 2005; Rogowska, Kuśnierz 2010; VertonghenTheeboom 2010; Třebický, Havlicek, Roberts, Little, Kleisner 2013; Ziv, Lidor 2013; Rosario, Kerr, Rhodius 2014; VertonghenTheeboom, Pieter 2014]; however, these mainly focused on the most popular styles, such as karate, judo or kung fu. Not only were the results obtained from empirical studies generalized over other martial arts, but they also failed to take into consideration the diversity of styles, techniques used, or discrepancies in theoretical-ideological approaches. The primary objective of training in all combat sports is learning how to fight; however, it must be emphasized that other aspects – such as implementation of techniques, or attitude to the core of the training itself – vary considerably depending on the fighting style.

Apart from the differences outlined above, it should be assumed that each fighting style varies in terms of trainee's personality traits as well. This assumption was confirmed in the pilot study[1], which was a starting point for a further analysis. This study was designed to identify the differences in three fighting styles, which originated from diverse philosophical and ideological concepts: aikido, belonging to the group of martial arts; taekwondo considered as a representative of martial arts and krav-maga, being a combat system. The study focused on two personality traits: aggression and anxiety, verifying their presence in the sample groups. The results of the pilot study had revealed that participants of different fighting styles differed in personality traits. It can be speculated that these differences resulted from either training or self-selection (people with certain personality traits choose a specific style).

The study presented in this paper focuses on the combat style which in the author's opinion yielded the most interesting results in the pilot study – namely taekwondo.

There has been a limited number of psychological studies focusing on this fighting style (63 records in EBSCO database for the entry: "taekwondo" + "psychology," dated 14.02.2015). Even less frequent is interest in taekwondo when combined with the term 'aggression' (4 records in EBSCO database for the entry: "taekwon-

[1] The results of the research thesis K. Wrześniewski.

do" + "aggression" accessed 02/14/2015). Nevertheless, the data collected so far has indicated the positive effect of taekwondo training, measured by psychological parameters such as aggression and anxiety [Trulson 1986; Skelton, Glynn, Berta 1991; Chapman Lane, Brierly, Terry 1997; Kwiatkowski 2007]. Given the fact that these studies were transverse in nature, it is not obvious whether the observed differences resulted from the training itself or trainee self-selection. Therefore, a longitudinal study was designed in order to detect the impact of taekwondo training on the level of aggression.

Methods

Participants

189 adult males took part in the study and were classified into three groups: 1) those who practised taekwondo for the entire course of study (*T*; *n* = 63); 2) those who abandoned the practice of taekwondo during the course of study (*TA*; *n* = 101); 3) a control group – students of physiotherapy at the University of Physical Education in Kraków (USPE) (*C*; *n* = 25).

The first and the second groups consisted of people who started training in taekwondo in 2010 (during the first measurement, their training experience accounted for no more than 6 months). The third group comprised students of physiotherapy at USPE, who were selected as a control group. They did not practise any sports and were tested three times throughout the study.

The size of each group and the age of the subjects are presented in Table 1.

Research tools

The **BPAQ – Buss-Perry Aggression Questionnaire** – a Polish adaptation of the Aggression Questionnaire test developed by A. Buss and M. Perry [1992] was used to measure the level of aggression. The adaptation was carried out by the "Amity" institute [Siekierka 2005]. The questionnaire consisted of 29 questions which measure:

- **Physical Aggression (PA)** – comprising items related to physical harm and hurting others. This referred to the instrumental and motor components of behaviour.
- **Verbal Aggression (VA)** – comprising items related to verbal harm and hurting others. This referred to the instrumental and motor components of behaviour.
- **Anger (A)** – comprising items related to physiological arousal and preparation for aggression. This referred to the emotional/affective component of behaviour.
- **Hostility (H)** – comprising items related to a sense of hostility and injustice, and referred to the cognitive component of behaviour.
- **Total score (T)** – the result of the general aggression tests [Buss & Perry 1992, p. 457].

Procedure

The longitudinal study commenced in December 2010 and was completed at the end of November 2013. The study consisted in three measurements: measurement 1 – pretest – December 2010, measurement 2 – June 2012, and measurement 3 – posttest – November/December 2013.

The participants were asked to complete the battery of tests before the training sessions/ classes at the university. The measurements in the first battery consisted of BPAQ and STAI, CISS and FCZ KT questionnaires. The results of the STAI, CISS and FCZ KT are not presented in this paper.

The single measurement time lasted between 30-45 minutes. Due to the fact that the study was anonymous each subject was asked to provide their date of birth and a password. This served as an identification code for further measurements.

Statistical analyses

6 separate 2-way mixed factorial analyses of variance (group [training vs. control] × time [pretest vs. 2nd measurement vs. posttest]) were used to examine the effect of taekwondo training on levels of aggression. Dependent and independent sample *t*-tests with Bonferroni corrections were used for post hoc analysis where significant differences were detected for main effects. In addition, partial eta square statistics (η^2_p) were calculated in which values of > .01, .06, and 0.14 corresponded to

Table 1. The size of each group and the age of the subjects

	Participants training taekwon-do for the entire course of study (*n* = 63)		**Participants who resigned from taekwondo training during the course of study (*n* = 101)**		**Control group (*n* = 24)**	
Variable	**M**	***SD***	***M***	***SD***	***M***	***SD***
Age [years]	23.2	3.41	22.9	2.55	19.3	0.68
Training time [months]	4.7	1.6	3.6	1.8	–	–

small, medium, and large effect sizes, respectively [Miles, Shevlin 2001; Cohen 1988; Cohen, Cohen, West, Aiken 2003]. A one-way ANOVA followed by Sheffe's post hoc test was used to assess differences in pretest samples (including group of participants who gave up taekwondo training during the course of study).

The statistical package "R for Windows (version 3.1.0)" was used for all analyses. An alpha level of $p \leq 0.05$ was considered statistically significant for all comparisons. All data are presented as mean ± *SD* except in the figures where data are presented as mean (figure 1) or percent of change (figure 2) for clarity of presentation.

Results

A One-way ANOVA showed statistically significant differences between groups in following BPAQ scales: physical aggression ($F(2, 185) = 4.861$; $p = .009$), verbal aggression ($F(2, 185) = 24.803$; $p < .001$), hostility ($F(2, 185) = 7.493$; $p = .001$) and total score ($F(2, 185) = 11.385$; $p < .001$).

Post hoc analyses using the Sheffe test indicated that level of physical aggression was significantly lower ($p > .05$) for the control group than for participants who practised taekwondo (those who practised taekwondo for the entire course of study and those who abandoned the practice of taekwondo during the course of study). In addition it indicated that participants who practised taekwondo for the entire course of study present a higher level of verbal aggression, hostility and result of the general aggression tests ($p < .05$) compared to the other groups (the control group and the group of participants who abandoned the practice of taekwondo during the course of study).

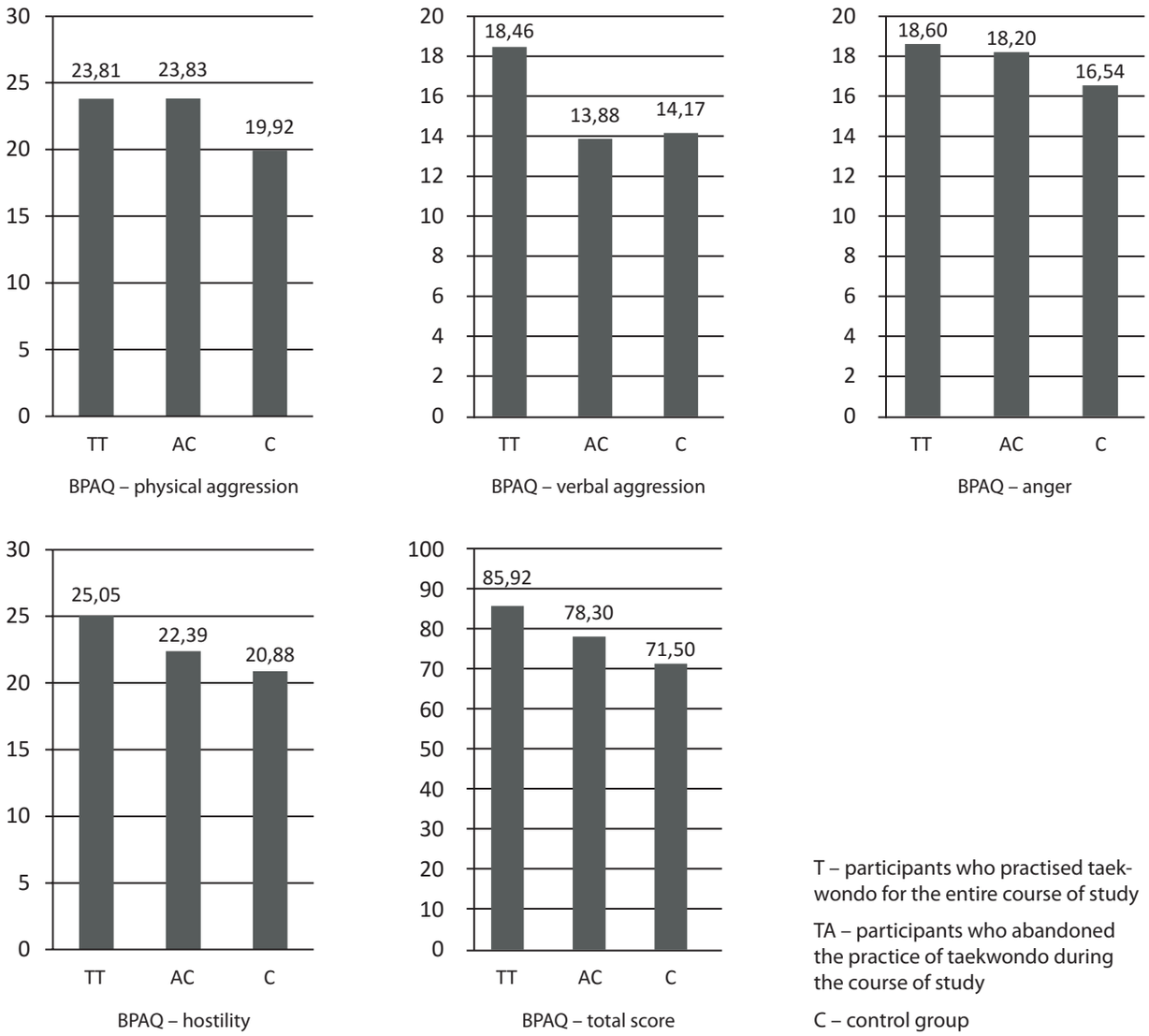

Figure 1. Mean results for BPAQ

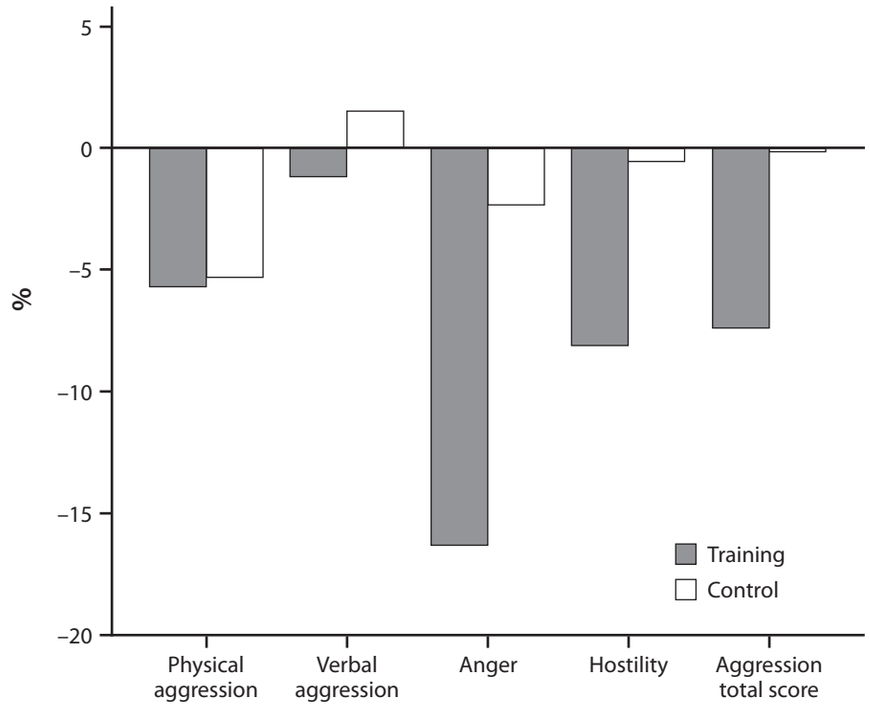

Figure 2. Pretest – posttest percentage changes in BPAQ scales for training and control group.

Mean (*SD*), % change, interaction (group [training vs. control] × time [pretest vs. 2nd measurement vs. posttest]) and Partial Eta Square are presented in table 2. Figure 2 illustrates the % of change in BPAQ scales for pre – post measurements.

For physical aggression, there was a significant interaction for time [pretest vs. 2nd measurement vs. posttest] ($F(2, 84) = 9.496$; $p > .001$; $\eta^2_P = .184$). No significant interaction was observed for group [practising vs. control] × time [pretest vs. posttest] ($F(2, 84) = 1.867$; $p = .161$; $\eta^2_P = .043$). These results indicate that the observed decrease in the level of physical aggression occurred at a similar magnitude in both groups

For verbal aggression there was no significant interaction for time [pretest vs. 2nd measurement vs. posttest] ($F(2, 84) = .047$; $p < .05$; $\eta^2_P = .001$) and group [training vs. control] × time [pretest vs. posttest] ($F(2, 84) = 1.338$; $p = .268$; $\eta^2_P = .031$).

Table 2. Mean (*SD*), % change, interaction, Partial Eta Square for BPAQ scales.

	Control group $n = 63$				Training group $n = 24$				Interaction (p)	Partial Eta Square (η^2_P)
Variable	Time 1 Pre-test	Time 2	Time 3 Post-test	% change	Time 1 Pre-test	Time 2	Time 3 Post-test	% change		
Physical aggression	19.92 ± 5.3	19.62 ± 5.3	18.92 ± 5.2 ǂ	5.0	23.81 ± 4,4 §	22.76 ± 4.8 §	22.46 ± 4,7 § ǂ	5.7	.161	.043
Verbal aggression	14.17 ± 4.0	14.46 ± 3.6	14.37 ± 3.8	–1.4	18.46 ± 4.0 §	18.21 ± 4.1 §	18.19 ± 4.3 §	1.5	.268	.031
Anger	16.54 ± 5.3	16.54 ± 5.7	16.41 ± 6.5	.8	18.60 ± 5.3	16.87 ± 5,5	15.57 ± 5,6 § ǂ	16.3	.001	.147
Hostility	20.87 ± 7.1	20.71 ± 7.4	20.96 ± 8.3	–.4	25.05 ± 3.54 §	23.92 ± 3.99 §	23.08 ± 4.34 § ǂ	7.9	.002	.133
Total score	71.50 ± 15.6	71.46 ± 15.4	71.42 ± 15.6	.1	85.92 ± 10.154 §	81.84 ± 10.3 §	79.52 ± 10.1 § ǂ	7.4	< .001	.311

Interaction effects are reported as group[training vs. control] × time [pretest vs. posttest]
§ – Significant between-group differences (Time 1; Time 2; Time 3) $p < 0.05$
ǂ – Significant within-group differences pretest – posttest $p < 0.05$

For anger, there was a significant interaction for time [pretest vs. 2nd measurement vs. posttest] ($F(2, 84) = 8.539$; $p > .001$; $\eta^2_P = .169$) and group [training vs. control] × time [pretest vs. posttest] ($F(2, 84) = 7.266$; $p = .001$; $\eta^2_P = .147$). The follow-up post hoc analyses revealed that statistically significant reduction in anger occurred only in the practising group ($p < .05$).

For hostility there was a significant interaction for time [pretest vs. 2nd measurement vs. posttest] ($F(2, 84) = 6.451$; $p = .002$; $\eta^2_P = .133$) and group [training vs. control] × time [pretest vs. posttest] ($F(2, 84) = 6.464$; $p = .002$; $\eta^2_P = .133$).The follow-up post hoc analyses revealed that a statistically significant reduction in anger occurred only in the practising group ($p < .05$).

For the total BPAQ score there was a significant interaction for time [pretest vs. 2nd measurement vs. posttest] ($F(2, 84) = 19.947$;$p < .001$; $\eta^2_P = .322$) and group [training vs. control] × time [pretest vs. posttest] ($F(2, 84) = 18.987$; $p < .001$; $\eta^2_P = .311$).The follow-up post hoc analyses revealed that a statistically significant reduction in anger occurred only in the training group ($p < .05$).

Discussion

Prolonged taekwondo training and the level of aggression

The results obtained from the research showed that, firstly, males with levels of aggression higher than average undertake taekwondo training. These results were confirmed by their higher scores on the scale of physical aggression, verbal aggression and hostility. Over the period of three years, the reducing impact of the taekwondo training on the levels: the overall level of aggression, hostility and in particular the intensity of anger were observed.

The results confirmed notions of the drive theory – the ethological concept [Lorenz 1975] and psychoanalysis [Freud 1976], as well as frustration-aggression hypothesis [Dollard, Miller et al. 1939; Berkowitz, LePage 1967]. These concepts assume that catharsis, or other manners of releasing negative emotions, reduces the need for aggression. In this light, taekwondo training can be considered a catharsis experience. Sparring and exercises, accompanied by training equipment (such as punchbags), allow instinctive drives towards aggressive behaviour to be expressed in a socially acceptable way. These elements of training also let athletes vent their accumulated frustration before it reaches a critical level, which in turn can potentially result in the outbreak of violent behaviour. The observable decrease in the level of anger (emotional and cognitive components) as a result of taekwondo training seems to favour the abovementioned notions. Moreover, it was found that the practice of this type of combat sport resulted in the reduction of aggression associated with the instrumental/motor component of behaviour, and physical and verbal aggression. The fact of the stability of aggressive behaviour and reduction of physiological arousal at the same time suggests the need for a more comprehensive analysis and verification within the concept of social cognition. Social psychologists assume that this type of training might create new scenarios of aggressive behaviour. Note, however, that learning fighting skills takes place in a specific situational context, that is to say at the gym, accompanied by appropriate equipment and according to the specified sports rules. Furthermore, some other elements of traditional taekwondo are introduced into training sessions, such as TKD patterns (tul) or the principles of ethical behaviours in taekwondo. Thus, it is believed they might be actually mitigate aggressive behaviours outside the training halls. What is more, coaches often play a model role and their behaviour may have a significant impact on how the newly acquired skills will be used by athletes. Coaches, as observed by the researchers of this study, in the majority exhibited a pacifist attitude toward life.

The findings confirmed the results obtained by Skelton et. al. [1991], in a group of 68 children aged 6–11 years old, randomly selected from ATA (American Taekwondo Association) schools. The study compared the level of aggression among children from different grades. Based on the results, Skelton and colleagues found that practising taekwondo reduced the level of aggression. The researchers speculated that learning traditional elements, such as formal arrangements, exercises focused on technology and meditative elements determined the decrease in aggression. It should be noted however, that in the case of taekwondo IT taught in Poland, the acquisition of traditional elements was minimized due to their low level of usability in competitions. Nevertheless, the meditation techniques, relaxation, or even imagination are taught in a preparatory process, and may be contributing to the reduction of aggression

The results obtained from the research carried out for the purpose of this paper, correspond with the results of Trulson's [1986] longitudinal research, who during a six-month training period, observed a change in level of aggression in three groups. The first group consisted of people who practised traditional taekwondo; the second group comprised people who trained 'modern' taekwondo, and which did not consider the psychological/philosophical aspects of the sport; and the third group consisted of students who trained at the gym with an instructor. The results showed that the level of aggression was reduced in the first group but increased significantly in the second group; while the third group showed no significant changes.

Combat sports other than taekwondo have also become the subject of scientific investigation. According to Budnik's [2004] research, the level of aggression in peo-

ple who practised karate remained lower than in a control group of students. Similarly, in Daniluk, Litwiniuk and Błacha's [2004] study, a low level of aggressiveness among participants in the Judo Olympic team was found. Contrarily, the results of Daniels and Thornton's [1990] did not show that people who practised martial arts such as jujutsu and karate, differed in level of aggression from those who played rugby – an aggressive contact sport, or people involved in non-combat sports such as badminton which did not incorporate elements of direct aggression. It was observed, however, that beginners in martial arts training were characterized by a higher level of hostility which, in the course of the training process, was gradually reduced [Daniels, Thorton 1990]. Similar conclusions were drawn by Turkish researchers who did not find significant differences between people training martial arts (it should be noted that athletes who practised kick-boxing, judo and taekwondo were considered in the same group), and those training team sports such as handball, basketball or volleyball [Ali Emrah, Fahri, Necmettin, Gulcan 2010].

In other words, the research cited above indicated either an average level of aggression in people practising various martial arts, or a lower level as compared to the control group.

The current study documented a higher – as compared to the control group – level of aggression in people participating taekwondo. It would, therefore, be sensible to search for the cause of such discrepancies between the results of this study and the findings of other research. The discrepancy could have been caused by the fact participants practised fighting styles other than taekwondo, which contained more traditional elements. Perhaps time spent in training might have a significant effect on the results. Other studies took the form of transversal research, and the participants were characterized by long training experience. Thus, it can be speculated that a prolonged training process could gradually mitigate the level of aggression in athletes who practised various martial arts. In contrast, this study took a longitudinal form and concerned a three-year training period. Although, during the time of the study, a gradual decrease in the level of aggression in people practising taekwondo was observed, it is assumed that the period was not long enough to diminish the intensity of aggression to an average or less than average level. We can stipulate that if the time had been extended and further observations implemented, the level of aggression in the sample would probably have been reduced even more.

Such presumption was confirmed by cross-sectional studies (not described in this paper), which showed that people with a high level of taekwondo technical skills (average length of training – 6 years) did not differ in their level of aggression from the control group. Further confirmation was found in the analysis of the four studies on different styles of fighting (aikido, judo, karate, taekwondo, krav-maga), which synthesized and summarized several studies on aggressiveness [Kubacka-Jasiecka, Wrześniewski 2012]. The results of such analysis showed the average level of aggression in people practising martial arts and no significant differences in aggression level from people who did not engage in any sports. Thus, based on the studies it can be assumed that the reduction of the level of aggression due to taekwondo training takes place slowly. In addition, the effect of such reduction is so slight that the level of aggression in advanced athletes is about average (comparable to the control group – people who did not engage in any sport).

Other empirical studies in this context were carried out by Żyto-Sitkiewicz [1981]. The author analysed the level of aggression of people practising judo and wrestling. Given the result of the entire sample the average level of aggression was noticeable. However, when the top athletes were selected from the group, a level of aggression higher than average was found among them. Similar conclusions were reached by Karolczak-Biernacka [1998], who noticed that successful sports people were characterized by higher than average levels of aggression. It can be, therefore, concluded that the observable level of aggression did not only result from length of participation in training, but it was also associated with the achievements in sports. It can be assumed that the initial level of aggression in athletes is associated with sports competitiveness, and in turn contributes significantly to building athlete's own position as a competitor. Thus, it can be concluded that aggression in some ways may foster sports achievements.

Summary and conclusions

The level of aggression in adult males training taekwondo is higher than average (as compared to males in control group).

Prolonged taekwondo training may reduce the level of aggression. The reduction can be affected by many factors. Based on reported studies, it can be noted that the two main reasons include: firstly, discharge of stored energy in an acceptable manner (on the punching bag, during sparring) and secondly introduction to sports training elements such as meditation, relaxation, imaginative training and the ethical principles of taekwondo. Taking this into account, it not advisable that highly aggressive individuals participate in combat sport as a means of reducing their aggression. Such individuals might use their technical skills as a potential tool of displaying aggressive behaviour towards other people. In the case of aggressive individuals, a modified training programme should be implemented, containing many relaxation and meditation elements. However, such a program would need to be verified in terms of its effectiveness in experimental conditions.

Further research should also focus on elaboration of aggression explorative tool taking into account the specificity of martial arts. It should differentiate between permissible manifestations of aggression in case of martial arts from unacceptable aggression in everyday situations.

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