



Aerobic exercise as exposure therapy to interoceptive cues in panic disorder

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ABSTRACT

Panic attacks are represented by distinct periods in which there is a sudden beginning of internal apprehension, fear or terror, frequently associated with feelings of imminent catastrophe, diagnosed in approximately 10% of the population. The panic disorder is an anxiety crisis that is characterized by the recurrence of panic attacks: sudden crises of uneasiness and sensation of danger or imminent death, followed by diverse physical and cognitive symptoms. Individuals with panic disorder are characteristically concerned about panic attacks implications or consequences. It is a complex clinical condition that involves different modalities or myriad of symptoms. Thus, the focus on the physical sensations misinterpreted in panic disorder and hypochondria, is basically centered in autonomic manifestations, such as tachycardia and dyspnea. There are scarce studies on physical activity and panic disorder. The main purpose of the study is to identify with different descriptions whether there is a 'main' population with symptoms predominantly respiratory presenting avoidance of physical activity and exercise influence on this population.

INTRODUCTION

The essential characteristic of a panic attack is a distinct period of intense fear or discomfort in which there is a sudden beginning of intense apprehension, fear or terror, frequently associated with feelings of imminent catastrophe. During these attacks, symptoms such as breathlessness, palpitations, pain or thoracic discomfort, suffocation feeling and fear of becoming crazy or lose control are present⁽¹⁾.

According to the DSM – IV TR – 2002⁽²⁾, the essential characteristic of the panic disorder is the presence of recurrent and unexpected panic attacks, followed by at least one month of persistent worries about having another panic attack, worries about possible implications or consequences of the panic attacks, or a significant behavior alteration concerned with the attacks.

Panic Disorder is a chronic medical condition which is characterized by the recurrence of panic attacks, sudden episodes of anxiety or discomfort, danger or imminent death sensation, followed by several physical and cognitive symptoms.

Panic disorders are diagnosed in approximately 10% of the individuals sent to mental health appointments. In contexts of medical clinics, the prevalence rates vary from 10 to 30% in neurology, otorhinolaryngology and respiratory diseases clinics, and up to 60% in cardiology offices⁽¹⁾.

According to the American Psychiatric Association Diagnostics and Statistics Manual of the Psychiatric Association⁽¹⁾, the diagnosis of panic disorder requires that the attacks are recurrent and

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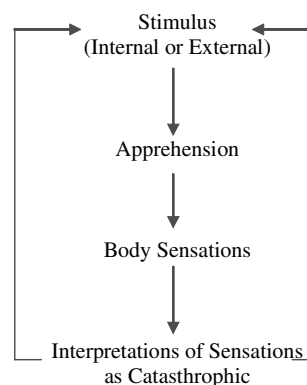
unexpected and/or associated with a persistent worry about the occurrence of new attacks or with their implications; or even, with consequent significant alteration of behavior for a period of on month.

According to Deakins and Graeff⁽²⁾, the panic attack is part of the normal alert and defense brain systems. Panic attacks are a reaction triggered in danger situations with imminent destruction risk of this body. Therefore, the emotional experience of a panic attack is necessarily aversive, since it interrupts any behavior that is going on.

The first panic attack is usually followed by others, equally spontaneous. As the crises (attacks) repeat, they can occur by exposition to triggering internal (places or situations) or external stimuli (certain thoughts or body sensations) which in previous moments have occurred simultaneously to the crisis and even to similar stimuli (generalization). Generally, in this stage phobic avoidance from situations, places and physical sensations associated by classic conditioning to the panic attacks have already developed⁽³⁾. This emotional learning process is called fear conditioning or fear learning. The anticipatory anxiety state has the function to prepare the individual to the next panic attack, which differs from panic as an emotional state designated for a traumatic event already in process⁽⁴⁾.

The interpretation of body sensations as panic activators is crucial for many patients. According to the model by Clark⁽⁵⁾, which developed the concepts by Griez and Hout⁽⁶⁾ and Beck, Emery and Greenberg⁽⁷⁾, predecessors in the internal environment, psychological factors are seen as mediators for physiological changes. Sensations interpreted like that are those usually associated with an anxious response, such as palpitations and breathlessness. If these body sensations were interpreted as a threaten, an apprehension state would be characterized.

Events Sequence in a Panic Attack



Clark⁽⁵⁾, Cognitive Model of Panic Disorder.

All panic attacks present neuroendocrine and autonomic activation. Tachycardia and moderate increase of blood pressure occur during panic attacks⁽⁸⁻⁹⁾.

In this study we tried to perform a systematic review of the medical literature available on panic disorder and physical activity avoidance and its possible association with a described respiratory panic disorder subtype.

METHOD

Online search was performed where the used database were the ISIS (Pub Med), Medline, Lilacs and Scielo between 1995-2005. In order to guarantee the range of search, only two terms have been used: physical activity and panic disorder. Later, articles were manually selected to be included in this review. Previous articles which reference was in the selected articles, were also manually selected.

Twenty-eight published articles with this uniterm have been found. Four of them were excluded either for being review articles or not being specific about the researched topic. The 24 remaining articles were described here, in three specific topics: physical activity and anxiety disorders, respiratory panic disorder subtype and physical exercise as exposition treatment to interoceptive stimuli in panic disorder.

LITERATURE REVIEW

Physical activity and anxiety disturbs

It has been observed that exercising may reduce anxious symptoms not specifically measured: Martinson *et al.*⁽¹⁰⁾ observed reduction in anxiety scores after eight weeks of aerobic exercises or weight training and relaxation in hospitalized psychiatric patients and that involvement with exercises and sports was associated with reduction of readmission in non-psychotic psychiatric adult patients⁽¹¹⁾.

Sexton *et al.*⁽¹²⁾ followed 'infirmary neurotic depressive' patients sent to walking or jogging programs for a year and observed improvement in depression and global symptoms. The effect was independent from aerobic conditioning, although as time passes by the anxiety levels were lower in the group which has reached better aerobic conditioning.

Physical activity in panic disorder

Broocks *et al.*⁽¹³⁾ performed a study comparing patients with panic disorder submitted to treatment with clomipramine, patients exposed to running aerobic training and a placebo group. The authors observed improvement in treatment with clomipramine in all scales compared with the placebo group (Bandelow Panic Agoraphobia Scale, Hamilton Anxiety Scale, Clinical Global Impression Scale) and only in the Clinical Global Impression Scale comparing with the running group.

Broocks⁽¹³⁾ in a study which tried to evaluate the responses of many treatments to the panic disorder, observed important data; 31% of the patients treated with physical exercises abandoned the study versus 0% from the other treatment groups.

Since the patients tend to interpret the autonomic alterations caused by exercises as a trigger for panic attacks, it is possible that these patients develop avoidance to physical activity.

According to Strohle *et al.*⁽¹⁴⁾ aerobic exercise has a good response as anti-panic activity in healthy subjects induced to panic attacks; however, the exercise intensity and duration optimization is still need to be characterized for the desired response.

Nevertheless, in these previous studies the differentiation between panic of respiratory subtype and non-respiratory was not conducted, which could theoretically help to identify a group particularly sensitive to physical symptoms of the panic disorder, in which physical activity avoidance would be more important.

Subtypes of panic disorder

According to Hegel and Ferguson⁽¹⁵⁾ there are differences in the respiratory function between patients with panic disorder and oth-

er anxiety disorders, as well as between the individuals with panic disorder.

Some individuals with panic disorder show signs of compensated respiratory alkalosis (that is, decrease of the carbon dioxide levels and bicarbonate with pH almost normal). Panic attacks in response to infusion of sodium lactate or inhalation of carbon dioxide are more common in the panic disorder than in other anxiety disorders⁽¹⁶⁾.

Based on these differences, Briggs *et al.*⁽¹⁷⁾ and Broocks *et al.*⁽¹³⁾, did a dichotomy of the panic disorder, splitting it in two parts, the respiratory panic disorder and the non-respiratory panic disorder.

In the respiratory panic disorder, the subjects would have symptoms more directed to the respiratory part, such as breathlessness, hyperventilation, dizziness and tachycardia. Hyperventilation, when in large extension and during very prolonged time, leads the subject to a hypocapnia state, that is, a chronic respiratory alkalosis which is characterized by dyspnea and tachycardia. This very same remark led some researchers to propose that panic attacks would be related with the hypersensitivity of the autonomous nervous system to the carbon dioxide, due to CO₂ rates not normally low of these patients, derived from chronic hyperventilation. This state would induce a compensatory adaptation of the nervous system making it hypersensitive to CO₂. The triggering of this hypersensitive respiratory control mechanism would directly or indirectly lead to panic attacks⁽¹⁸⁾.

Such state leads to an increase of the respiratory rate and effort which is experienced as an aversion by the subject. Some studies suggest that the respiratory panic is induced by lower resistance to the CO₂ accumulation in the body, leading to a cascade reaction situation, triggering panic crisis⁽¹⁹⁾.

CONCLUSION

In this review we approach the possibility of physical exercise use as exposition to interoceptive stimuli therapy in the treatment of panic disorder, specifically the respiratory subtype.

The first behavioral techniques used in the treatment of phobias were the Systematic Dissensibilization by Wolpe⁽²⁰⁾ and the Implosion by Stampfl and Levis⁽²¹⁾. The Systematic Dissensibilization and the Implosion are techniques which are based on the Two-Factor Theory by Mowrer, which proposes that the phobic avoidance reducing fear reinforces it and keeps a vicious circle. While trying to identify the factor which would make these techniques efficient in anxiety reduction, it was observed that the exposition to the real phobic situation is the active ingredient of these techniques⁽²²⁾.

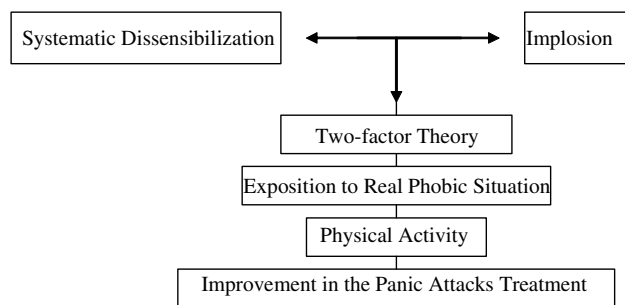
Exposition is the crucial factor of the treatment. It consists in remaining in contact for prolonged time with the elements triggering of the panic attacks (external, cognitive or interoceptive) or situational anxiety. In order to be efficient, it should last until the anxiety significantly decreases or ceases; it should be planned, systematically repeated and the attention should be focused on the exercise.

Panic attacks can be treated by exposition to the physical sensations experienced during them. The easiest way to cause these sensations is through hyperventilation. Other ways include to lower and raise the head fast, to spin around on a chair, to tense a specific muscular group, to hold breath with the thorax full of air, to empty the thorax and cross the arms around it contracting the muscles to the inside, to run on the same spot, to expose to bright light, sudden temperature changes, catastrophic thoughts, etc.⁽²³⁾.

A more pleasant exposition to interoceptive stimuli therapy would be through physical activity. Increase in respiratory frequency and effort which in return is catastrophically interpreted by the subject. Some studies have shown respiratory panic is induced by lower resistance to CO₂ accumulation in the body, which leads to a chain reaction situation triggering in panic⁽¹⁹⁾.

The study of exercise as a more pleasant exposition therapy alternative to interoceptive stimuli, with the aim to modify the catastrophic conditioning of the body sensations, suggests an improvement in the quality of life of patients with panic disorder.

Flowchart of Behavioral Techniques



It becomes clear and evident in this flowchart the grounding of the concepts in the approach of physical activity as a simulation to real phobic exposition directed to patients with panic disorder.

The table below represents a brief summary of the main studies mentioned in the text.

PHYSICAL ACTIVITY AND ANXIETY DISORDERS

Author	Year	Method	Conclusion
Broocks <i>et al.</i>	1998	Patients with PD Treatment: Clomipramine x Physical act x Placebo	Improvement in treatment: Clomipramine: 90% Physical activity: 80% Placebo: 0%
Strohle <i>et al.</i>	2005	Healthy individuals induced to panic attack + Physical act	Increase of anti-panic response
Martinson	1994	Non-psychotic psychiatric patients + Physical act	Decrease in the anxiety levels and lower index of readmissions
Sexton <i>et al.</i>	1989	Depressive patients + Physical act	Decrease of depression levels and increase of quality of life

In the table all studies show the characterization of physical activity as an aiding factor to the anxious disorders treatment.

An additional advantage to this kind of treatment is the conditioning itself derived from systematic physical exercise as well as reduction of cardiovascular risk associated with it.

Actually, Kawachi *et al.*⁽²⁴⁾ have observed that subjects with panic disorder, anxiety and phobia, in a naturalistic follow-up study, have from three to five times more chances to develop some coronaryopathy or experience sudden death. The author adds this finding to a possible consequence of autonomic dysfunctions; however, the physical activity avoidance may represent an additional risk factor.

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