

Dance Therapy Improves Quality of Life in Individuals with Neuromotor Disorders: Randomized Controlled Trial

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Abstract

Background: Dance is a possibility of non-verbal communication. It is supposed that, as a therapy, dance can embrace and interconnect cerebral areas responsible for the cognition, emotion and motor action. Objective: The aim was to investigate the effect of Dance therapy on life quality in individuals with neuromotor disorders. Methods: This controlled and randomized clinical trial was composed two groups: Dance therapy and Kinesiotherapy. Both of them were undergone to a 1-hour treatment, twice a week, along two months. The Short-Form 36 questionnaire about Life Quality (Brazilian version) was used as an instrument of evaluation. The applied procedures in the groups Dance therapy and Kinesiotherapy were conducted in suitable locations for the therapies. Results: Twenty-six subjects were proportionally allocated into those two groups of study. The findings suggest impairment in quality of life in various rules in both groups when analyzed through SF-36. The worst scores of this criterion were observed into the physical limitation field in both groups (Dance therapy 20.76±6.76, Kinesiotherapy 37.69±8.05). A Significant difference was observed through the following items: functional capacity ($p=0.019$); general health ($p=0.015$); social aspects ($p=0.002$) and limitation for emotional aspects ($p=0.039$) only for the group Dance therapy after treatment. Conclusion: This group promoted enhancement on the quality of life in patients with brain-related neuromotor disabilities.

Keywords: Dance Therapy; Rehabilitation; Brain Diseases; Muscle Hypertonia; Quality Of Life.

BACKGROUND

Man, as an individual, acts in the world through his body which moves allowing him to communicate, work, learn and feel the world[1,2]. Individuals with brain-related mobility limitations were difficult to demonstrate and express their individuality to the society[3]. A way to enhance the perception and processing of the external environment is through teleceptive stimuli–activation of visual and auditory senses and the vestibular system–which activate brain regions responsible for transmitting information by the sensory pathways[4,5].

Through these stimuli, it seeks the focus of intervention through the dance- therapy, as highlighted by Duignanet *al*[6] for its psychomotor as well as psychosocial importance. Dance as therapy is relevant for its precepts of public health, as it promotes health, prevents diseases and provides longevity by improving health and biological, psychological and social well-being[6,7].

Neurological diseases reduce quality of life because they affect the physical, cognitive, emotional and social aspects[8]. Brain injuries weaken cognitive and space-time orientation and this reflects on the difficulty to interact and to position itself in a situation, which affects the concepts of life quality[9,10].

Other studies that assessed life quality in subjects with neurological disorders, with similar methodological design, compared the effects of dance-therapy with other physical activities. Some researchers have conducted studies on interventions to identify the effects of various forms of dance on life quality among the elderly, and also in patients affected by Parkinson disease, schizophrenia and dementia[6,8,12,13].

Therapeutic approaches that promote integration of people with disabilities in social and

cultural contexts are of fundamental importance[14]. The therapy through dance allows exploration of space, transforms the environment and generates self-confidence, autonomy and independence[15]. Just as the aesthetic state, i.e., the identification of a body capable to produce something to the external environment, allowed by dance, boosts the sensitivity inherent in man, and questions the physicality is the body's ability to think[16]. And this physicality reflects into an organized movement (the state of thinking) that leads a movement to represent this individual[16]. The focus of the present study was to offer new proposals of therapeutic procedure aiming the improvement of well-being and life quality in people with physical disabilities in association with the benefits envision a more functional neuromotor apparatus. Following this, the present review was performed to add to the scarcity of knowledge in this area regarding possible contributions that dance, as a therapy, generates in patients with neuromuscular limitations.

METHODS

Formerly, a written informed consent term, approved by the Ethics Committee on Research from the Federal University of Sergipe, was obtained from all patients before their participation.

STUDY DESIGN

This study was a controlled and randomized clinical trial. After signing the informed consent term, the subjects were randomly enrolled into two groups according to a computer-generated randomization sequence: (1) Dance Therapy (DT) or (2) Kinesiotherapy (KT). Randomization occurred following an order in which patients were enrolled in the study according to what the computer system prepared before the beginning of the study. A blocking procedure was performed to generate a sequence of allocation in order to ensure that there was a close balance of numbers in each group at any time during the study. After every block, the number of participants in each group should be equal, in a 1:1 ratio.

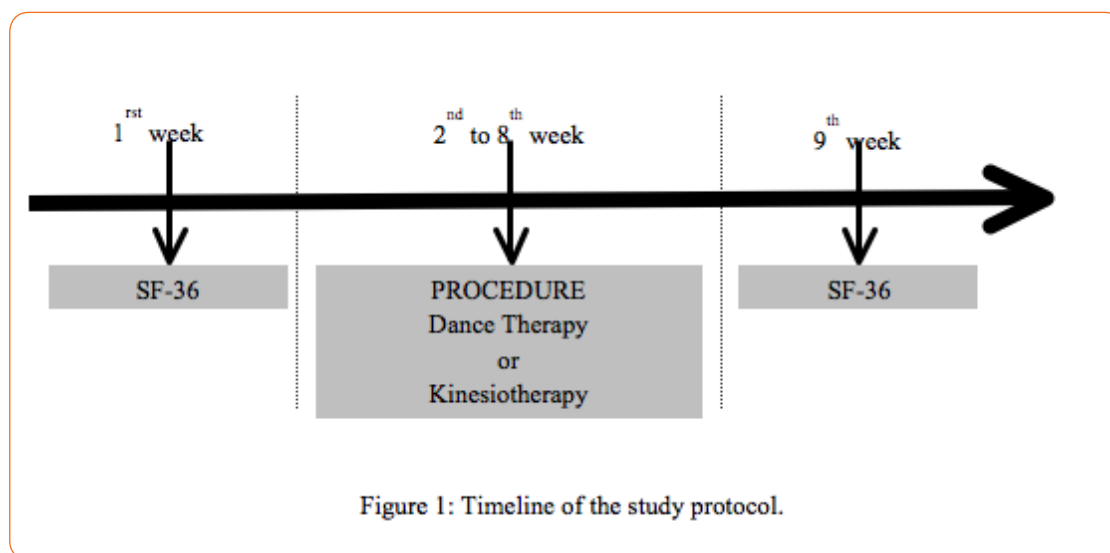


Figure 1: Timeline of the study protocol.

SUBJECTS

The inclusion criteria were as follows: subjects with brain-related neuromotor disabilities from both genders; aging between 15 and 29 years-old; muscle hypertonia determined through a passive movement examination; no parallel physical activity during the research protocol development; absence of cardiopathy or neoplasia. This research used as exclusion criteria the events associated with cognitive or psychiatric disturbances and refusal to continue participating in the study. The subjects were randomly allocated in one of the following groups: DT which was composed by subjects with neuromotor disabilities and undergone to Dance therapy

sessions; and the KT composed by subjects with neuromotor disabilities who were undergone to Kinesiotherapy sessions, featuring as a control group. An estimative of intended size sample bias to study groups was fixed using the demographics data of the twelve first involved subjects in the study. An $\alpha = .05$ and a power of 75% indicated a size sample bias of twelve subjects for group.

Experimental Protocols Dance -Therapy

DT Group received dance sessions based on the concepts of Feldenkrais, Horton, Graham and Laban/Bartenieff. Sessions of 1 hour, each one, were performed twice a week, along two months. Four sets with eight repetitions for each procedure were performed as follows: (a) global range of motion (ROM): coordinated and rhythmic dynamic activities in the ROM through floor exercises according to Feldenkrais and Graham methods; (b) motor coordination: coordinated movements of upper and lower limbs emphasizing opposite directions and the proposed diagonals through Feldenkrais and Laban/Bartenieff methods; (c) body image: interaction between executer and environment (space-time orientation); linkage of simultaneous movement components (time coordination); proprioception (inside knowing/perception of the movement) suggested by Feldenkrais, Horton and Graham methods; (d) skill and agility: linkage of sequential movement components (anticipatory adjustments in the course of the movement); movements of torso and head who aid spatial orientation and stimulate equilibrium notions proposed by Graham and Laban/Bartenieff.

Kinesiotherapy

The KT group received traditional therapeutic exercises, including Bobath and Kabat methods and Frenkel, as well as proprioception exercises, during one hour, twice a week, along two months. Four sets with eight repetitions for each procedure performed as follows: (a) global ROM with passive and active stretching exercises; (b) motor coordination: coordinated movements of upper and lower limbs emphasizing opposite directions and the proposed 55 through Kabat method; (c) body image: space-time orientation, dynamic activities following the neuroevolutive scale suggested by Bobath method; (d) skill and agility: proprioception activities; association of more than one movement to instigate flowing movement with Frenkel and proprioception exercises.

Assessment Instruments Social Demographic Data

An entrance form was used in baseline to collect demographic data (name, age, weight, job, marital status, general characters, and history of disease, preceding familiar, physiologic and social histories) and information registering related to the patients' functional activities inside the research.

Quality of Life

To assess the life quality we used the Brazilian version of SF-36 (Medical Outcomes Study 36 – Short Form Health Survey Item – SF-36). The Brazilian version of SF-36 is widely used in various areas of health for assessing life quality^{9,10,11}. The SF-36 includes a multi-item scale that appraises eight dimensions: 1) limitations in physical activities due to health problems; 2) limitations in social activities due to physical and emotional problems; 3) limitations in usual activities due to physical health problems; 4) body pain; 5) general mental health (psychological stress and well-being); 6) limitations in activities due to emotional problems; 7) vitality (energy and fatigue) and 8) general health perception. The questions are designed for easy understanding and relevant to most people. About five to ten minutes are required to complete the questions. The SF-36 Questionnaire (Brazilian version) was applied in two occasions: before starting the Dance Therapy and Kinesiotherapy sessions and two months after the protocol's completion.

Protocol Procedure

The procedure applied in the DT group was made in dance class with parallel bars, mirror and sound equipment. The procedure applied in the KT group took place in ambulatory for physical

therapy in the Ninota Garcia Rehabilitation Center from Tiradentes University in Sergipe State.

Statistical Analyses

The collected data were carried to data worksheet Excel for Windows 2007, and then to SPSS program, 17.0 version, for the following analyses: (a) descriptive analyses: frequency table confection, position measures (average, minimum, maximum) and dispersion (average standard error); (b) comparison: T-Student test for dependent and independent variables. Data with $p \leq 0.05$ results were considered statistically significant.

RESULTS

Thirty-two subjects were eligible to begin participation in this study. Two subjects were excluded from the study because they aged less than thirteen years old. Thus, 30 subjects began the research. During the implementation of protocols two participants concluded physiotherapy sessions and other two gave up their participation. Twenty-six patients were distributed in two research groups. KT Group was allocated with a thirteen roll, where there were five women and eight men. The DT Group, also compose by Thirteen subjects consisted in seven women and six men, (Figure 2). Age and weight were statistically similar for both groups (Table 1). The worst scores for the life quality were observed in the physical limitation field in both groups (KT: 37.69 ± 8.05 ; DT: 20.76 ± 6.76 : Tables 2 and 3).

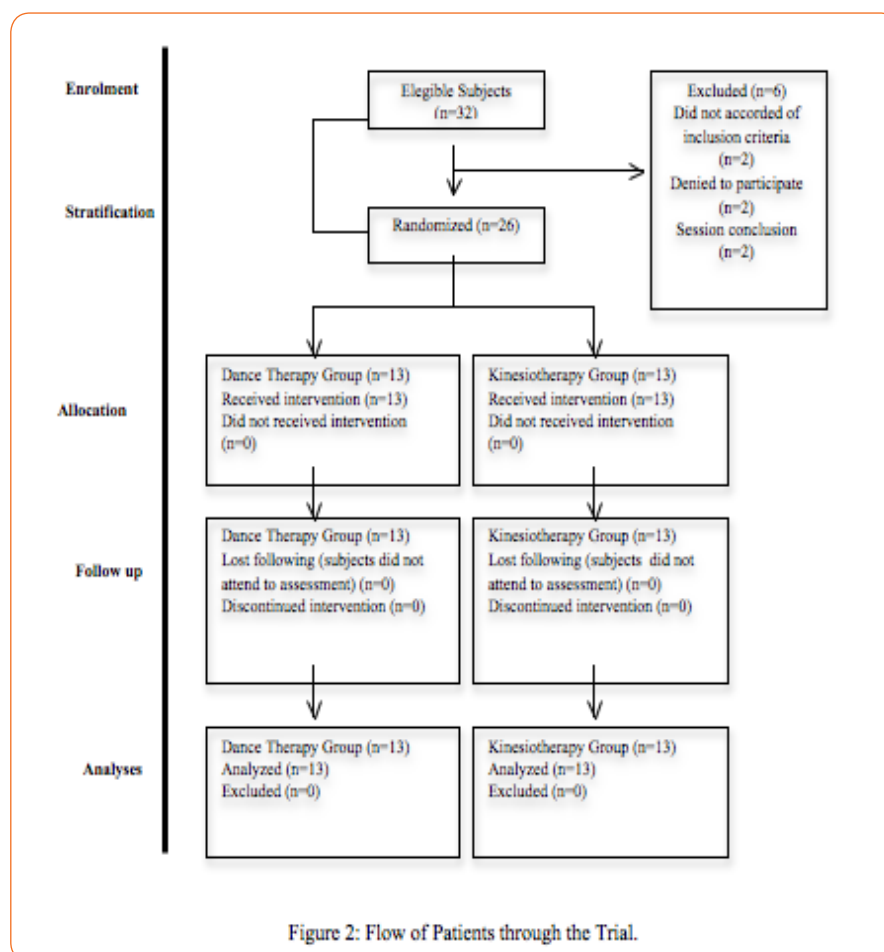


Figure 2: Flow of Patients through the Trial.

Table 1: Age (years) e weight (Kg) of the subjects included in the groups Dance Therapy and Kinesiotherapy.

Demographic Characteristics	Dance Therapy	Kinesiotherapy	P
Age (years)	20.46±2.19	20.61±2.31	.88
Weight (Kg)	58.77±3.83	59.54±3.86	.79

Mean±SEM and P. T-Student test.

Table 2: SF-36 Questionnaire domains before and after the Kinesiotherapy intervention.

SF – 36 Domains	Stages of Intervention with Kinesiotherapy		P
	BEFORE	AFTER	
Functional Capacity	37.69±8.05	39.23±7.67	.16
Limitation of Physical Aspects	46.15±8.41	46.15±8.41	1.00
Pain	74.92±6.08	75.69±6.60	.34
General Health	56.07±1.41	56.07±1.41	1.00
Vitality	60.38±3.60	61.53±3.50	.19
Social Aspects	59.61±7.23	59.61±7.23	1.00
Limitations of Emotional Aspects	51.00±10.40	51.00±10.40	1.00
Mental Health	79.69±2.14	79.69±2.14	1.00

Mean ± SEM and P. T-Student test for dependent variables.

There was an improvement in both functional capacity and vitality and also pain reduction for the KT group, although these results were not statistically significant (Table 2). From the analysis of SF-36 domains there was a statistically significant difference for the items functional capacity ($p=.019$), general health ($p=.015$), social aspects ($p=.002$) and limitations by emotional factors ($p=.039$) in DT group (Table 3).

Table 3: SF-36 Questionnaire Domains before and after the Dance Therapy intervention.

SF – 36 Domains	Stages of Intervention with Dance Therapy		P
	BEFORE	AFTER	
Functional Capacity	20.76±6.76	30.76±6.83	.02*
Limitation of Physical Aspects	46.15±10.14	53.84±10.53	.22
Pain	55.23±9.42	57.00±9.69	.66
General Health	50.76±3.38	57.53±2.45	.01†
Vitality	41.92±5.64	41.53±5.50	.86
Social Aspects	60.57±9.15	72.11±9.82	.01†
Limitations of Emotional Aspects	63.69±8.81	74.15±10.10	.03*
Mental Health	45.4±2.29	49.84±3.05	.13

Mean±SEM and P. T-Student test for dependent variables. * $P < .05$; † $p \leq .01$.

DISCUSSION

The significant improvement in the functional capacity, general health, social aspects and limitation for emotional aspects domains in DT group was similarly found in the study by D'Alencar et al[12] with older people regarding to the improvement of functional capacity and social aspects. Another similar study with deaf patients investigated the aesthetic education level in dance and its influence for their socialization, and how important was the integration of individuals with the outside world[18]. These data corroborate our findings. Most studies with similar methodological design to our study show the benefits of dance therapy in various other diseases and neuromotor impairments such as lung and mama cancer[19], Parkinson's Disease[8], rheumatoid arthritis[20], dementia[21] and elderly[17]. These studies have found that dance therapy helps to improve the quality of life, as evidenced by Duignan *et al*[6] in reducing anxiety, a key factor for the psychological status without significant changes in motor impairment. The emotional aspects were also accentuated by Goodill[22], who observed the effectiveness of dance therapy, evidencing the pleasure to dance as a stimulus to the process of communication with the outside world. Similarly, the findings by Eyigoret *et al*[6] have elucidated the integration of sensorimotor process through dance therapy intervention. Some studies indicate the benefits of dance in relation to depression in cancer patients[23], elderly[16], teenage depression[24]. According to Goodill[22] and Sacks[25], the rhythm accompanied by

movement foments analytical and symbolic perception and, thus, allows location and structure of time dimension, thus as perception, creation and expression of a developed movement in itself and natural space-time[26]. Observing these criteria the dance is a creative possibility of non-verbal communication that uses movements/thoughts of knowledge registered in the body. This creative possibility that develops movement must occur due to dance-therapy acting as a set of possibilities where the body explores always searching for a better solution, because it promotes satisfaction and sense of well being that can act as an evolutionary and adaptive strategy. Moreover, the dance communicates tacit knowledge, linked to the cognitive unconscious and depends on the processing information and the use of subjective insights. Pondering the peculiarities of each individual is fundamentally important in regard to the limiting factors of purposeful movement. So, dance as therapy is based on the concepts by Rouhiainen[27] and Sacks[25] about the brain having the ability to recognize rhythms and musical structures and give an emotional meaning. Physical aspects, although limiting, do not restrict the human being from having an active and participative social life, is crucial to achieve the concepts of bio psychosocial health, since health covers not only the physical but also psychological terms.

The significant improvement of functional capacity in DT group shows that dance therapy allows to discover new ways to better use of the body, not only it uses important components of motion as balance, posture, coordination, dexterity, but also promotes daily life activities. This was observed in a study by Hackney and Earhart⁴ in Parkinson Disease using tango and waltz as easy ways of functional capacity by optimizing the balance and gait, as well as social interaction, because the activities require dancing with a partner. The individual who is limited by its physical weakness cannot impose meanings of context because he is lack of tools that enable the excellence of his social integration. The arts, emphasizing the dance, are supports for the sensory motor rehabilitation in the relationships configuration that enable the body to act on the possibilities for the inclusion and integration in the community. The emotional weakness in cancer is well described in studies by Alpert and colleagues[28]. The intervention of dance as a therapy resulted in substantial improvement in physical and emotional needs in women after cancer treatment[19]. Dance enhances the emotional state to be rather keen on the motivation precepts, being effective in the improvement of the general state of health, either in cancer patients or in patients with neuromotor disorders, as the conductive principle of emotional states is common to both of them[29]. Noreau *et al.*[20] emphasized the positive changes in the force and function of limbs in patients with rheumatoid arthritis. The presence of a chronic disease is associated with worsening quality of life of a population, as exposed by Hackney and Earhart[8] as well as reduced life quality in patients with brain injury, when compared with general population. None of the above authors used the Short Form-36 Questionnaire for evaluating life quality. The instruments used in previous studies for evaluating it were structured and semi-structured questionnaires directed to specific diseases, and no protocol for valuing the already mentioned criterion for individuals with neuromotor disorders was found. Only one specific protocol for individuals with Parkinson Disease in study by Hackney and Earhart was observed[8].

From a statistical point of view, the results were not significant in KT group. In DT group there was no significance in the items of physical limitation, pain intensity, vitality and mental health. However, from clinical point of view, the SF-36 is a generic instrument to assess life quality, and it was used because it is widely reported in numerous studies and also for being the best in its category. There is not yet an appreciation tool for QOL specific for individuals with neuromotor disorders, a fact that disabled the analysis of changes during the sessions to what the subjects were submitted in both groups. The item on the physical limitation from the SF-36 discusses about activities such as running, participating in sports, lifting or carrying groceries, moving table, climbing stairs, tasks that are not executed, mostly by the population studied, as perceived in our sample. It is important to note that the physical limitation dimension measures especially

the performance in daily physical activities and motor work. Patients with neuromotor disorders relating to sequelae from brain injury have neuromuscular impairment that cannot run many of the tasks asked in the generic instrument used to assess this population's life quality issue inside a physical range. The central lesion sequelae difficult and in some cases disable the manipulation of objects and compromise the body in a whole aspect[1,14]. Most of the research subjects do not ramble independently; others were affected by lesions in regions responsible for movement control, affect the skill and organization of functional motor patterns. However, dance as therapy provides the integration of individuals with neuromotor disorders in social contexts, because it extends the personal choices and responses to various aspects of life, whether emotional, relational and intellectual, and determine the satisfactory results by allowing state of well being in various levels of human perception, especially in a body with difficulties and limitations of expression.

Although several authors have reported significant improvement in emotional, functional and social in the QOL[4,6,8,19,30], none emphasized the influence of dance-therapy in individuals with brain-related neuromotor disorders. This study is reforced by the scarcity of research on the influence of dance therapy in QOL in this population and encourages the development of further studies that underscore the effects of dance of such long-term therapy.

Dance, as therapy, interferes in the cognitive processes for the preparation of the movement by asking sensory stimuli that favors expansion of the functional capacity of people with physical disability. Regarding to the social aspects, the dance-therapy enables the insertion in the social contexts of individuals with physical limitations by providing participation in social and cultural activities. Using dance as a possible improvement of neuromotor apparatus for patients with neuromotor disorders it showed to have a significant importance in the emotional aspects by building meaning and motivation to do an activity or participate in a rehabilitation program that promotes physical and emotional well-being.

The results suggest appropriation or adaptation of a protocol to evaluate QOL in individuals in different degrees of functionality, not to exclude the essential factors in subjects with a high dependence degree to perform their tasks and, then, do not be a limiting factor for achieving satisfactory ratings on all QOL items with the intervention of any conduct of physical therapy, in particular dance therapy which was restricted to the parameters that cover functional, social and emotional aspects.

The insertion in the social contexts of individuals with physical limitations enables the design of "being part of a whole", but not in the breakdown or stigma, and yet in a situation in which self-esteem is provided in the social space given or obtained for them. The individual performs roles that will allow the development of solid, respected and rewarding identity. Thus, the continued intervention of this study is of a fundamental importance not only to perpetuate the results achieved, but also the symbolic content that characterizes individuals with neuromotor disorders to be able to see themselves as part of a whole conferred on it by the application of dance-therapy in their physical and emotional contexts, especially social context.

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Citation: Lavinia Teixeira-Machado and Josimari M DeSantana (2015) Dance Therapy Improves Quality of Life in Individuals with Neuromotor Disorders: Randomized Controlled Trial. *IJHSSE* 2(4), PP: 84-92.