Contents lists available at ScienceDirect

Complementary Therapies in Clinical Practice
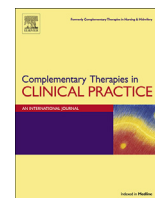
Immediate effect of basic body awareness therapy on heart rate variability

Alessandra Madia Mantovani [a], Cristina Elena Prado Teles Fregonesi [b],
Roselene Modolo Regueiro Lorençoni [b], Nathalia Ulices Savian [b],
Mariana Romanholi Palma [b], Afonso Shiguemi Inoue Salgado [c],
Luís Vicente Franco de Oliveira [d], Rodolfo Borges Parreira [c, *]

[a] PhD Student in Science Motricity, Institute of Biosciences, Universidade Estadual Paulista, Rio Claro, SP, 19060-900, Brazil
[b] Department of Post Graduate Program of Physical Therapy, Universidade Estadual Paulista, Presidente Prudente, 19060-900 Brazil
[c] School of Postural and Manual Therapy, Salgado Institute of Integral Health, Londrina, 86055-240, PR, Brazil
[d] Rehabilitation Sciences Master and Doctoral Degree Program - Nove de Julho University, UNINOVE, Sao Paulo, SP, 01504-000, Brazil

ARTICLE INFO

ABSTRACT

Objective: To determine the immediate effect of a Basic Body Awareness Therapy (BAT) session on measures of heart rate variability (HRV) in healthy young people.
Methods: 13 healthy young subjects of both genders, who showed no illnesses related to the autonomic nervous system (ANS) underwent an ANS evaluation before and after conducting a session of BAT. The assessment of ANS activity was conducted through the HR with the aid of Nerve-Express® software. The BAT session lasted for 50 min and was performed by one investigator (blinded to the assessment procedures).
Results: After BAT session significant improvement was found in the sympathetic and parasympathetic modulation ($p < 0.05$), and the general estimate of heart rate variability ($p < 0.04$).
Conclusion: BAT was found to be an effective, easy to apply and inexpensive therapeutic technique, able to change ANS in order to improve HR which may suggest better health conditions for participating individuals.

1. Introduction

Like other organs of the human body, the heart is dually innervated, and through the wide variety of physiological factors which determine cardiac function (heart rate (HR)), the autonomic nervous system (ANS) is the most relevant, so that a relative increase in sympathetic activity is associated with increased HR while an increase in parasympathetic activity is associated with decreased HR [1]. One method of evaluating a complex system is through temporal analysis of a suitable variable, for example, the interval between successive beats of a heart cycle [2]. This system is regularly assessed through heart rate variability (HRV), using markers of differentiation of the heart, which allows continuous observations of fluctuations in heart rate related to the sympathetic and parasympathetic efferent activities, directed to the sinus node and "fired" by the central and peripheral receptors [3,4].

HRV is analyzed in the time and frequency domain analysis where the time variations are quantified as the differences between successive RR intervals [3], while the analysis in the frequency domain allows the calculation of high frequency, which is mediated by vagal activity [5], and low frequency, which has been suggested to represent predominantly sympathetic modulation [6]. This technique is widespread among various fields of physiotherapy for the evaluation and promotion of mental or physical welfare [7—11]. In the context of physical therapy, Basic Body Awareness Therapy (BAT) is a mind-body activity tool that focuses on body awareness as a basic level of self-awareness [12].

Basic Body Awareness Therapy (BAT) is a form of physical

* Corresponding author. Rubens Carlos de Jesus, st. # 355, 86055-240, Londrina, Paraná, Brazil.
E-mail addresses: leka_indy@hotmail.com (A.M. Mantovani), cristina@fct.unesp.br (C.E.P.T. Fregonesi), roselene@fct.unesp.br (R.M.R. Lorençoni), natysavian@hotmail.com (N.U. Savian), marianaromanholi@hotmail.com (M.R. Palma), afonsosisalgado@yahoo.com.br (A.S.I. Salgado), oliveira.lvf@uninove.br (L.V.F. de Oliveira), dolfo23@yahoo.com (R.B. Parreira).

therapy with a holistic approach that involves focusing attention on awareness of internal body sensations, directed to an awareness of how the body is used in terms of behavior, interaction with the self and others [12,13]. Basic BAT consists of simple exercises such as stopping moving whilst sitting, lying, standing or walking, with an emphasis on each moment of the movement. The principles used in this therapy are to work with experiences to increase contact with the ground, postural control and awareness of the body [12]. A focus on emotions is important in basic BAT; it helps patients to become aware of feelings and emotions in the body, one of the main foci of treatment, and the physiotherapist confirms these emotions as they are continually emerging [14]. It has been seen that psychological factors such as anxiety and depression and coping strategies are important predictors in the genesis of chronic musculoskeletal conditions [15].

Basic BAT can be used in various clinical settings both for prevention and rehabilitation, particularly by improving aspects of pain and mental health as demonstrated above, however, to analyze the relationship between basic BAT and the body-mind integration and modulation of emotions on the behavior of the ANS, it is necessary to investigate the possible changes through HRV analysis before a session of basic BAT. The aim of this study was to determine the immediate effect of a session of basic BAT on the HRV parameters of healthy young people.

2. Methods

2.1. Participants

The sample consisted of 13 subjects, two males and 11 females (20.5 ± 0.76 yrs), which of the total participants, 85% regularly engaged in physical activity. Subjects are from the student body of the Faculty of Science and Technology, Universidade Estadual Paulista, Presidente Prudente/SP-Brazil, who presented no illnesses related to the ANS. Participants were asked to refrain from stimulants and/or alcoholic substances for at least 12 h prior to the ANS examination. All procedures were submitted to and approved by the Research Ethics Committee of FCT/UNESP (Protocol n^0 2178113.9.0000.5402) and all participants, after reading and agreeing to the procedures and purposes of the study, signed a Free and Clear Consent Form.

2.2. Assessment

Initially, personal data was collected through a semi-structured interview, following which; the participants underwent an anthropometric assessment (weight, height and body mass index). The ANS activity (sympathetic and parasympathetic), through HRV, was evaluated both before and after a session of basic BAT, with the aid of Nerve-Express® *software* (Heart Rhythm Instruments, Metuchen, NJ, EUA). Data were recorded by means of a transmitter belt (Polar® T31 coded™ transmitter, Electro Oi, Finland), placed on the chest of the participant at the xiphoid process, and a heart rate receiver attached to the waist and linked to a computer for processing and storing captured data.

The subject began the test on a stretcher in the supine position and after 192 RR intervals the patient was asked to stand up and looking at a wall, remaining in this position for a few minutes until the end of the test. The test was determined as being completed after 448 RR interval points, which represents approximately five minutes. A recording of approximately 1 min is needed to assess the HF components of HRV while approximately 2 min are needed to address the LF component. In order to standardize the procedure, 5 min recordings were performed according to the standard measurement of heart rate variability of the European Society of Cardiology and The North American Society of Pacing and Electrophysiology (Task Force of the European Society of Cardiology and the North American Society of Pacing and Electrophysiology 1996).

All assessments took place in a controlled environment (i. e. light, temperature, and sound). HRV signals were compiled with MATLAB routines (The Mathworks, Natick, MA) and analyzed in both the time and frequency domain using the software Kubios HRV version 1.1 (Biosignal Analysis and Medical Imaging Group; Kuopio, Finland). The frequency bands analyzed in this study were in accordance with previous guidelines published by the American Heart Association which state the recommendations for HRV measurement and interpretation [16]. The variables used in this study for the time domain (obtained by determination of correspondent RR intervals at any point in the time) [16,17], were mean RR (mean values of N–N intervals from a period of time), HR intervals (beats/min), SDNN (standard deviation of the N–N intervals – an estimate of total HRV) and rMSSD (square root of the mean squared difference of the successive N–N intervals – a parasympathetic marker); these variables are routinely measured in the supine position. In the time domain a nonlinear method, the Poincaré plot, was used, denoted by SD1 that describes the standard deviation of the beat-to-beat short-term variability, characterized as a marker of parasympathetic modulation; and SD2 which represents the long-term standard deviation of the continuous R–R intervals, characterized as a marker of parasympathetic and sympathetic modulation [18]. HRV triangular index (HRVtri) was obtained as the total number of RR intervals divided by the height of the histogram which depends on the selected bin width [16]. This method present RR intervals in geometric patterns and various approaches are used to derive measures of HRV from them, and is an estimate of overall heart rate variability [19].

The frequency domain (contributing to an understanding of the autonomic background of RR interval fluctuations in the recorded heart rate) was measured in both the supine and orthostatic positions, and the variables analyzed were; the low frequency power (LF – is modulated by both parasympathetic and sympathetic activities) and high frequency power (HF – modulated exclusively by parasympathetic activities). The LF/HF ratio was considered as a marker of the sympathovagal balance.

2.3. Therapeutic intervention

The body awareness performed in this study it was based on body working methods devised by physiotherapist Serge Peyrot (creator of the Morfoanalitica Therapy) [20,21,22]. The session was led by a physical therapist with background in Morfoanalitica Therapy. The BAT session lasted for 50 min in a comfortable environment, regarding light and sound. The practice included body awareness, moving, diaphragmatic breathing and massage. The session began with participants standing. Later they were in the supine position and, as guidelines were getting consciousness touches and non-touches the body structures with the ground. They were oriented to the perception of diaphragmatic breathing. The massage was made with the body movement on a foam cervical support or body movement on the ground. The session ended with the participant feeling again each body part and realizing how responded to therapy. After was performed a group moment, where each participant shared the bodily sensations and feelings experienced during therapy. The experience of body awareness began asking to the participant to feel the different parts of the body - through the own presence of the body part to perceptions of the sensations of the skin surface, weight and volume, so get in touch with your body [23].