Parkinson's Disease Treatment: The Role of Music Therapy

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7.1 Introduction

In the last decades, Parkinson's disease management approach has changed, becoming both global and person-centered at the same time and ready to focus both on movement disorders and on the sick person in its wholeness.

On these bases, therapy will succeed not only in treating the "cardinal" motor symptoms but also in balancing all the other spheres of everyday and social patient's life. In other words, the whole quality of life, both actual and personal, should become the main principle of efficiency and primary outcome beneath clinical trials [1].

The framework of the therapeutic outcome is expanded: education and training, diet, physiotherapies, and finally alternative therapies are all part of the global program [2]. However, to discuss the specific role of music therapy for PD, we should first introduce the complementary therapies, which include music therapy, and the new trend that excludes the word "therapy" from complementary methods if they're not strictly medical, using instead the word "well-being."

7.2 Complimentary Methods

In Western nations, more and more people decide to utilize "complimentary or unconventional medicine" (also called "alternative") to treat both chronic disorders like headaches, backaches, anxious-depressive neurosis, and in some cases looking for hope in incurable or terminal illness. However, this field is quite hard to define: doctors and other healthcare operators with perfect curriculum act within it, but also some ambiguous healers do, and all of them have in common the adoption of

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therapies that are not taught at medical school or available in hospitals. There's a lot of debate about those methods between supporters and detractors and I'd rather abstain from taking part to it, but, in brief, complementary medicines promote healthcare by scanning every aspect: physical, psychological, emotional, cognitive, social, and spiritual.

The emphasis is put on word "holistic," from Greek "Olos" meaning "all," and it never omits, but it enhances the emotional sphere and the personal feeling of the sick person. In this concept, illness doesn't come only from biological dysfunctions, but it also concerns the whole person even with its deep, psychological, and social aspects. In the United States and in the rest of Europe, holistic interventions are more common than in Italy and are led by the practitioner himself in agreement with doctors, nurses, and other health operators. According to World Health Organization (WHO), 15% of Italians turn to alternative medicine. In this context, the Technical Scientific Committee of Lombardy Region (CTS) assumed that supporting new therapeutic techniques is "ethically unacceptable" until (1) their safety and effectiveness aren't at least at the same level of the other available therapies, and (2) provided safety and effectiveness criteria, in order to protect both citizens and operators themselves. Among alternative methods, music therapy plays an important role since it is widely adopted in medical and nursing environments and it has gained mass media attention.

7.3 Music Therapy (MT)

According to the World Federation of Music Therapy (WFMT)'s definition, "MT is the professional use of music and its components as an intervention in medical, educational, and everyday environments with individuals, groups, families, or communities who seek to optimize their quality of life and improve their physical, social, communicative, emotional, intellectual, and spiritual health and wellbeing".

However, today the use of MT in the medical environment is random and depends on the medical directors' culture and purposes. Besides cultural reasons, one of the critical points is the lack of regulation about the music therapist's curriculum. In order to find a quick answer to the question, the experts advise the nurses and the other health operators to increase their professional skills with a basic knowledge of MT. Since MT could be useful for all ages and in different healthcare areas, music therapist has to be able to work with children and adults with emotional, physical, mental, or psychological problems.

The sound/musical component applies as a therapy, especially in two operational areas: psychotherapy and rehabilitation. In the first area, music becomes a nonverbal communication channel enhancing interpersonal relation, while in rehabilitative area, the rhythmic component acts like a stimulus for motor, vocal, or cognitive function. The sound/musical stuff choice depends on the music therapy intervention requirements, on its modes, and on its final users. There are two music therapy modes: receptive and active. In the receptive MT, the subject is in listening mode, involving not only his auditory canal but also his full body, living both physical and

emotional experience. On the contrary, in active MT, the subject takes part individually or in group by producing music with his voice, body, musical instruments, or dancing being stimulated by rhythm and melody.

Music is recommended as therapy for different diseases since it could also help noncollaborative patients: bedridden, in a coma state, or if both affected with cognitive degeneration and in development but in mental retardation. Back to the objective of this article, we created a set of rehabilitative interventions based on harmonic integration between scientific medicine and alternative medicine, aiming to soothe individuals with Parkinson Disease's (PD) pain, not to unfairly promise them an impossible healing but to agree with them in order to avoid both isolation and helplessness mood, frequently gripping patients and their relatives.

7.4 Rhythm Therapy for Individuals with PD

It's easy to explain: please, hands up who has never realized he was tapping his foot while listening to music? However, this rhythmic movement is two times synchronized, since it has the same passage of the stimulus and stimulus and its reaction occur in the same moment. Actually to produce synchronization between the foot tap and a regular rhythm, an anticipation system at a cerebral level should work; in fact the synchronization is different from the reaction caused in answering the phone. The answering signal of synchronization isn't the rhythmic stimulus but the time interval among the following beats and, if the frequency is regular, synchronization shows by anticipating the following beat. Since synchronization is an irrepressible phenomenon, we may use rhythm by inducing a movement in a part of the body and then accelerating or slowing the frequency. Rehabilitation through rhythm could be extended to voice, because phonation also depends on a motor activity. Besides, rhythmical experience has a natural "social feature" in dance, march, and choral singing, which are typical rhythmical collective phenomena. On this basis, it comes out that the auditive system is a very fast processing system for acoustic information and an excellent decoding system for the rhythmical aspect of the sensorial signal.

Michael Thaut, from *Center for Neurorehabilitation Research of Colorado State University*, carried out several studies on the effect of auditive rhythmic on motor performance, achieving to claim that individuals with PD don't need ganglion integrity to take advantage of the rhythmical-auditive facilitation [3].

Physiology's studies hypothesize the existence of an auditive-motor path through which sound, using reticular spinal connectors, activates spinal motoneuron activity [4, 5]. However, it's not clear if some specific neural structures are responsible for rhythmic motor synchronization or auditive stimulus is *tout court* directly projected in the motor system circuits.

Masahiro demonstrated how rhythm could stimulate accurate and fast motor answers even under the conscious perception threshold [6]. Finally, Sutteerawattananon claims the auditive input influences the *Secondary Motor Area,* acting like a stimulus to reduce akinesia and bradykinesia [7].

In our team [8], we utilize specific exercises associated with rhythm as a fundamental pre-requirement to promote the patients' motor "decision-making." Admittedly, the difficulty in acting simultaneous movements and programmed strategies to reach their goals is well known in PD patients. In a recent study, still going on, we selected 20 patients with idiopathic PD, randomized into two groups of 10 patients. The first group was treated with traditional rehabilitation (without rhythm). The second group was assigned to rhythm therapy. None of the patients have modified their pharmacological therapy during this study, and none showed a relevant cognitive deficit. Evaluation was carried out before treatment, at the sixth session, and at the end of the study using the UPDRS scale, the LSI scale (Life Satisfaction Index), and the Walking Test. For the statistical analysis, we used Student's t-test. Values of $p < 0.05$ were considered significant with a confidence interval 95%. **Even if the number of patients enrolled is low and final data are not published yet, first results could confirm the rehabilitative effect of rhythm therapy on PD disease. Results are favorable, e**specially in patients with more severe symptoms compared to the less serious ones. In conclusion, rhythmical motor induction could *increase* speed and precision in the movement execution. Moreover, individuals with PD may take advantage of rhythm also during everyday life by imaging the learned rhythmic exercise. Finally, the rhythmical experience with its social and ludic character showed a positive influence on individuals with PD quality of life.

7.5 Music Therapy for Parkinson's Disease

Parkinson's disease can be evaluated from various points of view: music therapy could be a complementary therapy option. Many patients affected by Parkinson's disease have experienced different music therapy programs focused on the motor component, which can be addressed through listening, body rhythm, and rhythmic auditory stimulation. In order to improve quality of life, other music therapy programs focused on communication, swallowing, breathing, and emotional aspects were standardized through exercises focusing on singing, either individually or in groups. We concluded that music therapy programs can achieve improvements in various areas of patients with Parkinson's disease. Music therapy has been defined as the use of sounds and music within an evolving patient–therapist relationship to support and develop physical, mental, and social spiritual well-being [9]. Music has cognitive, psychosocial, behavioral, and motor benefits for patients affected by neurological disorders such as Parkinson's disease or dementia [10, 11]. The value that music offers both to human health and well-being provides a framework for the development of non-pharmaceutical treatments for neurological disorders [12]. In this context, making music is a powerful way to engage a multisensory and motor network. These multimodal effects on emotional brain areas can be used to facilitate the rehabilitation of neurological disorders [13]. A recent study confirmed that a music-based physical therapy program is able to improve functional mobility in patients with PD [14]. According to De Bartolo et al. [15], in Parkinson's disease, the timing of repetitive sequences of internally

generated automatic movements is compromised. The consequence of this deficit is on the alteration of gait patterns, including shorter steps, slower gait, loss of rhythm, and trunk instability. In addition to cognitive and emotional disturbances, the most frequent non-motor symptoms are autonomic, sensory, gastrointestinal dysfunctions, and sleep disorders [16]. Music therapy and other rhythm-based interventions can offer benefits for patients with Parkinson's disease and other related movement disorders [17]. According to De Luca et al. [18], music-based rehabilitation for gait training can be considered a powerful strategy. Thaut et al. described that rhythmic auditory cues are able to improve gait and motor behaviors in Parkinson's disease [19]. A systematic review and meta-analysis of 17 studies concerning music therapy and Parkinson's disease, with a total sample of 598 participants, concluded that music therapy improves motor function, balance, freezing of gait, gait speed, and mental health in patients with Parkinson's disease [20]. Furthermore, a group singing program with deep breathing training and song learning can promote memory, language, executive function, and respiratory muscle strength in adults with Parkinson's disease [21]. Choral singing has also been studied to help patients affected with Parkinson's disease with social isolation and mood disturbances [22]. In conclusion, music therapy in Parkinson's disease has a scientific basis to support physical, emotional, and social benefits [23]. Some recent work (such as the paper of Barnish and Barran) [24] introduced performing arts and music therapy, considering their possible positive effects on Parkinson's disease. The favorable effects of music therapy programs on different spheres of human development in Parkinson's patients were confirmed. The majority of studies focused on the motor component, stimulating it through programs based on listening music, body rhythm, and rhythmic auditory stimulation. Group singing, optimizing the quality of life, and listening to the music help maintain or improve the cognitive functions of PD patients.

7.6 Holistic Musical Techniques

On this basis, we should notice that some years ago Lombardy Region in Italy banned the use of the term "therapy" if referring to not strictly medical professions. Meanwhile, the role of Bio-natural Disciplines Operators was defined, referring to "activities and practices focused in maintaining or recover wellbeing." These practices (which are not sanitary) enhance the individual vital energy through natural methods whose effectiveness was certified in the cultural and geographical environment where these special disciplines were developed.

In accordance with the Regional Law 2/2005, Bio-Natural Disciplines Technical Scientific Committee (CTS-DBN) was established. It is based on the Education Institution and Operators Association promoting and broadcasting Bio-Natural Disciplines culture and methods across the Lombardy region and the whole country. Many represented that disciplines have been carrying out important research activities, cooperating both with hospitals and universities in the Lombardy Region. For this reason, they become best practices also at the national level.

The author, neurologist, and musician, in line with CTS-DBN statements, created the educational program Holistic Musical Techniques, a bio-natural discipline using music (sound, rhythm, melody, and harmony) and musical instruments to perform a process in order to maintain or recover well-being, stimulating vital resources. Holistic Musical Techniques are based on a scientifically proven operating model, for example, the Argentine Benenzon's model based on music and movement to encourage socializing. Moreover, an insight is derived from Francesco Padrini's work. It was a psychologist, psychotherapist, and sexologist invented Bioenergetic Massage® and Grounding Massage® techniques and founded Integrated Psychophysiognomy Society – face-body-character (SPI). All these techniques are well integrated with active and receptive bio music therapy. Finally, the author's method, based on holistic musical, artistic, and physical techniques, is focused on maintaining or recovering psychophysical elderly people's health. After a 3-year program, including 850 hours of on-site lessons, internship, thesis preparation, and final examination, the graduated operator will be certified in the Lombardy region Bio-natural Disciplines Operators Register. Consequently, it will be able to support its patients in customized bio-musical programs, scheduled for all different ages. In conclusion, TMOs belong to Bio-natural Disciplines: using the auditive canal, they involve the whole person. We could say "*music matters too*."

7.7 Conclusions

The most relevant improvement in PD treatment in the last years should be credited to the more and more clear and widespread awareness of how worthy the new disease treatment philosophy is. In fact, it's global, customized, and patient centered, rather than focusing exclusively on motor diseases. This change of perspective's influences is several and deep. The primary treatment target is the patient, rather than the motor autonomy. The treatment is tailored as an integrated and customized program, rather than only active principles drugging. Awareness toward patients and their relatives is focused on a real therapeutic alliance rather than just compliance. For these reasons, music therapy and TMOs are very well accepted among alternative and bio-natural disciplines with the aim of maintaining or recovering well-being. As a matter of fact, TMOs are not intentionally considered medical treatment: they positively tend to encourage vital resources of individuals through natural stimuli like music, rhythm, and natural sounds in order to promote well-being and health.

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