

# COGNITIVE-BEHAVIORAL APPROACH AND THE ROLE OF PHYSICAL ACTIVITY IN THE TREATMENT OF MUSCULOSKELETAL PAIN IN ATHLETES

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**Abstract.** *The importance of a cognitive-behavioral approach is richly documented in world scientific literature. In the light of the current knowledge about the determinants of pain treatment, the significance of psychological factors for the course and effects of analgesic therapy becomes more comprehensible. Many psychological processes have an influence on both the experience of pain and the treatment outcome. The factors like cognitive interpretation of pain, level of activity and emotional states of musculoskeletal pain sufferers are very important.*

*The research referred to in this work makes a part of a long-term research programme the subsequent stages of which are analysed based on the literature of the subject that can assist in interpreting the new findings within dependencies between psychological factors and functioning in the case of the persons who cope with pain. Integration of psychological findings about attitude to pain into physical therapy treatment would seem to have potential to enhance outcomes. In this work we are presenting the problem in a context i.e. in the context of a role of cognitive-behavioral approach approach. The purpose of the article is to present the role of cognitive-behavioral approach in the field of applications that aim at supporting people who are involved in sport activity and cope with musculoskeletal pain-related ailments.*

**Keywords:** *cognitive-behavioral approach, pain treatment, health, physical activity.*

## Introduction

Along with the biopsychosocial understanding of the phenomenon of pain in many cases pain cannot be reduced to a simple reflexive reaction. An assumption was made psychological attitude has a big impact, playing an active role in both pain treatment patients with musculoskeletal pain. Because psychological processes have an influence on both the experience of pain and the treatment outcome, the integration of psychological principles into physical therapy treatment would seem to have potential to enhance outcomes

(Linton & Shaw, 2011). In the literature of the subject within the last decades there have been many works from health psychology that concern the perspective

of a biopsychosocial model based on the corresponding research (Eccleston, 2001; Gallagher, 2006; Ortenburger et al., 2017). The biopsychosocial model includes the interaction between biological, psychological, social and cultural factors. Among these factors is cognitive attitude and level of physical activity. The process of pain consists of many stages. The psychic factors: cognitive interpretation of pain and emotional states of pain sufferers are very important. Cognitive and emotional factors have a surprisingly important influence on pain perception. The relationship between pain and emotions is multidimensional. Emotion (anxiety, fear, anger) can exacerbate the sensation of pain or can exist as the consequence of chronic pain. Anger can be the most difficult emotion and reaction to modify (Lisiecka et al., 2016).

Not only does experiencing pain make the result of interaction between sensory impression and emotional response to this reaction. Previous experience and emotional response of that experience also count here (e.g. if it was accompanied with the feeling of helplessness or if certain degree of control that something can be done in order to soothe discomfort was present).

Contemporary knowledge makes it obvious that there might be many factors influencing on an illness and on treatment. Research suggests that higher levels of self-reported physical activity are associated with more pain inhibition and less pain facilitation on quantitative sensory test in healthy adults (Naugle et al., 2017). Today's society needs educated and competent people who are able to make use of existing knowledge and are ready for further development, which includes the idea of perfection and progressive changes (Usca, 2016: 152).

This article refers to the research that was partly published in the work concerning the problematics of psychological strategies of coping with pain in a group of people practicing martial arts, during therapy due to muscular-skeletal pain caused by injuries during sport activity and other reasons (Ortenburger et al., 2016).

In this work we are presenting the problem in a wider context i.e. in the context of a role of cognitive and behavioural approach. The approach makes a common plane of influences in sport, including professional competitive sport, as well as in rehabilitation. That is why the aim of the article is to present the role of behavioural and cognitive approach in the field of applications that aim at supporting people who are involved in sport activity and cope with pain-related ailments (of muscular and skeletal character). The research referred to in this work makes a part of a long-term research programme the subsequent stages of which are analysed based on the literature of the subject that can assist in interpreting the new findings within dependencies between psychological factors and functioning in the case of the persons who cope with pain (especially sportsmen representing different fields of sport).

## **Cognitive-behavioural approach - selected assumptions and selected research studies**

Cognitive-behavioural approaches to pain management are based on the assumption that a patient's thoughts, feeling, beliefs and behaviours are important (Crombez et al., 1999; Adams et al., 2008; Turk & Okifuji, 1994).

The biopsychosocial literature describes the phenomenon of reduction and even the reduction of pain that is referred to as post stress analgesia. The phenomenon of lowered or even reduced pain in the effect of stress present during fight (including fight of a sport character), referred to as post stress analgesia, is becoming more and more common in science. However, despite much research, certain mechanisms of this phenomenon have not been recognized yet.

Many research suggests that higher levels of self - reported physical activity are associated with more effective pain inhibition (Vlaeyen & Linton, 2012; Wąsik & Wójcik, 2017).

From the general- biological perspective the sense of post stress analgesia means the reduction of motion and affective reactions for the benefit of the ones that allow the body for overcoming immediate effects of stress such as e.g. pain. The biopsychosocial model assumes that the psychological processes of attention (processes of intentional management of attention) play a significant role in shaping the emotional reaction on pain. Generally speaking, due to the mechanisms of attention, filtration of information to consciousness is possible: attention can widen its scope or make it smaller, increase or decrease its intensity. One of the motives of martial arts practicing is eagerness (desire) of a better dealing with weaknesses and overcoming limitations. In the light of referential literature concerning health psychology, we may relate it to main types of beliefs and psychological strategies concerning individual abilities of coping with pain. Pain perception, together with cognitive-behavioral strategies of coping with pain, are under the influence of one's personality, physical activity level and temporary mediating variables (Ortenburger et al., 2016; Crombez et al., 2016; Vlaeyen & Linton, 2012). Coping with pain has been defined as intentional efforts to deal with the negative impact of particular this stressor (Eccleston, 2001; Gallagher, 2006; Gunnarsson, 2006).

In accordance with the literature about health psychology, there exist principal types of beliefs concerning individual abilities of coping with pain: they reflect how a man himself regards the possibilities of having influence on his own situation under the condition that pain is lowered (its intensity and frequency). The "W"- type beliefs and strategy is referred to as relying on oneself, one's internal possibilities of coping with ailments and pain. In the „L"- type beliefs regarding considerations over the possibilities of influencing the situation, there exists the dominance of health-related belief according which, first of all, medical

doctors have major influence on the situation and can reduce ailments (as for the intensity and frequency of pain). In the case of „P”- type beliefs of a particular person, there is the dominance of health beliefs that experience, mood, intensity and frequency of pain neither depend on doctors nor the person himself, but on accidental events and external effects (Ortenburger et al., 2016).

The Table1 describes: a) the main goals of the cognitive-behavioral method, such as the change in the perception of pain, the change of the patient's attitude to the problem (from that of passivity and helplessness to that of activity), or teaching the patient some of the more adaptive methods of coping with pain; b) stages of the cognitive-behavioral therapy (reconceptualization, gaining skills, consolidation of the skills gained, generalization and maintaining the skills, positive attitudes).

Table 1 Cognitive-behavioral to musculoskeletal pain - selected assumptions

<b>From that of passivity and helplessness to that of activity in treatment of musculoskeletal pain - selected assumptions</b>				
<i>Individualizing, setting goals</i>	<i>Active involvement in therapy</i>	<i>New skills, specifying steps to achieve goals</i>	<i>Self-efficacy expectancies in chronic pain</i>	<i>Perception of pain, thoughts, appraisal</i>
Individualizing the treatment to suit the client's (patients sportsman, other) needs. Reappraisal. Behaviour is reciprocally determined by both the individual and environmental factors.	Getting the client to play an active role in the treatment and accept some responsibility. Gaining skills, consolidation of the skills gained, generalization and maintaining the skills). Conscious way of living.	Participating to acquire new skills and participate in exercise programme.  Teaching the patient some of the more adaptive methods of coping with pain.	Encouraging a client's self – efficacy. Increased behavioural activities.  Individuals can learn more adaptive ways of feeling and behaving	The change in the perception of pain. Reconceptualization. Coping strategy: diverting attention, reinterpreting pain sensations, pain control, pain decrease. Thoughts can elicit and influence mood, affect physiological processes; Conversely, mood, physiology can influence the nature and content of thought processes.

## Materials and methods

The paper compiles the results of research conducted in two groups that are considerably different in respect of their physical fitness (at the area of the Silesian Voivodeship in Poland). The first group was composed of 29 people who practise

taekwon-do (TDK), age average 30.5±8.9 years. In the sample group, the majority practise 2-3 times a week, some people practise once or twice a week, and almost the same number of people 4 or more times. The minority practise every day. The second group comprised 30 patients aged average 33.5±11.9 years (in City Polyclinical Hospital Czestochowa). Questionnaires used in psychology and health promotion and a self-made questionnaire including open and close question were applied in the study (Ortenburger et al., 2016). These measures concern cognitive and behavioural coping strategies that patients can use to help them manage pain. Adjustmen to the patients with chronic pain, or the ability to manage pain, can be measured using the Coping Strategies Questionnaire (Rosenstiel & Keefe, 1983).

### Research Results

In the mentioned research, that is referred to in this work, the psychological factors of a cognitive character were examined as they perform a very important role in sportsmen’s approach to the challenge that is participating in trainings despite ailments. The obtained data underwent statistical analysis, including the measurement of the parameters of variability such as mean, and standard deviation (statistical significance at the level,  $p < 0.05$ ). The obtained results are presented in tables 2-5.

Table 2 **Strategies for coping with musculoskeletal pain (based on Ortenburger et al., 2016)**

Explanatory variable	Athletes N=29		Patients N=30	
	Mean (I-36)	SD	Mean (I-36)	SD
W- type strategy	20.03	3.95	13.79	6.89
L -type strategy	10.87	4.09	11.71	5.02
P-type strategy	11.53	3.91	13.68	4.64

*W - coping with the situation on one’s own, L - appeared, the strategy based on “trusting doctors”, P - experience, intensity and frequency of pain neither depend on doctors nor the individual.*

The obtained data contained in Table 2 indicate that athletes use the active strategy to cope with pain on their own more frequently than others people, also demonstrate higher proactivity, which is a rather active strategy coping with pain.

Table 3 **Proactivity (based on Ortenburger et al., 2016)**

Explanatory variable	TDK N=29		Patients N=30	
	Mean (I-10)	SD	Mean (I-10)	SD
Proactivity	7.55	2.48	4.63	2.18

**Table 4 Proactivity and “W” - type strategy – taekwon-do group  
(based on Ortenburger et al., 2016)**

Explanatory variable	Cluster 1		Cluster 2		Variance between clusters	Variance inside clusters	F	p
	Mean	SD	Mean	SD				
Proactivity	8.17	1.94	6.50	3.03	15,02	139,43	2,58	0,12
W-type strategy	22.35	1.69	15.60	2.36	287,70	94,33	73,19	0,00

*W- coping with the situation on one’s own, appeared*

**Table 5 Proactivity and “W”- type strategy – patients group  
(based on Ortenburger et al., 2016)**

Explanatory Variable	Cluster 1		Cluster 2		Variance between clusters	Variance inside clusters	F	p
	Mean	SD	Mean	SD				
Proactivity	3.01	0.82	5.05	1.95	21,16	70,94	9,95	0,00
W-type strategy	6.10	3.07	18.05	4.05	918,86	363,84	65,66	0,00

*W- coping with the situation on one’s own, appeared*

In the research we have analyzed the way in which sportsmen and patients cope with ailments including muscular and skeletal pain. Such pain often appears in a group of people of a high level of physical activity, due to overtraining, injuries, and not enough regeneration.

Due to the fact that the obtained data are of self-descriptive character (they derive from questionnaires), the analysis was performed applying methods recommended for proceeding “non-acute” imprecise data that frequently appear in the humanities and health science. Explorative techniques that aim at identifying subgroups within multidimensional data collection were applied as well. Among others, cluster analysis with the use of k-means clustering was carried out. Thanks to the above, clusters that possibly differ from one another were identified (Table3) (Ortenburger et al., 2016). The obtained results indicate that within each examined group there are subgroups (clusters) that are different from one another with respect to an average result within the variable “proactivity” and the variable “W” - type strategy of coping with pain. The strategies were used by patients in chronic pain therapy and people performing taekwondo (Table 3). The research revealed that the values of other index of the analyzed strategies of dealing with pain do not differ considerably in the taekwondo group and in the group of patients. Strategy value index „L”: in the taekwondo group equaled 0,5 and in the group of patients covered by the pain treatment programme equaled 1,2. On one hand, the research proved that

taekwondo practitioners reveal higher proactivity than patients covered by the pain treatment programme and more often rely on themselves, trying to reduce ailments. They also attempt to limit the negative consequences of ailments on their own more often. On the other hand, both-patients and taekwondo practitioners use these active strategies to a different degree. Within the patients' group and within the taekwondo group the occurrence of smaller subgroups that differ from one another was identified. In summary, observational studies provide compelling evidence that regular physical activity and a high fitness level are associated with a reduced risk of musculoskeletal pain.

Pain cannot be eliminated from our life completely and there is no need for it, risk is part of many sports (Bakota et al., 2018; Wąsik, 2011; Wąsik & Gora, 2016). Every man tries to deal with it using, among others, different strategies that are more or less adaptive. However, for some people (due to their character) the process of adaptation to this may be more difficult (Turk & Okifuji, 1994). They pay a high price for it- they experience unpleasant psychosomatic disorders. One of positive factor is high level physical activity connected with positive mental attitude.

## **Conclusions**

Cognitive-behavioral approach in the treatment of musculoskeletal pain in athletes requires further attention. Future research should pay careful attention to the outcome measures (objective measures of physical activity behavior), studies will be continued. The results indicated that light physical activity significantly predicted pain inhibitory function on the conditioned pain modulation test. Physical activity behavior predicts endogenous pain modulation (Naugle et al., 2017). Contemporary knowledge makes it obvious that there might be many factors influencing on an chronic musculoskeletal pain illness (Sogabe, 2013; Uher & Švedová, 2013). Looking at a man as a bio-psycho-social individual one must assume that all factors, including psychological factors, play a certain role and can make the element favorable for the increase of an illness or recovery. That is why it is so considerable for both: the course of an illness as well as treatment. There is also the dependency of a contradictory direction: psychological factors can have protective meaning, facilitating dealing with chronic pain and recovery.

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