

Perfetti method: a sustainable approach to cognitive and functional enhancement in intellectual disabilities

Método Perfetti: un enfoque sostenible de la mejora cognitiva y funcional en la discapacidad intelectual

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ABSTRACT

Background: As for the functional and cognitive capacities of people with intellectual disabilities, there has been evidence of a deficit in activities of daily living such as eating, getting dressed, going to the bathroom, moving around, walking, going up and down steps. And as for the cognitive area, functions such as visuospatial, attention, memory, concentration and language were evaluated. A correct treatment has not been given to these areas so they cannot develop a better quality of life. **Objective:** To apply the Perfetti Method for functional and cognitive abilities improvement in patients with intellectual disabilities. **Methods:** The research is an observational study with a quantitative approach and with 20 participants. An initial assessment was made and after 12 weeks of intervention with the Perfetti Method a final assessment was carried out. Sociodemographic characteristics, Barthel index assessment scales and the Montreal Cognitive Assessment (MoCA)-Test were used. **Results:** After 12 weeks of applying the Perfetti Method Guide, it significantly improved functional and cognitive abilities and consequently the participants' quality of life. The application of the T student test, for related samples, established a relation between the Barthel Index and the Montreal Cognitive Assessment (MoCA)-test, with a significance of ($p < 0.001$); **Conclusions:** The Application of the Perfetti Method is effective to improve the functional and cognitive capacities of people with intellectual disabilities and their quality of life.

Keywords: Exercise Movement Techniques; Cognitive Dysfunction; Intellectual Disability; Neurocognitive Disorders; Health sustainability.

RESUMO

Antecedentes: Quanto às capacidades funcionais e cognitivas das pessoas com deficiência intelectual, tem-se evidenciado um déficit nas atividades da vida diária como comer, vestir-se, ir à casa de banho, deslocar-se, andar, subir e descer escadas. E quanto à área cognitiva, foram avaliadas funções como visuoespacial, atenção, memória, concentração e linguagem. Não foi dado um tratamento correto a essas áreas para que não possam desenvolver uma melhor qualidade de vida. **Objetivo:** Aplicar o Método Perfetti para melhora das habilidades funcionais e cognitivas em pacientes com deficiência intelectual. **Métodos:** A pesquisa é um estudo observacional com abordagem quantitativa e com 20 participantes. Foi feita uma avaliação inicial e após 12 semanas de intervenção com o Método Perfetti foi realizada uma avaliação final. Foram utilizadas as características sociodemográficas, as escalas de avaliação do índice de Barthel e o Montreal Cognitive Assessment (MoCA)-Test. **Resultados:** Após 12 semanas de aplicação do Guia do Método Perfetti, melhorou significativamente as habilidades funcionais e cognitivas e consequentemente a qualidade de vida dos participantes. A aplicação do teste T de Student, para amostras relacionadas, estabeleceu relação entre o Índice de Barthel e o teste Montreal Cognitive Assessment (MoCA), com significância de ($p < 0.001$); **Conclusões:** A aplicação do Método Perfetti é eficaz para melhorar as capacidades funcionais e cognitivas de pessoas com deficiência intelectual e sua qualidade de vida.

Palavras-chave: Técnicas de exercícios e movimentos; Disfunção cognitiva; Deficiência intelectual; Distúrbios neurocognitivos; Sustentabilidade na saúde.

INTRODUCTION

Worldwide, 15% of the population has some type of disability. That is, nearly 1 billion inhabitants, 190 million people are identified as having intellectual disabilities. In Ecuador, 471,205 people have some type of disability, with 23.12% having an intellectual disability and 5.85% having a severe disability. In Ambato city, 20.54% of the inhabitants have an intellectual disability and 5.07% have a degree of severe disability (CND, 2022) (WHO, 2023) (WHO, 2023).

The Perfetti Method focuses on the performance of exercises, which allow movement in patients with neurological difficulties, difficulties in functional and cognitive abilities and intellectual disability. This method improves the ability to perform activities that are difficult or those with a high degree of difficulty (Leyva et al., 2022).

According to Sarabia (2020), the Perfetti Method is an effective therapeutic strategy, with the performance of activities that keep the brain's cognitive functions active. It generates nervous connections at the moment of developing the movements such as moving several brushes through the hands. This sends a stimulus and allows the development of motor

and sensitive responses.

The Perfetti Method improved muscle tone. It focused on the work of the upper limbs (elbows, shoulders and wrists), with greater agility in the grip, potentiation of motor skills, reactivation of sensitivity and reinforcement of cognitive aspects, such as attention, memory, perception, and proprioception (Vaca, 2021).

It is stated that through the application of the Perfetti Method, the individual's own abilities to perform certain daily activities are mastered. This is produced by the mental construction of an image, through cognitive, emotional and motivational processes. Based on this, it should be clear that both cognitive and perceptual processes, as well as motor processes will present a series of changes at the time of starting a therapeutic session or when exposed to pathologies that affect the CNS. (Pazmiño, 2019).

The development of movement gestures and the recognition of the objects that are used, has been catalogued as one of the most efficient tools in the recovery of hand mobilization. However, it also provides activities for the whole body itself. The development of the Perfetti Method was originally intended for hemiplegic patients, considering the hands as an important organ for allowing touch. The Perfetti Method has evolved being part of several treatment processes (Clavijo, 2020).

The objective of the research is to apply the Perfetti Method to improve functional and cognitive abilities in patients with intellectual disabilities.

BACKGROUND

Intellectual disability is a neurodevelopmental condition characterized by cognitive deficits and functional impairment in adaptive behavior that occur during development. It should be noted that this generates a variety of symptomatology, which is why it is considered by neuropsychology as an axis of analysis. In this sense, emphasis will be placed on why neuropsychological screening is necessary in this pathology. Such relevance lies, on the one hand, in determining whether the disability is due to alterations in the central nervous system and the unfavorable conditions of the environment in which it develops. On the other hand, the neuropsychological examination provides information on which areas of the brain are responsible for one or another disability. (Echavarría-Tirapu, 2021).

The study by Martín (2015), on the Perfetti Method in patients, presents an effective approach that proposes to recover movement through the activation of cognitive processes, including perception. Cognitive processes are oriented to the perception of one's own body at rest, in movement and in interaction with the environment. In this way, they recover the ability to program and perform actions independently, with a movement of the highest quality. It is an integrative tool of perceptual-cognitive and motor processes for rehabilitation (Morreale et al., 2016).

The application of the Perfetti Method activates cognitive functions during the teaching-learning process. It is feasible in the tactile-kinesthetic recovery as an essential factor to achieve a better level of motor control to improve functionality, mobility and qualitative aspects of gait and lower limb (Ferraz et al., 2014).

The Perfetti Method, according to the author Ruiz et al (2009), is a neuro restorative strategy to improve balance and gait in patients with chronic sequelae of stroke. It gives them advantages such as the somatosensory contribution. The simplicity with which it is presented to the patient (in terms of commands) is highlighted. The treatment is based on a single approach. In light of this appreciation, the program tested in this research meets the characteristics of a model based on a motor learning approach from cognitive exercises. The different types of therapeutic exercise had significant effects in reducing pain and improving the quality of life of patients (Hernando et al., 2021).

Corrective therapeutic exercise, as authors Ceballos et al (2018) mention, appears to have positive effects in reducing symptoms and improving function, as well as various body angles and asymmetries. However, more studies with better methodological quality are required to confirm these results and determine the best therapeutic exercise intervention. In addition, the neurodynamics program experienced improvements in neuropathic symptoms and leg raising compared to the motor control exercise group (Plaza et al., 2020).

The Perfetti Method intervention, based on the combination of manual therapy sessions, physical exercise sessions in an outdoor circuit and aquatic physiotherapy sessions of the AquaCap program, was able to improve functional capacity. It reduced neuropsychiatric symptoms, improved the capacity for emotional expression and the quality of life of older adults with intellectual disabilities at high risk of dementia (Arrizabalaga, 2020) (Arrizabalaga, 2020).

The researched theoretical data expose the current reality of the aging process in the studied population and validate the vital importance of functional assessment for the work with people with disabilities. It constitutes an effective tool that will allow to outline strategies aimed at improving the quality of life of this important population segment. The therapeutic physical exercise program achieved independence in basic and instrumental activities of daily living and improved their functional capacity. It can be inferred, from this study and other research that correlates with these results, that the

practice of physical exercise improves functional capacity and quality of life (Herrera et al., 2022).

In the study of Arias et al (2018) on exercise to improve functional capacities, there are results that assure the positive effect of exercises on joint mobility by slowing the normal deterioration produced by aging. A discrete improvement in the quantitative parameters evaluated were observed. The practice of therapeutic exercises has a positive influence on agility, dynamic balance and gait.

Therapeutic exercise interventions, according to Muñoz et al (2022), were effective in improving mild to moderate functional capacity. A remote physical exercise program could be a useful therapeutic strategy in replacement of written exercise guidelines to improve functional capacity. It promotes self-care, facilitating access to opportunities and decreasing health gaps.

METHODS

The research developed was observational, reaching a descriptive level, with a quantitative approach. It was carried out at the Centro Asistencial Municipal Centro Inclusivo de Discapacidades El Peral 2 (Inclusive Center of Disabilities El Peral 2) of the Autonomous Municipality of Ambato, located in Tungurahua Province, Ambato city. The center belongs to Zone 3 of the Economic and Social Development of Ecuador. The sample consisted of 20 participants who met the inclusion criteria: patients with a disability card issued by the National Council for the Equality of Disabilities (CONADIS which exercises the powers of public policy on disabilities), patients with intellectual disabilities, authorization of the legal representative, and age between 16 and 26 years. Exclusion criteria: participants with severe visual diseases, with difficulty to follow orders, with some kind of health alteration, or with any other type of disability.

An initial assessment was performed prior to the intervention after week 12. An evaluation was applied at the end of the intervention, where the levels of mild, moderate and severe dependence in cognitive and functional activities were measured using the following tests:

An instrument of sociodemographic characteristics was used to describe the clinical situation of the patient as well as to demonstrate the health problems they undergo. This had the objective of offering information that allows an excellent approach and guarantees a good quality of life for the patient. The structure of the document consists of an anamnesis, a physical examination validated by a committee of experts and is complemented by the different assessment scales. When cognitive and functional dysfunctions were known, tests and scales were applied to allow the individual to assess dependent and independent functioning.

The Montreal Cognitive Assessment (MoCA)- Test is a Montreal cognitive assessment instrument. It evaluated the following cognitive domains: attention and concentration, executive functions, memory, language, visuospatial skills, conceptual reasoning, calculation and orientation. It is flexible, sensitive and specific. Its purpose is the identification of cognitive impairment and dementia. It has variable cut-off points which are in accordance with the population analyzed. It has a reliability and validity of 0.87. (Pedraza et al., 2016). The test measures visuospatial and executive functioning: 5 points, animal naming: 3 points, attention: 6 points, language: 3 points, abstraction: 2 points, retrieval - memory: 5 points, and orientation: 6 points. A total score of 30 points can be obtained and its interpretation of results is as follows:

- A score equal to or greater than 26 is considered normal.
- Score less than 10: Cognitive Impairment.
- From 20 to 23: Mild Cognitive Impairment.
- 26 or more: Normal. No alteration of cognitive functions.

The Barthel index is an instrument widely used for this purpose and measures the person's ability to perform ten basic activities of daily living. It allows to obtain a quantitative estimate of the degree of dependence of the subject. It has a reliability and validity of 0.68 and 1.81 (Bernaola-Sagardui, 2018). It evaluates the following scores, 0 points: unable to perform basic activities and 15 points: performs basic activities independently. The activities are: eating from 0 to 10 points, moving from chair to bed from 0 to 15 points, personal hygiene from 0 to 5 points, toilet use from 0 to 10 points, showering or bathing 0 to 5 points, moving from 0 to 15 points, going up and down stairs from 0 to 10 points, dressing and undressing from 0 to 10 points, stool control from 0 to 10 points, and urine control from 0 to 10 points. The total possible points are 100. The Barthel index was interpreted as follows:

- 0 - 20 Total Dependency
- 21 - 60 Severe Dependency
- 61 - 90 Moderate Dependency

- 91 - 99 Low Dependency
- 100 Independence

The intervention was carried out for 12 weeks, with a frequency of 2 times per week and a duration of 40 minutes per session. A guide, based on the Perfetti Method, was applied to improve functional and cognitive abilities in patients with intellectual disabilities.

Protocol of intervention

The Perfetti Method is used in rehabilitation for the recovery and activation of movement spontaneously, through cognitive processes of perception, attention, memory and language. It is also called Cognitive Therapeutic Exercise (CTE). According to the study of (Fernandez, 2015), with a validity and reliability of 63 articles in total, 56 valid articles have been obtained. 22 articles, after review, were selected. Eight of them showed results of the Perfetti method as a proposal for rehabilitation of patients with a sequelae of stroke and 14 explained the neurophysiological basis on which the Perfetti method is based. Seven books have been selected because of the need to explain the characteristics of the ETC and the neurocognitive theory. Conclusions: ETC differs from traditional methods of Neurological Physical Therapy by using the activation of cognitive functions during the teaching-learning process. It emphasizes tactile-kinesthetic recovery as an essential fact to achieve a better level of motor control. The use of CTE in hemiplegics seems to improve functionality and qualitative aspects of gait and upper limb. Studies on the subject are still scarce and of low scientific quality (Cuvillo et al., 2022).

The Perfetti Method was applied in 3 phases: 1. First grade is when the patient is required to have control over the exercises and the effects that one or more muscles show when being stretched by the physiotherapist during the execution of the sequence. In second degree exercises, control should be exercised over the effects caused by the irradiation of the contraction of certain voluntarily activated muscles towards other muscles, with a programmed sequence of behavior facilitated by the physiotherapist. 3. Third-degree exercises comprise the group of exercises in which the preceding exercises progressively lose their signal value and the patient's attention is directed solely to the verification of the correspondence between the results of the movement and the perceptual hypothesis. This is possible through the control applied to the intensity, spatiality and temporality of the movement. In practice, in order to proceed to the third degree exercises, it is not possible to wait for the patient to fully automate his ability to control the previous elements. It is therefore evident that in the third degree exercises there will be, at least at the beginning, a control not yet automated. So the patient will also direct his attention to the irradiation and the reaction to the stretching. The motor impairment of the subject, moreover, is not homogeneous, so it is usually frequent that the recovery of the mobility of the different segments occurs with different magnitudes. Therefore, exercises of different degrees are required within the same behavior. (Fernandez, 2015).

Statistical Analysis

The data obtained, after applying the Perfetti Method to improve functional and cognitive abilities in intellectual disability, were processed through the IBM SPSS statistical system Version 26.0 A database was created to tabulate and analyze data. Tables, on the changes in the improvement of functional and cognitive abilities in intellectual disability, were used. For verification, the statistical T student test was used, considering the variables before and after the intervention. The significance level was ($p < 0.001$).

Ethics Committee

It should be mentioned that before carrying out the assessment and intervention, authorization was requested at the Inclusive Center of Disabilities El Peral 2 of the Autonomous Municipality of Ambato. It aimed to start the development project. In addition, in order to apply the physiotherapeutic form of socio-demographic considerations, the participants and their representatives were informed about the aspects of participation in the study. In this way, the objectives, the form of evaluation, the type of intervention, the benefits and possible effects were socialized in order to obtain their voluntary consent to participate in the study. The research protocol with the topic: APPLICATION OF THE PERFETTI METHOD TO IMPROVE FUNCTIONAL AND COGNITIVE CAPABILITIES IN PATIENTS WITH INTELLECTUAL DISABILITY was submitted to the Ethics Committee of Research in Human Beings of the Faculty of Health Sciences - UTA.

The approval code is 040-CEISH-UTA-2023, which meets all the ethical, methodological and legal requirements established by the regulations of this Committee.

RESULTS

The results obtained from the application of the Perfetti method in the study participants are shown below.

Table 1. Sociodemographic characteristics age, sex and results of the mean and deviation.

Age	Frequency	Percentage (%)
16- 17 years old	8	40
18- 26 years old	12	60
Total	20	100
SEX	Frequency	Percentage (%)
Female	10	50
Male	10	50
Total	20	100

Interpretation: as for the age of the participants, 40% are adolescents and 60% are adults. In reference to the sex of the participants, 50% are women and 50% are men.

Table 2. Barthel initial/end dependency index

BARTHEL'S INDEX	Initial Assessment		Final Assessment	
	Frequency	Percentage	Frequency	Percentage
Total Dependency	0	0	0	0
Severe Dependency	8	40	5	25
Moderate Dependency	12	60	12	60
Low Dependency	0	0	3	15
Independence	0	0	0	0
Total	20	100	20	100

Source: Barthel Index

Interpretation: Regarding the initial Barthel Index, 60% of the participants have moderate dependence and 40% have severe dependence. Most of the study participants can perform some activities of daily living without help and for others they need the assistance of their caregiver to carry out a given action. In reference to the results obtained after the application of the Perfetti method, 60% of participants obtained a moderate dependency level, 25% severe dependency and 15% low dependency. A predominantly small percentage developed the necessary skills to carry out the activities independently and another small percentage carried them out with the appropriate assistance of a trained professional.

Table 3. MoCA index of initial cognitive impairment

(MoCA)- TEST	Initial Assessment		Final Evaluation	
	Frequency	Percentage	Frequency	Percentage
Cognitive Impairment	17	85	16	80
Mild Cognitive Impairment	3	15	4	20
Standard	0	0	0	0
Total	20	100	20	100

Source: Montreal Cognitive Assessment (MoCA)- Test

Interpretation: In relation to the Montreal Cognitive Assessment (MoCA)- Test, in the initial assessment, 85% presented a deficit in cognitive impairment and 15% a mild cognitive impairment. After the application of the guide, based on the Perfetti Method, the final assessment was carried out. We noticed a significant change: 80% of people presented cognitive impairment, and 20% obtained a mild cognitive impairment. This indicates a significant change in cognitive development after the application of this methodology.

Table 4. T-Student's test for related samples

	Mean	Desv. Desviation	Desv. Average error	95% confidence interval of difference		t	gl	Sig. (bilateral)
				Lower	Superior			
MoCa Initial – MoCa Final	-3,35000	13999	,23255	-3,83673	-2,86327	-14,406	19	00
Barthel initial – Barthel final	-16,50000	5,15548	1,15280	-18,91284	-148716	-14,313	19	00

Source: Montreal Cognitive Assessment (MoCA)- Initial and final Barthel test and index.

Interpretation: The results obtained from the application of the T-test for related samples establishes that, in relation to the Moca questionnaire that measures the level of cognitive impairment, there are significant differences concerning the data obtained in the initial and final assessment with a significance level of ($p < 0.001$). On the other hand, as for the Barthel test, significant differences were also identified in relation to the application of the Perfetti method, with a significance level of ($p < 0.001$). This indicates that the method applied to people with disabilities shows improvement in relation to the level of functional dependence and cognitive impairment.

DISCUSSION

The current research was conducted with 20 adolescents and adults with intellectual disabilities at the Inclusive Center of Disabilities El Peral 2 of the Autonomous Municipality of Ambato. The age range was from 16 to 26 years, specifically 40% adolescents and 60% adults. The selected population were men and women with 50% of each gender. The average age was also studied in the population assessed by (Santacruz, 2018). It was between ages 17 to 20 years olds which corresponds to 22% of its population.

The results of the study during the initial and final assessment of the scales that were used, as the Barthel index and the Montreal Cognitive Assessment (MoCA)- Test, showed the significant improvement in the final assessment verified with the T-Student test with a significance of ($p < 0.001$). This demonstrates that the Perfetti Method improves the functional and cognitive abilities of the participants of the study.

Similarly, in the research of Castro et al (2019), the Perfetti Method is functional and global. It focused on working sequentially according to the patients progress. Thus, it emphasizes the gradual rehabilitation in the planning of the development of activities from movement to execution. This allowed to generate the motor function of the upper limbs, including functional patterns which go together with the cognitive area, and the proper development of a specific task. (Salles et al., 2015).

It is evident that the research of Collado (2018) has similarity when applying the Perfetti method in the treatment of patients with cerebral palsy. He states that the method is effective in generating an adequate integral development since it contributes to increase the level of mobility and above all the functionality to maintain an adequate development in the environment. This method is applied in several problems of patients with cerebral palsy and intellectual disability since it works at a global level to improve their quality of life.

According to Gil et al (2013), the application of therapeutic exercise evidences the effect of physiotherapeutic treatment, including therapeutic exercise. It decreases the intensity, frequency and duration of pain. Limited evidence was also found for the effectiveness of aerobic exercise in patients with migraine. Although it was not better than the effects derived from other forms of treatment.

In the study by Arias et al (2023), in their initial physical and functional evaluation, an eight-session treatment plan was developed and applied. It included first-degree exercises with the Perfetti Method, and a daily duration between 20 and 30 minutes. An increase in the patient's functionality was verified. Therefore, the benefit of this therapeutic method was described.

CONCLUSIONS

In the identification of dysfunctions in functional and cognitive abilities in intellectual disability through the application of the MoCA test and the Barthel index, the results showed a moderate level of dependence and significant cognitive impairment. This means that the study participants showed severe difficulties in performing functional activities autonomously such as activities of daily living, as well as problems in visual and spatial abilities, identification and naming, attention and concentration, language, abstraction, delayed recall and orientation.

The stability of the patients who participated in each session during the application of cognitive therapy exercises or the Perfetti Method showed that this is an effective rehabilitation tool. It is equally useful for the development of independence in different proposed activities, areas of cognitive process and its activation. During the application of the method the patient is the one who performs actions, modifies and integrates external information through actions.

In the study, the Perfetti Method in all its variables improved the independence of patients with intellectual disabilities. Thus, it can be concluded that the application of the Perfetti Method is effective in improving the functional and cognitive abilities of patients with intellectual disabilities.

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