

The effect of short-term multidisciplinary intervention on the levels of anxiety, ego-resilience and affect in sports shooters with disabilities

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Abstract. The aim of this study was to evaluate the effect of short-term multidisciplinary intervention (remedial training physical therapy procedures, training in shooting and psychological sessions) on anxiety, ego-resilience and affect in sports shooters with disabilities. *Material and Method.* Participants were 8 sports shooters with disabilities – 3 males and 5 females, aged 24-48. All participants took part in a study as an experimental group. Subjects were tested twice: immediately in the beginning of 9 days long intensive training and multidisciplinary intervention and after it. *Results.* Analysis showed statistically significant reduction only of Trait Anxiety and Negative Affect in the tested athletes representing their good adaptation to conducted remedial training physical therapy procedures, training in shooting and psychological sessions. *Conclusion.* Conducted complex program lead to a significant reduction of trait anxiety and negative emotions without significant changes of state anxiety, ego-resilience and positive emotions in athletes with physical disabilities.

Keywords: shooters, disabilities, anxiety, ego-resilience, affective balance.

Introduction

Sport provides opportunities for disabled people to positively reinterpret their role following a disabling injury and to meet other handicapped people and share similar experiences. Building up skills and confidence is another motive for disabled people's participation in sport (1). Potential benefits of enhanced activity for those with physical disability include a more positive mood and state of mind, a reduction of anxiety and depression, an increase of self-esteem and feelings of greater self-efficacy. (2) Sociological gains include new experiences, new friendships, and a countering of stigmatization (2).

The scientific consensus linking physical activity to mental health has resulted in recommendations that exercise should be used for the promotion and maintenance of mental health, and in the management of mental health problems (3).

All athletes experience distress in sport because they constantly have to withstand a wide range of difficulties and stressful situations to achieve and maintain high performance. Sports results and successful adaptation to training requirements can be significantly affected by high levels of stress and anxiety in shooters. Anxiety disorders are said to be universal, across all cultures, and recent reviews have found relatively high prevalence rates in different countries (4). The review of physical activity for anxiety prevention and treatment shows there is low to moderate anxiety-reducing effect with regular and even not very regular physical activity (5).

Ego-resilience (ER) is conceptualized as a central personality construct for understanding motivation, emotion, and behavior. Highly ego-resilient individuals are characteristically able to modify their level of control, either up or down, as may be appropriate or necessary according to the situational context (6). According to Block an ego-resilient person tends to be resourceful and adaptive when confronted by new situations and an individual who is not ego-resilient tends to become inflexible when confronted by new situations, and is slow to recoup after stress (7). An athlete's emotional state may affect the outcome of a competition by influencing performance both during training and while competing. Individual's emotional state could influence motivation along with both physical and cognitive functioning (8).

Material and Method

The subjects are 8 disabled sports shooters with various disabilities, 3 males and 5 females, aged 24-48 (mean 37,5 SD 9,26), who participated in a 9-day long intensive training and treatment program.

Subjects were classified in class SH1-SH2 in accordance with the rules and regulation of IPS Shooting (2014). Table I shows participant's disabilities and sport classes. Four of those surveyed have 1.5 to 5 years of sports experience and four are beginners in the 10 m rifle discipline.

The subjects of the experimental group were tested twice: immediately in the beginning of the intensive training and treatment program and after it.

The survey was conducted from 17 to 25 June 2014. In this period the sports shooters with disabilities who were the subjects of the research participated into a 9-day short-term intensive sports training and treatment program. They had daily: remedial training procedures in physical therapy, training in shooting, group or individual psychological sessions. An investigation of athletes' muscle strength and balance preceded an individually tailored physical therapy (PT) plan based on the results of PT tests and the type and severity of disabilities. PT procedures included strength exercises (mainly for the trunk and muscles involved in shooting), balance exercises, massage and in some cases cardiovascular exercises. The subjects underwent efficient individual training in shooting with a top-level shooting coach and sessions with a sports psychologist. Classes were conducted by qualified and experienced specialists respectively: physical therapists, a shooting coach and a sports psychologist. All activities were conducted under individual supervision for 8 days (with 1 day rest in the middle of the 9-day period).

The following psychological scales were used in the study:

1. The State-Trait Anxiety Inventory (STAI-Y) – test for measuring state and trait anxiety by C. Spielberger. Bulgarian adaptation by Shtetinski & Paspalanov, 1989 (9).
STAI-Y is comprised of two 20-item self-report scales for measuring state anxiety (S-Anxiety) and trait anxiety (T-Anxiety) as distinct, clearly defined psychological constructs. S-Anxiety was conceptualized as a transitory psychobiological emotional state or condition. T-Anxiety refers to relatively stable individual differences in anxiety proneness as a personality trait (10). The STAI was designed to be self-administering, has no time limits, and may be given either individually or to groups of respondents. When the STAI S-Anxiety and T-Anxiety scales are administered together, it is recommended that the S-Anxiety scale be given first, followed by the T-Anxiety scale. The S-Anxiety and T-Anxiety items are printed on the front and back sides of a single-page test form. Each anxiety-present item is given a direct score of 1 to 4, which is the score recorded on the test form. The anxiety-absent items are reverse score. The score range for the 20-item S-Anxiety and T-Anxiety scales can vary from a minimum of 20 to a maximum of 80. Higher scores indicate greater anxiety (9,10).
2. ER-89 – test for measuring ego-resilience by Block & Kremen, 1996 (11). Bulgarian adaptation by Zsheliaskova-Koynova, Misheva-Alexova & Chervencova, 2010 (12).
Ego-resilience (ER) is conceptualized as one of central personality constructs for understanding motivation, emotion, and behavior. In general ER refers to a meta-dimension of a person's dynamic capacity to contextually modify his/her level of control in response to situational demands and affordances (13). According to the Blocks theorizing, ego-resilience is the ability to adapt one's level of temporary control up or down as circumstances dictate (13). As a result of this adaptive flexibility, individuals with a high level of resilience are more likely to experience positive affect, and have higher levels of self-confidence and better psychological adjustment than individuals with a low level of resilience (11). When confronted by stressful circumstances, individuals with a low level of resilience may act in a stiff and self-preserving manner or chaotically and diffusely, and in either case, the resulting behavior is likely to be maladaptive (11). The score range for the 14-item ER-89 scale can vary from a minimum of 14 to a maximum of 56. Higher scores indicate greater ER.
3. Positive and Negative Affect Schedule (PANAS) – test for measuring positive and negative affect by Watson, Clark and Tellegen, 1988 (14) - Bulgarian adaptation by Yordanova, 2007.
The 20-item Positive and Negative Affect Schedule (PANAS) is a reliable, valid, and efficient means for measuring these two important dimensions of mood (14). It comprises two mood scales, one measuring positive affect (PA) and the other measuring negative affect (NA). Each item is rated on a 5-point scale ranging. PA scale (but not the NA scale) is related to social activity and shows significant diurnal variation, whereas the NA scale (but not the PA scale) is significantly related to perceived stress and shows no circadian pattern (14). The score range for the 12-item PA and NA scales can vary from a minimum of 12 to a maximum of 60. Higher scores indicate greater values of the indicators.

Statistical Analyses. All data were analyzed with a Statistical Package for the Social Sciences. The means, standard deviations and standard errors of measurement were calculated for each of the tests applied. After testing for normal distribution (Kolmogorov-Smirnov test) variables were compared with paired samples t-test (CI 95%) to determine significant changes in variables.

Results

The statistical results are presented in Table II. We observed a statistically significant reduction of Trait Anxiety and Negative Affect in the tested athletes. Differences between initial and second measurement were highly significant ($p < 0.01$). An interesting result was obtained with reference to Trait Anxiety, which is a construct more difficult to change. As a result of the experiment there was a statistically significant difference in this indicator. However, no statistically significant changes in State Anxiety, Ego-Resilience and Positive Affect during the study were recorded.

Graphic 1 presents graphically mean values of selected psychological indices from the 1st and 2nd testing.

Table I. Participant's disabilities and their sport classes in accordance with the rules and regulation of IPS Shooting

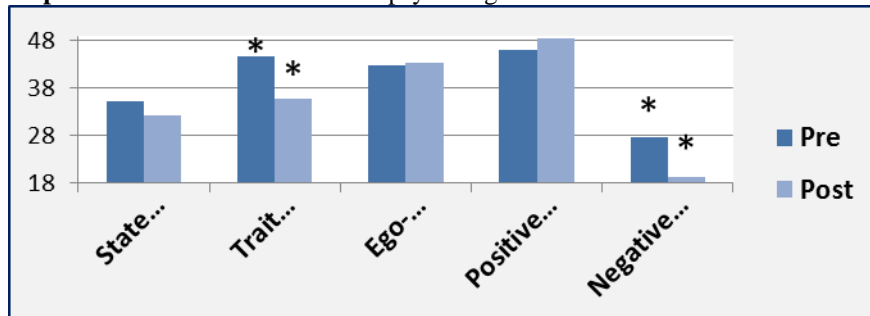
No	Kind of disabilities	Sport classes
1	Spina bifida, status post comminuted lumbar vertebral fracture, bilateral below-knee amputation, wheelchair user	SH1Ab
2	Unilateral below-knee amputation due to peripheral artery disease	SH1A
3	Unilateral disarticulation of the hip due to malignant tumor of bone	SH1A
4	Spinal muscular atrophy – SMA3, wheelchair user	SH2Cb
5	Spastic triplegia due to encephalomyelitis	SH2Aa
6	Post traumatic flaccid monoplegia of one upper limb, status post STEMI	SH2Aa
7	Cerebellar ataxia after radiotherapy, wheelchair user	SH2Aa
8	Disc disease with 4 surgical implants, flaccid paralysis of left upper limb and right lower limb	SH2Aa

Table II. Comparison between the mean value of selected psychological indices between the 1st and 2nd testing in the experimental group

No	Variable	n	Before		After		p
			M	SD	M	SD	
1	State Anxiety	8	35,14	5,31	32,14	9,63	0,356 n.s.
2	Trait Anxiety	8	44,57	8,75	35,71	11,32	0,005 **
3	Ego-Resilience	8	42,71	6,34	43,43	4,04	0,739 n.s.
4	Positive Affect	8	46,00	5,4	48,38	6,6	0,115 n.s.
5	Negative Affect	8	27,50	6,4	19,25	6,3	0,008 **

*Differences-p (paired samples t-test, CI 95%); n.s.-not significant; * $p < 0.05$, ** $p < 0.01$. Lower state/trait anxiety and negative affect values are beneficial.*

Graphic 1. Mean values of selected psychological indices at the 1st and 2nd testing



*statistically significant differences

Discussion

Research on athletes of various sports, experience levels, and gender has indicated that self-efficacy is negatively related to both cognitive and somatic anxiety (15). But it is also possible that those athletes who experienced heightened pre-competition anxiety also demonstrated exceptional coping skills such as relaxation, thus anxiety did not affect their performance. According to Bray and Martin (16), there is lack of difference in anxiety levels experienced in competitions at home and away with individual sport athletes. The competition location did not affect the participant's psychological state and/or his/her subsequent performance.

Exercise is associated with reductions in anxiety, but only for aerobic forms of exercise. These effects are generally independent of both subject (i.e. age and health status) and descriptive characteristics (17). Exercise training programs need to exceed 10 weeks before significant changes in trait anxiety occur (17, 18) and trait-anxiety reducing effects are not dependent on changes in physical fitness (18). There is evidence that exercise sessions should provide a distraction from worry and anxiety-inducing thoughts and give the training person a sense of mastery and achievement (5). The subjects in our study underwent both physical therapy (individualized remedial training) and psychotherapeutic programs. They also had efficient training in shooting with a top-level shooting coach which may have given them a sense of mastery and achievement. The application of this combined approach led to a significant reduction of athletes' personal anxiety during the research, while situational anxiety remained unchanged.

Ego-resilience (11) is a fairly stable personality trait that reflects an individual's ability to adapt to changing environments. These adaptive responses may include identifying opportunities, adapting to constraints, and bouncing back from misfortune (18). Ego-resilience is related to better interpersonal and intrapersonal adjustment across the lifespan, faster cardiovascular recovery following a laboratory stressor, and less depression and more thriving following a real-world tragedy (18). Resilience has had numerous meanings in prior research, but it generally refers to a pattern of functioning indicative of positive adaptation in the context of significant risk or adversity (19). Positive adaptation, the second core component of resilience, represents adaptation that is substantially better than would be expected given exposure to significant risk. Although indicators of positive adaptation have varied across the context, population, and risk factor understudy, extant conceptualizations have, in general, included three kinds of phenomena: good developmental outcomes despite high risk, sustained competence under stress, and recovery from trauma (19). A five-month training for adult beginners in group psycho-physical exercises (Pneurhythmy) showed significant increase in Ego-resilience, measured with ER-89 (20). In our opinion, longer time is needed to achieve change in the level of Ego-resilience compared to the applications in our study.

Positive emotions are a powerful source of growth and change, influencing individuals' judgments about life and their skills for living well (18). Negative Affect (NA) is a general dimension of subjective distress and unpleasant engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, guilt, fear, and nervousness, with low NA being a state of happiness and serenity (21). Traditionally, variation in affect has been used as a psychological marker for training adaptation in sport. Most of the multidimensional studies investigating the quality of training responses in elite athletes have used mood variation as the main psychological marker of training adaptation (22). The results from the complex treatment and training conducted by us showed a statistically significant improvement in the test PANAS and more precisely - reduced NA of the investigated athletes. As a result, the affective balance of athletes was improved.

Seen as the byproduct of cognitive and physiological adjustment to perceived training and competition demands, mood states represent an important marker of human adaptation (22).

Conclusion

This complex program was created in order to improve the mental and physical health, and the physical and technical sports preparedness of the athletes with disabilities included in the research. The application of the program led to a significant reduction of trait anxiety and negative emotions in athletes. It facilitated their adaptation to the remedial training physical therapy procedures. It supported their training in shooting and their psychological sessions.

We consider that the lack of significant changes in state anxiety, ego-resilience and positive emotions in this research is due to the short period of time in which it was conducted.

The National Shooting Championship for people with disabilities was held in November 2014 and all athletes involved in our intensive program improved their sport achievements - most of them winning medals for the first time. Therefore we can conclude that our intensive training and treatment program resulted in improved athletic performance of the surveyed athletes with disabilities in the long term.

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