

## DEEP BRAIN STIMULATION AND COMPLEMENTARY PRACTICES AS A TREATMENT OF PARKINSON'S DISEASE

### *ESTIMULAÇÃO CEREBRAL PROFUNDA E AS PRÁTICAS COMPLEMENTARES COMO TRATAMENTO DA DOENÇA DE PARKINSON*

Larissa Pereira Righi da Silva<sup>1</sup>, Francielle Dutra da Silva<sup>2</sup>,  
Lara Barbosa de Oliveira<sup>3</sup> e Claudia Zamberlan<sup>4</sup>

#### ABSTRACT

The objective of this study was to compare the effectiveness of two forms of treatment for Parkinson's disease: Deep Brain Stimulation and Integrative and Complementary Practices. To this end, an integrative review of the literature was carried out with the following guiding question: "Deep brain stimulation is more effective in treating Parkinson's disease when compared to Integrative and Complementary Practices. After comparison, it was identified that Deep Brain Stimulation is not more effective than Integrative and Complementary Practices, due to the possibility of having an adverse effect after surgery, progressing the symptoms of Parkinson's Disease, while Integrative Practices do not have harmful effects when complementary to drug treatment. The need for more studies on Deep Brain Stimulation and Integrative and Complementary Practices as a treatment for Parkinson's Disease was identified.

**Keywords:** Complementary Therapies; Deep Brain Stimulation; Nursing; Parkinson Disease; Therapeutics.

#### RESUMO

*Objetivou-se desenvolver uma comparação entre dois tratamentos adicionais a medicação para a doença de Parkinson, sendo eles a Estimulação Cerebral Profunda e as Práticas Integrativas e Complementares e assim identificar o tratamento mais benéfico para essa doença. Trata-se de uma revisão Integrativa da Literatura, realizada no ano de 2021. Foram realizados o levantamento dos artigos, o qual de 46 artigos, 5 foram elegíveis. Sendo descritos em uma tabela sinóptica. Após a comparação, foram identificados a necessidade de mais estudos em relação às práticas integrativas como adicional ao tratamento da doença de Parkinson, visto que foi demonstrados diversos efeitos benéficos. Já a Estimulação Cerebral Profunda demonstrou mais pesquisas, porém diversas que relataram os efeitos maléficos do tratamento, relatando a importância de mais estudos sobre o mesmo, além de ter sido identificado a necessidade de escalas que informam a aptidão da pessoa para realizar a cirurgia.*

**Palavras-chave:** *Doença de Parkinson; Terapias Complementares; Estimulação Encefálica Profunda; Terapêutica; Enfermagem.*

1 Discente do curso de Enfermagem da Universidade Franciscana, Santa Maria, Rio Grande do Sul. E-mail: larissa-righi89@gmail.com. ORCID: <https://orcid.org/0000-0002-1644-8817>

2 Cirurgiã-Dentista, Mestranda em Ciências da Saúde e da Vida, Universidade Franciscana, Santa Maria, Rio Grande do Sul. E-mail: fran\_dutra\_silva@hotmail.com. ORCID: <https://orcid.org/0000-0002-1515-7292>

3 Discente do curso de psicologia da Universidade Franciscana, Santa Maria, Rio Grande do Sul. E-mail: lara.barbosa@ufn.edu.br. ORCID: <https://orcid.org/0000-0003-2777-0032>

4 Doutora em Enfermagem, Docente do Curso de Enfermagem e Mestrado Profissional em Saúde Materno Infantil da Universidade Franciscana, Santa Maria, Rio Grande do Sul. E-mail: claudiaz@ufn.edu.br. ORCID: <https://orcid.org/0000-0003-1898-328X>

## INTRODUCTION

Parkinson's Disease (PD) is a chronic neurodegenerative disease, which can be idiopathic or secondary and so far has no cure. This disease causes a disorder in the entire nervous system triggered by a deficit in dopamine, which causes a disorder in the motor system that leads to incessant tremors. The dopamine deficit also results in non-motor consequences, such as cognitive ones. PD occurs mainly in people over the age of 50 and there are various treatments that can be used together with complementary practices (Souza *et al.*, 2011).

PD also causes physical symptoms such as bradykinesia, rigidity of the extremities, resting tremors and postural instability. That said, physical symptoms can trigger depressive symptoms that can weaken memory capacity and consequently worsen basic activities of daily living, such as cooking, remembering your chores, not being able to hold objects firmly, such as a spoon when eating, causing shame about tremors and resulting in low self-esteem, thus stimulating depressive symptoms (Aguar, 2020).

Although there is no cure for PD, there are several treatments to decelerate the clinical worsening and reduce symptoms. Among the most commonly used treatments are drugs including levodopa, which is the first choice, and the others are selegiline, anticholinergics, amantadine and dopaminergic agonists. In addition to drug treatment, it is necessary for an interprofessional team to help with drug adjustment, control and adherence (Santos *et al.*, 2018).

Because of this, it is important to know about innovative, problem-solving treatments that work in conjunction with medication. Integrative and Complementary Practices (ICPs) have emerged with the aim of increasing the resolubility of Parkinson's Disease treatment in a non-invasive, therapeutic way based on traditional knowledge, also helping with depressive symptoms. Among the main ICPs used for Parkinson's are acupuncture, substances found in teas and tactile massage (Moreira *et al.*, 2020).

Integrative and Complementary Practices are proving to be effective in influencing patients' neurocognitive, emotional, psychological and social aspects. In addition to playing an important role in quality of life, depressive symptoms, communication and social and family life. In addition, when associated with Parkinson's, this practice has already been shown to be effective in many cases, so it helps not only with the disease, but also with depressive symptoms, which worsen in people with Parkinson's disease (Moreira *et al.*, 2020).

Another treatment that has been proving its effectiveness for Parkinson's disease is Deep Brain Stimulation (DBS), which is a surgical implantation, uni- or bilateral, where electrodes are implanted and then a generator is placed in the collarbone region and the cables are tunneled under the skin, where the intensity at which the signals will be transmitted to the brain is also controlled by the doctor. This surgery reduces the dose of medication, muscle rigidity and, above all, reduces

or suppresses tremors, which is very important for the patient, especially in terms of their mental health (Cruz *et al.*, 2016).

However, although DBS has been shown to be a procedure that has better results and in a shorter time, it is known that most people with Parkinson's are over 50 years old (Souza *et al.*, 2011) because of this, the surgical procedure becomes more complicated due to the aggravations of surgery, in addition to the fact that an invasive procedure such as DBS has weaknesses, mainly in relation to the cognitive aspect of the patient and in relation to speech (Acera *et al.*, 2019).

Therefore, the aim of this integrative review is to compare DBS in relation to ICPs, and thus identify which treatment proves to be more beneficial for Parkinson's Disease, identifying the potentialities and weaknesses of each one and verifying the need to perform an invasive procedure.

This is an integrative literature review, conducted in the second half of 2021, which was made through the analysis of research in evidence-based practice, thus allowing an in-depth knowledge of the topic and assisting in decision making during clinical practice (MENDES; GALVÃO; SILVEIRA, 2008).

In order to elaborate this research, it was necessary to adhere to six stages: identification of the topic and selection of the research question; establishment of inclusion and exclusion criteria; identification of the pre-selected and selected studies; categorization of the selected studies; analysis and interpretation of the results and presentation of the review/synthesis of knowledge (MENDES; GALVÃO; SILVEIRA, 2008).

The methodological construction of the research question was based on the PICO strategy, with P corresponding to the population/problem, in this study Parkinson's Disease, I for the intervention of deep brain stimulation, C for the comparison with integrative and complementary practices and O for the outcome of the effectiveness of deep brain stimulation.

Taking into account the new technologies for the treatment of Parkinson's Disease and their harmful effects, the research question chosen to guide the study was "Is Deep Brain Stimulation more effective in the treatment of Parkinson's Disease when compared to Integrative and Complementary Practices?".

The Boolean operators and descriptors were listed according to the Medical Subject Headings (MeSH), namely "Parkinson's Disease" and "Deep Brain Stimulation" or "Deep Encephalic Stimulation"; "Parkinson's Disease" and "Complementary Practices". The search strategy used descriptors with Boolean operators in the Lilacs, Medline, Virtual Health Library (VHL) and Scielo databases.

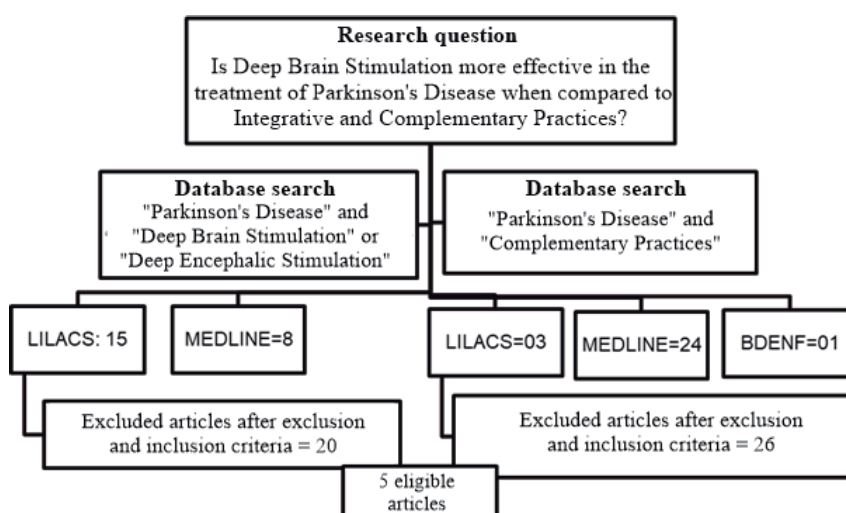
The proposed inclusion criteria were articles that addressed the physiology of parkinsonism and demonstrated the effectiveness of each proposed treatment, Deep Brain Stimulation and Complementary Practices; and complete articles with abstracts available. The exclusion criteria were articles that addressed treatments other than those proposed in the topic, paid-for articles and research that did not study DBS and ICPs as a complementary treatment for PD.

For the research of the Complementary Practices two search strategies were applied using the descriptors and filters: “Parkinson’s Disease” and “Complementary Therapies”, using studies in English, Portuguese and Spanish and only full text and unpaid research was accepted. Studies in Portuguese and Spanish were not used for the Deep Brain Stimulation search, due to the number of studies in English.

After surveying the articles, a total of 51 studies were identified, of which 18 were in the Latin American and Caribbean Literature in Health Sciences (LILACS), 32 in the Medical Literature Analysis and Retrieval System Online (MEDLINE) and 01 in the Bibliographic Database specialized in the area of Nursing (BDENF), via the Virtual Health Library (VHL). As for the inclusion criteria, articles were eligible after filtering full texts, online articles available in full in English, Portuguese and Spanish for complementary practices in the treatment of PD. For DBS as a treatment for PD, full-text articles in Spanish and Portuguese were eligible. Articles that did not demonstrate the effectiveness of the proposed treatment and articles that were cross-referenced between virtual libraries were read and then excluded. There was no time frame because these treatments have only recently emerged and there have been no studies on the two integrated treatments.

Articles were excluded using the search criteria: paid-for articles, duplicated articles and articles that did not meet the proposed objective of the topic were not accepted. A total of 13 articles on Deep Brain Stimulation and 24 on Complementary Practices were excluded, giving a total of 14 studies to compare each treatment. Below (figure 1) is the sample flow for better visualization.

**Figure 1 - Sample Flow**



Source: Author’s Construction

Following the selection criteria, 5 studies were selected, 1 in English, 2 in Portuguese and 3 in Spanish. The year of publication varied between 2018 and 2020, with a prevalence in 2020. These studies were described in a synoptic table (Table 1), using the following variables: Authors/Year, Journal, Objective, Method, Results and Conclusions.

**Table 1** - Synopsis of the articles listed for the review

Authors/ Year	Journal	Objective	Method	Results	Conclusions
Chuancheng Li <i>et al.</i> (2020)	Medicine	To provide evidence for the efficacy and safety of Integrative and Complementary Practices for Parkinson's Disease and safety for doctors and patients.	Randomized clinical trial.	The efficacy and safety of the different complementary practices was compared using network meta-analysis (NMA). This study was identified as the first NMA for integrative and complementary practices. Until now, there has been no NMA to compare the different complementary practices for parkinson's disease. However, after the research, it was identified that integrative and complementary practices show positive results for treatment.	Complementary practices have positive significance in the treatment of people with Parkinson's disease and can provide evidence-based support for doctors and patients.
Toneti <i>et al.</i> (2020)	Rev. Latino-Am. Enfermagem	To analyze the literature on the benefits of the integrative and complementary practice of Qigong for the health of adults and the elderly.	Systematic Review.	In patients with Parkinson's disease (n= 89), aged 67, it was shown that the group practicing Baduanjin Qigong (6 months) showed significant improvements in sleep, functional mobility and the 6-minute walk test when compared to the control group. In addition, walking speed was increased.	It revealed the beneficial application of Qigong in the promotion, prevention and rehabilitation of diseases and physiological disorders in adults and the elderly, such as Parkinson's disease.
Acera <i>et al.</i> (2017)	Neurologia	To evaluate the effects of deep brain stimulation on cognitive status 5 years after surgery.	Prospective study	Reductions were observed in the scores of the Mini-Mental State Examination (-0.89%), the Clock Drawing Test (-2.61%) and the MDRS (-1.72%), most markedly in phonetic verbal fluency (-13.28%) and semantic verbal fluency (-12.40%). For the Rey auditory verbal learning test, we observed a deterioration in delayed memory capacity (-10.12%) one year after surgery. The deterioration occurred mainly after 5 years.	Verbal function deteriorates within 1 year, although it can worsen after 5 years of surgery. Despite the deterioration, improvement in activities of daily living has been seen with the use of antiparkinson drugs.

Kunstmann <i>et al.</i> (2018)	Rev Med Chile	To evaluate the results of a series of patients with Parkinson's disease treated with stimulation of the subthalamic nucleus.	Research article.	There was an improvement in all the aspects studied. ON hours without dyskinesia changed by 21%. ON hours with dyskinesia changed by 15%. The need for medication changed from 1,505 ± 499 to 1,214 ± 528 levodopa equivalents. It was also shown that there was continuous improvement in symptoms after 5 years.	Deep brain stimulation in patients with Parkinson's disease has good immediate and delayed results.
Alves <i>et al.</i> (2018)	Rev Bras Neuro	The aim of this study was to analyze the impact of deep brain stimulation on the quality of life of these patients.	Clinical trial.	A total of 11 patients were analyzed. After six months of surgery, a score of 8.3 was found, compatible with a significant improvement in depression, and quality of life was better after surgery.	After analyzing the data, it can be concluded that the deep brain stimulation technique had a positive influence on the patients who were re-evaluated, showing an improvement in their depressed mood and a positive influence on their motor function, autonomy and quality of life.

Source: Author's Construction.

Based on the results obtained, in order to answer the research question, it can be seen that DBS causes a greater possibility of worsening symptoms, mainly because it is a surgery and there are risks, while ICPs do not have this possibility of worsening. Therefore, it can be concluded that DBS is no more effective than ICPs, due to its risk of worsening symptoms.

After analyzing the articles listed, it was noticeable that there is a lack of studies mainly on integrative and complementary practices as a treatment for Parkinson's disease, although 100% of the articles listed concluded that the practices are effective in treating Parkinson's disease, increasing quality of life, helping with anxiety, gait speed and not being an invasive procedure.

Furthermore, 60% of the studies found that deep brain stimulation has harmful effects on people and should be studied further, given the lack of studies on the harmful effects. The main complications include verbal fluency, phonetics and cognition, as well as intraoperative and postoperative risks.

When comparing the two treatments, it was clear that although both were positive, Deep Brain Stimulation, because it is an invasive procedure, although more effective in reducing tremors, can be harmful to cognition and speech.

**DISCUSSION**

The use of Integrative and Complementary Practices has shown to be positive for the treatment of Parkinson's Disease, as well as having several practices, such as acupuncture, music therapy, massage and meditation. Unfortunately, there is still no meta-network analysis that can compare the

various practices and define the best ones for treatment, knowing each of these practices (Chuancheng Li *et al.*, 2020).

One of the Integrative Practices that has proved beneficial in the promotion, prevention and rehabilitation of diseases and physiological disorders in adults (including Parkinson's Disease), is Qigong, which consists of performing energy work or cultivation, establishing a better circulation of Qi energy in the body. Despite proving beneficial, it is still not widely used for Parkinson's Disease, mainly because there are not many studies and there are still many cultural barriers to using this technique (Toneti *et al.*, 2020).

In line with this, another beneficial integrative practice for Parkinson's Disease, according to a study carried out by Corte and Neto (2008) is music therapy, which is important for individuals with Parkinson's Disease, as it is a therapeutic medium and performs several good functions for the human mind. Because of this, the nervous system, which causes the tremors, synchronizes with the music and thus makes the individual relax and raises their self-esteem. This reduces tremors and muscle rigidity.

In a study on Deep Brain Stimulation, Acera (2017) reported on the deterioration of the cognitive state and phonemic verbal fluency of patients undergoing surgery within one (1) year, which may worsen after five (5) years. When associated with PICS, one realizes that there is a fragility that it does not have and that although it helps to reduce tremors, other complications may occur that affect the individual's quality of life.

In addition, it is important to notice that when comparing Deep Brain Stimulation and Integrative and Complementary Practices, it can be seen that mainly due to cultural factors the Integrative and Complementary Practices are not widely used and if there is a lack of studies on them. Furthermore, it is possible to observe that Positive Brain Stimulation can become more effective when treated together with the practices and it is also important to know every single individual since there are several weaknesses after surgery that can worsen quality of life.

## CONCLUSION

Therefore, during the research, it was possible to identify that ICPs are not more effective when compared to ICPs due to possible harm in the worsening of symptoms. However, ICP is an innovative technology for treating PD and should therefore be increasingly studied in order to reduce the adverse effects that can occur.

It has been shown that ICPs are rarely studied as a complementary treatment for PD. Deep Brain Stimulation, on the other hand, has more studies, but few of them discuss complications and the age of the individual who is going to have the surgery.

This study identified the need for scales to verify the most appropriate treatment for each individual and their uniqueness, especially with regard to tremors, age and cognition, since the older the

patient, the greater the aggravation. In addition, Deep Brain Stimulation should be considered as a treatment from the very beginning of the discovery of the disease, as it is more effective in the long term.

In conclusion, it is possible to say that there is a need for public policies in Health Units for integrative practices targeted at people with Parkinson's Disease, making them feel more welcome within the Unified Health System and raising their self-esteem, as well as being effective in treating the disease.

## REFERENCES

ACERA, M. *et al.* Long-term impact of subthalamic stimulation on cognitive function in patients with advanced Parkinson's disease. / Impacto de la estimulación subtalámica a largo plazo sobre la situación cognitiva de los pacientes con enfermedad de Parkinson avanzada. **Neurologia (Engl Ed)**, v., 39, n.,9, p.573-581, 2019. Accessed on December 12, 2021

AGUIAR, I. M. *et al.* Associação dos sintomas depressivos com o comprometimento da memória episódica em pacientes com a doença de Parkinson. **J. Bras. Psiquiatr** . v., 69, n. 4, p. 255-62, 2020. Accessed on December 13, 2021.

ALVES, G.K.J. *et al.* Impacto da estimulação cerebral profunda na qualidade de vida e humor em pacientes com doença de Parkinson / Impact of deep brain stimulation on quality of life and mood in patients with Parkinson's disease. **Rev. bras. neurol.**, v. 54, n. 1, p. 5-9, 2018. Accessed on December 12, 2021.

CHUANGENG LI, M. D. *et al.* Comparison of efficacy and safety of complementary and alternative therapies for Parkinson's disease A Bayesian network meta-analysis protocol. **Medicine**, v., 99, n. 38, p. 1-5, 2020. Accessed on December 11, 2021.

CORTE, B.; NETO, P. L. A musicoterapia na doença de Parkinson. **Ciências de saúde coletiva**, v. 14, n. 6, p. 2295-2304, 2009. Accessed on December 15, 2021.

CRUZ, A. N., *et al.* Aspectos de comunicação oral em pacientes com doença de Parkinson submetidos à Estimulação Cerebral Profunda. **CoDAS**, v. 18, n. 4, p. 480-485, 2015.

GALVÃO, C. M; MENDES, K. D. S; SILVEIRA, R. C. C. P. Revisão integrativa: método de pesquisa para a incorporação de evidências na saúde e na enfermagem., **Texto contexto enfermagem.**, Florianópolis., v. 17., e. 4., p 758-64, 2008. Accessed on December 02, 2021.



KUNSTMANN, C. *et al.* Estimulación cerebral profunda en enfermedad de Parkinson. **Rev. Med. Chile.** v. 146, n. 6, p. 562-569, 2018. Accessed on December 12, 2021.

MOREIRA, J. L. S. *et al.* Práticas Integrativas em saúde no tratamento da doença de parkinson: uma revisão integrativa. **Revista Interfaces**, v. 8, n. 1, p. 445-460, 2020. Accessed on December 15, 2021.

SANTOS, D.M. *et al.* Tratamentos farmacológicos e fisioterapêuticos na melhora da qualidade de vida dos pacientes com doença de Parkinson. **Revista Faipe**, v. 8, n. 1, p. 60-71, 2018. Accessed on December 14, 2021.

SOUZA, C. F. M. *et al.* A Doença de parkinson e o processo de envelhecimento motor: uma revisão de literatura. **Revista Neurociências**, v. 19, n. 4, p. 718-23, 2011. Accessed on December 13, 2021.

TONETI, B. F. *et al.* Benefits of Qigong as an integrative and complementary practice for health: a systematic review. **Rev. Latino-Americana de Enfermagem**, v. 28, n. 3317, 2020. Accessed on December 11, 2021.