**Abstract**

Cerebral palsy (CP) is currently considered the first cause of childhood disability in the pediatric age, it is a non-progressive neuromotor disorder caused by an injury or trauma to the immature brain; Coming to cause alteration in movement, coordination, posture and increased muscle tone, followed by cognitive, behavioral and communication deficits. For this reason, this article seeks to know at a neuropsychological level how this disease affects cognitive abilities that denotes changes in their environment, with their peers, at an educational level and, above all, at a family level; and through this research to detail possible therapeutic plans that will help improve the quality of life of people with CP. The revised methodology in this non-experimental design is given by literature processes, for the data collection I have used sources of a different nature. It is expected that the first beneficiaries will be infants with this disorder, adolescents, parents and professionals interested in the subject.

**INTRODUCION**

Cerebral palsy is related to a wide range of disorders of a diverse nature, which have been delved into in great depth in recent years, which has contributed to the development of Neuropsychology and other disciplines related to the disease (Cardenas et al., 2019); It has always been a challenge to conceptualize the name of cerebral palsy in a unified way, however it has been denoted since ancient times by its symptoms that cause limitations in daily activities or in the child in the first and subsequent moments of brain development (Amador and Montealegre, 2016).

Cerebral palsy is a neurodevelopmental disorder, more specifically neuromotor, coined for the first time by William Osler in 1888; Previously, in the year 1860, this disease was known as Little's disease, since William Little was the first doctor to prescribe a childhood disorder whose main characteristic was muscle rigidity, with a higher incidence in the lower extremities of the body than in the upper ones (Vega et al., 2015). Its subsequent, more exhaustive definitions and classifications were carried out by Sigmund Freud, among other authors (Fernandez and Sandoya, 2017).

Throughout history, multiple investigations have been carried out to try to understand, define and classify cerebral palsy, determining it as a diagnostic term, which refers to a group of neurodevelopmental disorders, whose essential characteristic is the affectation of posture. and movement, due to an early lesion of the nervous system, that is, when the brain is in the middle of the maturation process (Benedet, 2014). Schiariti et al. (2014) mention that in addition to the primary motor involvement, children with CP frequently present epilepsy, scoliosis, gastrointestinal problems, osteoarticular deformities, cognitive and behavioral deficits; which together will cause a permanent limitation of the functional capacity of the affected person, as well as in their quality of life and their biopsychosocial adjustment.

The "Executive Committee for the definition of Cerebral Palsy" defined CP as: a group of developmental disorders of movement and posture, which causes limitations in activities, attributable to non-progressive alterations...
that occur in the fetal or brain development of the child, this not only encompasses a group of alterations in motor functions, but also it is generally accompanied by more or less significant affectations presenting cognitive, behavioral and communication deficits (Jover et al., 2015).

Arias and Huiracocha (2015) mention that, worldwide, cerebral palsy is the most frequent cause of motor disability in childhood, with an incidence of 3-2 per 1,000 live births, and increases to 40-100 per 1,000 live births. alive in preterm and very low or low birth weight infants; In his study conducted in children under 16 years of age with cerebral palsy in the city of Cuenca-Ecuador, 72 patients with a mean age of 6.2 years (±4 SD) were found; the mean age of diagnosis was 8 months (±10.8 SD). ), 80.6% had epilepsy, 53.9% in CT had brain atrophy, in 43.1% the cause of admission was respiratory infection; From the prenatal and neonatal history, 54.2% were admitted to the neonatology unit, 38.9% received resuscitation, 6.9% had neuroinfection, and 42.1% of the children's families had a low-medium socioeconomic status.

From what this definition, introduces very valuable concepts for neuropsychological clinical practice; The dynamics of the relationships between psychic activity and motor activity have long been the object of interest of researchers from various scientific disciplines, including Physiology, Neurology, Psychology, and more recently modern neurosciences.

Materials and Methodology
The revised methodology in this non-experimental design is given by literature processes, for the data collection I have used various sources of different nature such as computer networks, specialized web pages, scientific articles from electronic journals in Spanish and English, I have used books of the Library focused on modern studies and research on this disease.

THEORETICAL FRAMEWORK
Cerebral palsy is the most frequent cause of motor disability during childhood, in 2016 the World Health Organization indicates that 15% of the population suffers from some type of disability (Cardenas et al., 2019). The Pan American Health Organization (PAHO) in 2014 determined that approximately 140 million people with disabilities live in Latin America, but only 3% have access to rehabilitation services (Fernandez and Sandoya, 2017); 94% of their totality acquired their disability in the womb or during childbirth, the remaining 6% occurred during their first years of life; Half of the people have intellectual disabilities, 33% need assistance in their movements and 25% require auxiliary communication systems (Millar et al., 2018).

Enireb and Patiño (2017) consider that cerebral palsy comprises a non-progressive heterogeneous pathology with alteration of movements or posture that limits the performance of daily activities of patients associated with sensory, perceptual, cognitive, communicational, behavioral disorders, epilepsy or other secondary musculoskeletal disorders. However, CP is a disease that is presumed to have accompanied humanity since its inception, with evidence existing in ancient Greece by Hippocrates (460-370 B.C.) and Sorano (98-138 A.D.), as well as in Rome by historians such as Suetonius (Espinoza and Aviles, 2019).

The most common clinical manifestations occur in a varied way, that is, they do not all occur in the same way in patients, since they depend on the type, location, amplitude, and diffusion (Perez, 2019). However, a general characterization can be based on changes in posture, coordination problems, difficulty walking, they are usually accompanied by disorders of cognition (intellectual deficit), of communication (difficulties in articulating words), sensory and seizures (epilepsy), which can affect the quality of life (Perez-de la Cruz, 2017). There are some parameters that allow us to identify relevant alterations in neurodevelopment, such as failure to progress at a given age, asymmetric development of movement, tone or reflexes, loss of previously acquired skills, and poor social interaction and psychoaffectivity (Fuenmayor and Villasmil, 2015). Sensory development plays an essential role and the very young child must be evaluated, who must be able to respond adequately to visual and auditory stimuli in the first trimester of life; finally, an abnormal cranial growth curve is another relevant alarm sign (Medina et al., 2015).

Lopez et al. (2019) contribute that the first symptoms of CP occur before three years of age; CP can be classified according to several parameters (Chavez and Bolaños, 2018); with a combination of degrees and topologies that end up with a greater or lesser number of neuropsychological deficits that produce decompensation in different areas. Depending on the degree of dependence, it can be: slight, meaning total independence, although with clumsy movements; moderate requiring technical help or help from another person; and severe indicating total dependence for any task and requires more specialized help (Vargas, 2018).

The CP is distinguished according to the physiological classification in: Spastic cerebral palsy: the lesion is in the pyramidal system, which is in charge of controlling voluntary movements; It is characterized by an excessive increase in muscle tone (hypertonia), accompanied by a high degree of muscle rigidity (spasticity), which causes exaggerated and poorly coordinated or harmonious movements, especially in the legs, arms and/or back (Gonzalez et al. et al., 2016). When spasticity affects the legs, they may bow and cross...
at the knees, giving the appearance of scissors, which can make walking difficult; Some people experience tremors and uncontrollable shaking on one side of the body that, if severe, interferes with carrying out movements (Rubio, 2016).

It is also classified as dyskinetic or athetotic cerebral palsy: due to involuntary movements, which can become uncontrollable, it mainly affects muscle tone, going from states of hypertonia (high muscle tone) to hypotonia (low muscle tone), these alterations disappear during treatment. sleep (Ortiz et al., 2018). We also find Ataxic cerebral palsy: the lesion is located in the cerebellum and presents problems with balance and lack of coordination in movements, it is characterized by alterations in muscle tone with fluctuations and sudden changes, the appearance of involuntary movements and very persistent persistence. manifested from arcahai reflexes, these abnormal movements affect the hands, feet, arms or legs and, in some cases, the muscles of the face and tongue, causing grimacing or drooling (Gonzalez and Brizuela, 2015) (Cardenas et al., 2019); and Mixed cerebral palsy, which is a group of disorders that can compromise the functions of the brain and the nervous system such as movement, learning, hearing, vision and thought (Medina et al., 2015), the most frequent is that people with mixed cerebral palsy present a combination of some of the three previous types, especially spastic and athetotic (Vasquez et al., 2016).

Cuesta (2018) alludes that depending on the severity of the affectation both at the motor, language and functionality level, the degree will depend: Grade 0: normal, without alteration; Grade I: without alteration of the function, with possible slight anomalies that can be corrected voluntarily; Grade II: more severe anomalies, but without impeding function; Grade III: requires help because the functions that are limited; Grade IV: without function.

Regarding the nomenclature of the topographic distribution, we can differentiate cerebral palsy based on the part of the body that is affected, thus having a classification such as: Hemiplegia- which occurs when the disability occurs only in the left half or right of the body; Paraplegia- affectation mainly of the lower limbs; Tetraplegia- both arms and both legs are affected; Dysplegia- affects both legs, the arms being not at all or slightly affected; Monoplegia: only one member of the body is affected (Robaina et al., 2007).

Gonzalez et al. (2016) indicate that the majority of cerebral palsy is due to factors such as: Prenatal causes such as placental abruption, which occurs when the placenta detaches from the wall of the uterus before delivery; Perinatal causes: it is a lack of perfusion or adequate cerebral blood flow (ischemia); stroke or intracranial hemorrhage: hemorrhages that occur inside the skull or brain usually occur suddenly, either from external or internal causes, causing damage to the brain and nerves very quickly and can be fatal; Postnatal causes: infectious diseases that are caused by pathogenic microorganisms such as bacteria, viruses, parasites or fungi; strokes that obstruct blood flow to part of the brain, if blood flow stops for more than a few seconds, the brain cannot receive nutrients.

Vega and García (2015) mention that Neuropsychology has been focused on cerebral palsy, finding among them the multiple cognitive alterations and deficits that accompany the disorder; due to the fact that most of the studies have focused on investigating the physical alterations, leaving aside the cognitive aspects that affect the quality of life of these patients. However, in recent years there have been numerous articles that describe the cognitive deficits of this population; among all children with CP, those born prematurely (less than 32-38 weeks gestation) and with low birth weight (less than 1500 grams) have been found to show increased risk; Likewise, these children have a 2.65% higher risk of developing ADHD during school age (ASPACE Confederation, 2021).

Lerma et al. (2019) in their research with a sample of 10 children with spastic CP found that these patients made more omissions in a more variable response time than the control group, concluding that sustained attention and inhibition capacity are affected. When evaluating children with CP, we must take into account their visual limitations, because the visual system is the system that provides the most information about the outside world and at birth, the retina (where the rods and cones are located) will be fully developed and this is why light perception is possible while the lens is still immature, so visual focus will be reduced (Millar et al., 2018).

Also in the associated symptoms we find language, children with CP have often shown difficulties in communication and language, dependent in many cases on the motor, cognitive and sensory level, this theory also supports this theory that there are speech disorders in a 21% of children with CP analyzed in their sample, of which 41% had cognitive deficits; It should be noted that other studies that have evaluated language in children with CP have found this cognitive capacity relatively intact (Gavillanes et al., 2016).

Attention: attention deficits are one of the most frequent diagnoses in the CP population, probably related to damage to the white matter networks that surround the lateral ventricles and that connect the prefrontal area with posterior regions, deficits which can seriously hinder life daily of these patients (Perez, 2019). Attentional problems with postural control are also reflected, this problem can interfere with the correct performance of various activities.
that require a specific posture or even listening to what someone says, in this case we are talking about divided attention (Solinas, 2018).

The visuoperceptive abilities that allow the brain to have the ability to understand and interpret what the eyes see and visuoconstructive, have been the most studied cognitive functions in children with CP (Fuenmayor and Villasmiil, 2015). Some studies have found that up to 72% of subjects with CP have visuospatial and visuoconstructive deficits. Several studies have associated visuoperceptive impairment with a reduction in white matter in the parietal lobe and occipital lobe, as mentioned, also conclude a correlation between the degree of ventricular dilation together with the narrowing of the posterior part of the corpus callosum and the deficits mentioned above (Robaina et al., 2007).

CP is also associated with deficits in the executive system, which are responsible for regulating and monitoring cognitive processes while performing complex tasks (Millar et al., 2018). In clinical practice, children with CP stand out for performance deficits in inhibitory control and cognitive flexibility, which helps explain the relationship with behavioral manifestations, social and learning problems (Benedet, 2014). Hernández et al., (2016) in their research indicate that CP can be affected at a cognitive level and behavioral problems. It is estimated that the prevalence of emotional and behavioral problems in children with CP is between 25%-60%, with one in four children with CP having behavioral difficulties compared to one in ten typically developing children (Arias and Huiracocha, 2015).

There are also learning difficulties as a consequence of gnosic, praxic, perceptual and linguistic deficits; the understanding and analytical capacity of this type of patients is very low, however, there are those who, despite these difficulties, do not present mental retardation and, on the contrary, their cognitive profile, that is, their intelligence quotient (IQ) is within expected (Navarro and Restrepo, 2004).

As already mentioned, cerebral palsy is not a univocal concept and in its definition appears the heterogeneity of its manifestations based on severity, age of development or level of affection, for all this, the approach that is carried out carried out with this population must be multidisciplinary and individualized (Chambi et al., 2019). Within the treatments for your rehabilitation we can find Physical Therapy or Physiotherapy that serves to prevent deterioration or muscle weakness due to not using a certain member (atrophy due to lack of use), it also prevents contractures; in them, the muscles contract chronically due to alterations in muscle tone and the weakness associated with CP (Mendizabal, 2019).

An important technique is also Early Stimulation, being a tool that is used for the neurodevelopment of children with and without alterations from birth; For this reason, the research was done in children with Infantile Cerebral Palsy to observe how it influences the development of gross motor skills within 0 to 4 years (Fernandez and Sandoya, 2017). Currently Early Stimulation is seen as a direct and satisfactory approach to help the child with CP in the development of gross motor skills. Its purpose is for the child to achieve the maximum improvement of her potentials since it works on the development of gross motor skills that correspond to head control, coordination, sitting, crawling and standing (Rubio, 2016).

The Rood method is also the most widely used, it is named after its creator Margaret Rood, an American occupational therapist and physiotherapist, who in 1956 designed this method that consists of motor patterns that can be modified through sensory stimulation. (Fernandez and Sandoya, 2017), the sensitive receptors are the exteroceptive ones found in the skin, epidermis, dermis and the proprioceptive ones are located in the muscles, causing changes in muscle tone and achieving the facilitation and inhibition of movements; Rood’s Method observed that with damage to the central nervous system, the normal sequence of reflex development and learned voluntary motor control do not appear (Abarca, 2015).

The therapeutic approach is also necessary because it focuses on the psychological and functional aspects of the child, it refers to cognitive stimulation, this being the most recurrent and complete of the therapeutic options due to its diversity (Canto, 2017). Some authors defend that early intervention favors brain reorganization, favoring the acquisition of compensatory skills and improving the quality of life and functional independence of children with CP; authors such as Vega and García (2015) concluded that language can be reorganized in the right hemisphere when the lesion has occurred congenitally. In these processes, brain plasticity plays a very important role, which is why when the lesions are earlier and an enriched environment is favored, brain reorganization is more likely, achieving compensation in the skills to be developed and, therefore, a change in the manifestation of the disorder (Jimenez, 2017).

We also have computerized rehabilitation which deals with cognitive stimulation in a computerized format, this type of rehabilitation can be beneficial for improving the spatial capacity of children, it is based on the presentation of certain tasks, such as mazes, on the computer; The objective of the activity is to solve the task by using a mouse or a joystick to move around the screen (Enireb and Patiño, 2017). Macama et al. (2018) mention that one of the current techniques is the use of Virtual Reality, which refers

to computerized graphics that aim to recreate a simulation of the real world and with this type of program it is possible for children, in this case, with cerebral palsy carry out an interaction, as with computerized tasks, and an immersion in the task and in reality.

Another type of treatment is surgical, when the degree of involvement of spasticity is high and causes relevant contractures, among these procedures are tendon transplants and lengthening of retracted tendon units, among others (Hernandez et al., 2016). And the pharmacological, where GABA, botulinum toxin and adrenergic agonists predominate. It is important that these types of interventions at the motor level are accompanied by physiotherapeutic programs to promote rehabilitation and development of motor skills that are intended to be achieved with the procedures (Cevallos and Molina, 2015).

In short, given the variety and amount of neurocognitive disorders that occur in children with CP, in addition to the restriction of movement, the scarcity of personal experiences, the lack of social participation, and the degree of functional dependence, it is foreseeable that they may manifest emotional and behavioral problems. Therefore, specialized interdisciplinary care is necessary that covers all areas of development, and educational intervention adjusted to the neuropsychological profile of each child with CP.

RESULTS

After the development of the article, it was evidenced that children with cerebral palsy present dysfunctions in multiple areas of cognitive, linguistic, and motor skills; Because this disorder involves the brain, which affects nervous system functions such as movement, learning, hearing, vision, and thinking. After analyzing various investigations related to the disorder, it was verified that there are two areas in which there is no improvement, such as gross motor and expressive communication; It may be due to the fact that the paralysis occurs fundamentally with motor disorders. In other words, the efferrant function par excellence, the motor function, is the one that is most compromised and is the one that executes speech and general motor coordination.

However, it is possible to improve the quality of life of the affected people from various levels; developmental progress is evident, even with cases of severe cerebral palsy. Let us remember that although it is a static and not a progressive condition, changes can occur with the continuous development of the brain, so it must be considered as a condition. However, the approach to the patient with CP must be carried out by a multidisciplinary team specialized in the different treatments and interventions that users need, therefore, in addition to motor rehabilitation, early attention is required. For this reason, quick action is key to improvement; Within the different areas we have Neuropsychology, which thanks to its treatments and therapies with this approach can stimulate cognitive development to improve their quality of life, behavior and functionality, and lead to changes in neuroplasticity; also the integration of techniques such as physiotherapy, early stimulation, virtual reality, can improve cognition and motivation in children with CP.

DISCUSSION

After scientific and bibliographical research, there are few works in which the various cognitive abilities are jointly analyzed in order to determine possible patterns of affectation and conservation of specific abilities. Considering that despite the studies carried out on CP, a cure for its entirety has not been found; but physical, occupational and language therapies are essential after receiving your diagnosis; although most studies agree on the relative integrity of linguistic functions regardless of the lesion and despite articulation defects. From the point of view with a neuropsychological approach, in order to carry out a good cognitive rehabilitation it is essential to determine all the functions that are preserved to strengthen them to the maximum, later consider having a neuropsychological profile to objectify goals, based on individual needs for effective planning. And currently, surgical procedures that seek to reduce spasticity through intervention in the lower upper extremities can also be used. This procedure significantly improves the tone and muscle strength of the child, however, it considerably reduces sensitivity in the extremities causing alterations at the level of proprioception; and the drugs.

References


