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## EQUINE THERAPY AS A PHYSIOTHERAPEUTIC RESOURCE IN THE TREATMENT OF CHILDREN WITH DOWN SYNDROME

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**Abstract: Introduction:** Down Syndrome (DS), also known as Trisomy 21, is caused by an extra chromosome in pair 21. Worldwide, it affects around 1 in 1,000 live births, causing complications such as delays in neuropsychomotor development and heart disease. **Aim:** To discuss how equine therapy acts as a physiotherapeutic resource for children with Down's Syndrome. **Methodology:** A descriptive qualitative bibliographic review looking at equine therapy as a physiotherapeutic approach in children with DS, using studies published between 2014 and 2024 in the Scielo, PubMed, PEDro and Google Scholar databases. **Results:** Equine therapy contributes to neuropsychomotor development. **Final considerations:** Equine therapy brings benefits to trisomic children. **Keywords:** Down syndrome. Physiotherapy. Equine therapy

## INTRODUCTION

Down's Syndrome (DS), also known as Trisomy 21 or Trisomy 21, was first identified in the 19th century, showing varying degrees of intellectual disability (Schwartzman, 1999). Historically, people with this syndrome have faced discrimination and even death in some societies, such as ancient Greece, where they were considered non-human beings (Mata; Pignata, 2014).

Johnn Langdon Haydon Down described the condition in 1866, observing cognitive difficulties and physical changes, initially called "mongolism" (Coutinho *et al.*, 2021). According to Mata; Pignata (2014), the cause of the syndrome was confirmed in 1958 by Jérôme Lejeune, who identified chromosomal alterations such as trisomy 21.

The disease is usually caused by an error in the separation of chromosomes during cell division, resulting in an extra chromosome in pair 21 (Freire *et al.*, 2014). According to Marinho (2018), there are three types of

chromosomal abnormalities associated with the syndrome: simple trisomy, translocation and mosaicism. According to the Ministry of Health (2020), DS affects children all over the world, with an incidence of 1 in 1,000 live births and, in Brazil, around 1 in 700 children are born with the condition each year.

Those with the syndrome face health complications such as delayed development, congenital heart disease, hearing and visual disorders, among others (Marinho, 2018). The motor development of these children is especially compromised, requiring therapeutic interventions (Souza; Alves, 2016). Physiotherapy plays a crucial role in the treatment of the syndrome, constituting an essential condition for promoting neuropsychomotor development (NPMD) and contributing to patients' quality of life (Ramos; Muller, 2019).

Equine therapy is increasingly used as an effective therapeutic approach, providing physical, psychological and educational benefits for trisomic individuals, improving motor coordination, balance, posture and communication, among other aspects (Marinho, 2018).

The study is relevant because it promotes the dissemination and propagation of knowledge regarding the importance of equine therapy in the treatment of children with Down's Syndrome. Still within the scope of the above and in relation to the positive emphasis - of physiotherapy in conjunction with equine therapy in the treatment of these children - the guiding question arises: what are the benefits of equine therapy in the treatment of trisomic children?

The general objective of the study was to highlight how equine therapy acts as a physiotherapeutic resource for children with Down's Syndrome. The specific objectives are: to describe DS, to report on the relevance of using equine therapy as a physiotherapeutic resource and to list the benefits provided by equine therapy in the NPMD of trisomic children.

## METHODOLOGY

This is a qualitative, descriptive bibliographical review in Portuguese. The texts were chosen according to the object of study Equine therapy in Down's Syndrome and of the 55 articles found, 10 were discarded and 45 selected in order to answer the objectives; a survey was carried out by analyzing books, in PDF, found on Google, and works published in the Scielo, Medline, PubMed, PEDro databases as well as Google Scholar.

The inclusion criteria were articles that addressed the pathology in question (Down's Syndrome), physiotherapy and equine therapy. Articles were selected in Portuguese, English and Spanish, with a time limit of 10 years (2014 - 2024). Exclusion criteria were articles that presented equine therapy through a bias that addressed patients with pathologies other than DS. Papers that were not in one of the three chosen languages or that were prior to the time period were also discarded.

The following descriptors were used: Physiotherapy, Down Syndrome, Equine Therapy.

## BASIC CONCEPTS

### DOWN'S SYNDROME

Down Syndrome (DS), also known as Trisomy 21 or Trisomy 21, was the first pathology - with varying degrees of intellectual disability - to be identified, with a chromosomal abnormality as the initial cause. DS has always been present in humans, but the first studies and scientific papers on the condition date back to the 19th century (Schwartzman, 1999; Coutinho *et al.*, 2021).



Figure 1: Child with Down's Syndrome.

Source: Brazilian Society of Pediatrics (SBP), 2020.

Among ancient European peoples, children with obvious disabilities - such as Down's Syndrome - were subject to death. In Spartan civilization, these individuals were abandoned because they were considered non-human beings, called "idiots", a term that was associated with people with cognitive disorders (Mata; Pignata, 2014).

DS was described in 1866 by the English doctor John Langdon Haydon Down, who observed cognitive difficulties and physical changes in children, called "mongolism" (Coutinho *et al.*, 2021). According to Mata and Pignata (2014), the cause of the disease was ratified by Jérôme Lejeune in 1958, who reported cytogenetic alterations such as free trisomy 21, translocation and mosaicism.

The disease is usually caused by a separation error - of a pair of chromosomes - during cell division, i.e. by non-disjunction. Each person has 50% of their chromosomes from their father and the other half from their mother, meaning that sperm and eggs have 23 chromosomes (Freire *et al.*, 2014).

In the non-disjunction process, during meiosis, one daughter cell receives 24 chromosomes and the other 22. Germ cells with 24 chromosomes are able to survive and fertilize, which differs from cells with only 22. In this way, the fertilized egg will have 47 chromosomes and if chromosome 21 is extra, there will be trisomy 21 and the newborn will be diagnosed with Down's Syndrome (Freire *et al.*, 2014).

There are three types of chromosomal abnormalities and according to Marinho (2018), in simple trisomy, the carrier has 47 chromosomes in all the cells; in translocation, there is an extra chromosome from pair 21, which is allocated to another chromosome; in mosaicism, there is impairment of some parts of the cells.

According to the Brazilian Society of Pediatrics (2020), DS occurs due to chromosomal disharmony and its diagnosis is based on phenotypic characteristics, confirmed by karyotype examination. The phenotype present in the newborn allows the clinical diagnosis to be made in almost all cases.

Down Syndrome affects children all over the world. According to sources from the Ministry of Health (2020), the incidence of DS in the world is 1 in 1,000 live births. In Brazil, 1 out of every 700 children born alive has the condition.

People with Down Syndrome are predisposed to health complications: delayed development, congenital heart disease, hearing and vision disorders, and postural changes (Marinho, 2018). Thus, the motor development of these children is very compromised, requiring intervention (Souza and Alves, 2016; Souza, 2020).

Among the most common characteristics are altered motor skills and posture, a tendency towards obesity, neurological disorders and disorders of the stomach system, small hands and short fingers (Silva; Dessen, 2022; Halberstadt *et al.*, 2019; Trindade and Nascimento, 2016; Araruna *et al.*, 2015). The ability to learn new motor skills is influenced by the delay in NPMD and the sensory issue interferes with posture control, balance and coordination; with regard to intellectual disability, this is related to the difficulty in transmitting neuronal circuits, which causes impairment in the processes of analysis, correlation and abstract thinking, in addition to other cognitive impairments (Coelho, 2016; Ferreira *et al.*, 2018).

According to Coppede (2012), muscle hypotonia and joint hypermobility are the main characteristics present in the child's motor development, contributing to the impairment of gross and fine motor skills. Below is a figure with information about other characteristics of the pathology.

Segmental examination		Signs and symptoms
Head	Eyes	Epicanthus
		Oblique palpebral fissure
		Synophrys
	Nose	Flat nasal bridge
		Small nose
	Mouth	High palate
		Hypodontia
		Lingual protrusion
	Form	Brachycephaly
	Hair	Thin, smooth and low-set
Ear	Small with delicate wolf	
	Low deployment	
Neck	Connective tissues	Excess fatty tissue on the back of the neck
		Excess skin on the neck
Chest	Heart	Heart disease
Abdomen	Abdominal wall	Diastasis of the rectus abdominis muscle
	Umbilical scar	Umbilical hernia
Locomotor system	Superior	Single palmar crease
		Clinodactyly of the 5th finger of the hand
	Bottom	Distance between 1st and 2nd toe
	Tone	Hypotonia
Ligament laxity		
Global Development		Natural Weight Deficit
		Psychomotor deficit
		Intellectual deficit

Figure 3: Clinical features of DS.

Source: Ministry of Health, 2013.

STANDAR	TRANSLOCATION	MOSAIC
<p>The karyotype is the study of the representation of the chromosomes present in cells.</p> <p>In standard trisomy 21, the karyotype is 47XX or 47 XY (+21).</p> <p>The individual has all 47 chromosomes in all cells, with three chromosomes in pair 21, which occurs in 95% of cases.</p>	<p>The karyotype looks like: 46XX (t 14; 21) or 46 XY (t 14; 21).</p> <p>The individual has 46 chromosomes and an extra chromosome, chromosome 21, which is attached to another pair, usually chromosome 14.</p> <p>Occurs in 3% of cases.</p>	<p>The karyotype looks like: 46XX / 47XX or 46XY / 47XY (+21).</p> <p>The individual has a mixture of normal cells (46 chromosomes).</p> <p>And trisomic cells (47 chromosomes).</p> <p>Approximately 2% of cases occur.</p>

Figure 2: Karyotype of DS due to free trisomy 21 in females.

Source: Marinho (2018). Adapted by the authors (2024).



Figure 4: Clinical characteristics of muscle hypotonia in DS.

Source: Down Syndrome Care Guidelines. MINISTÉRIO DA SAÚDE Brasília - DF, 2013.

## DOWN SYNDROME: COGNITIVE CHARACTERISTICS AND MOTOR DEVELOPMENT

According to Gallahue; Ozmume; Goo-dway (2013), and corroborated by Araki; Ba-gagi (2014), motor development is configured as the uninterrupted transformation of the repertoire and motor skills in the flow of the life cycle, fostered by the amalgam between motor demands, the individual's biology and environmental circumstances.

Motor development in a child with DS is not standardized, as it happens in a very peculiar and specific way, taking into account the expected degree of mental disability. However, from the point of view of many scholars, mental disability should not be reinforced or ratified, but rather the abilities of those with the syndrome to adapt and perform every-day tasks should be reinforced (Silva; Dessen, 2002) (Araki; Bagagi, 2014).



Oliveira *et al.* (2014) point out that children with DS tend to have motor deficits, making different therapeutic interventions necessary that can positively influence the development of motor skills.

The motor development of these children is highly compromised and requires intervention (Alves *et al.*, 2016). In agreement, Costa *et al.* (2017) point out that children with DS can have a variety of impairments that result in multiple delays in motor milestones, when compared to typical children.

According to Borssatti (2013), standing, crawling and walking are basic stages of motor development in which children with DS have difficulties. The author also refers to changes in stability, muscle asthenia, weakened muscle tone and hypermobility.

## **PHYSIOTHERAPY IN DOWN SYNDROME**

According to the Brazilian Society of Pediatrics (2020), “every child with Down syndrome should be referred, in the first year of life, to early stimulation, carried out by a multi-professional team, whether or not they have a psychomotor delay up to the date of referral”.

The Ministry of Health (2016) points out that early stimulation employs therapeutic methods and management, with the aim of encouraging, increasing and enabling all aspects related to the child’s maturation, in order to provide motor, cognitive, sensory, linguistic and social development, preventing or mitigating possible impairments. The aim of early physiotherapy - through passive, assisted active and resistance exercises - is to stimulate the development and conservation of muscle strength and function, muscle tone and the maintenance of joint amplitude (Mussalem *et al.*, 2019).

Early physiotherapy provides children with DS with better development, helping with global organization, identifying altered aspects, preventing abnormal movement patterns, ai-

ming for functionality in carrying out daily activities and solving problems, promoting quality of life (Ramos; Muller, 2019).

According to Prado *et al.* (2019), physiotherapy has always played a strategic role in the treatment of people with Down’s Syndrome, since in addition to treating patients - so that they can carry out their daily activities to the best of their ability - it also encourages the maintenance or inclusion of these individuals in society.

Silva; Santos; Schiavon (2016), followed by Pereira *et al.* (2019) report that physiotherapy plays a valuable and indispensable role in treatment, as it significantly reduces the negative effects caused by the syndrome, improving patients’ motor and respiratory development and restoring life expectancy and quality of life; however, it must be emphasized that treatment cannot be limited to physiotherapy, as children with DS have needs that go beyond physical aspects and include physiological and psychological perspectives, thus requiring a multidisciplinary team approach.

According to studies and reports by Hasegawa *et al.* (2018) and Clara (2018), children with DS have muscle hypotonia from birth, so early physiotherapeutic follow-up is necessary to stimulate and treat them, with the aim of optimizing the development of gross motor coordination and all aspects of sensory stimuli, as well as improving quality of life and, consequently, longevity. Souza *et al.* (2018) also reinforce that the physiotherapy protocol must achieve the objectives aimed at optimizing and enhancing the child’s development.

## EQUINE THERAPY

Equine therapy is a therapeutic resource widely used in the treatment of children with disabilities; it is a therapeutic and educational method that uses the horse within an interdisciplinary approach. It was recognized by COFFITO (Federal Council of Physiotherapy and Occupational Therapy) as a therapeutic resource for Physiotherapy and Occupational Therapy in 2008, based on Resolution No. 348/081 and since then it has been adding several positive points to the quality of life of practitioners, such as improving motor difficulties, improving balance and optimizing psychosocial development (Alves *et al.*, 2016; Marinho, 2018).

Based on neurophysiology, it uses the rhythmic and repetitive movement patterns of the horse's gait. When walking, the horse's center of gravity is displaced three-dimensionally, resulting in a displacement similar to that of the human gait, with alternating movement of the upper limbs and pelvis, which sequentially and simultaneously determines a tonic adjustment of the muscles to maintain posture and balance, generating - in the vertical plane - movements up and down and, in the horizontal plane, movements to the right and left (transverse axis of the horse) and forward and backward (longitudinal axis) (Lopes *et al.*, 2019).

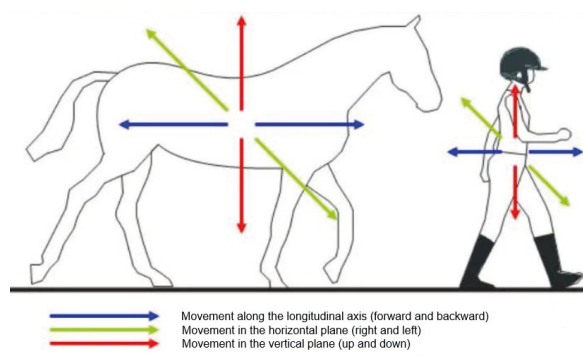


Figure 5: Three-dimensional movement between the horse and the practitioner.

Source: Martinez (2005).

During Equine Therapy, sensory integration occurs between the visual, vestibular and proprioceptive systems and specific stimuli are sent to the corresponding areas in the cerebral cortex, generating changes and reorganization of the Central Nervous System and, consequently, postural adjustments, physical and psychological gains and more appropriate and efficient movement patterns. The acquisition of greater muscle strength and mobility of the pelvis, spine, adjustment of tone, greater symmetry and better control of the head and trunk, improved relaxation, explain why children with disabilities show improvement in motor functions and gait after the sessions (Cabral *et al.*, 2014; Lopes *et al.*, 2019).

According to Chaves; Almeida (2018), the characteristics of the gait and the type of stride of the horse can improve balance, posture, general and fine motor coordination, the adequacy of muscle tone, the dissociation of movements, body awareness, breathing, circulation, the integration of the senses and the gains made in the activities of daily living. In this way, children with Down's Syndrome gain independence in their ADLs.

Equine therapy provides various benefits related to hypertonia and balance, control of global synergies and neuromotor improvement. It affects fine and global motor skills, gait phases, tendon reflexes, muscle tone and strength - especially in the lower limbs - which occurs when the practitioner stands in the stirrups in the orthostatic position (Chaves; Almeida, 2018) (França *et al.*, 2018).

According to Silva and Ribeiro (2014), therapeutic effects in equine therapy can be achieved in four ways: 1) improving relationships: achieving self-confidence, self-control, communication and attention; 2) improving psychomotor skills: involving muscle tone, mobility of the spine and hips, balance, posture, proprioception, coordination, dissociation of movements, precise gestures; 3) im-

provement of the technical nature: facilitating learning that refers to caring for the animal and riding techniques; 4) improvement of socialization: enabling individuals with mental or physical disabilities to interact with the team and with other practitioners.

Equine therapy has also been emerging as a treatment option with positive results in different areas of development. Therefore, carrying out a survey on the role of Equine Therapy in the neuropsychomotor development of children with Down's Syndrome is relevant, since, in the professional context, the method is configured as a therapeutic possibility. It is also important for the learning acquired and, above all, for the social context, given that the number of people with the syndrome is significant and brings with it a range of different prognoses, which, thanks to the intervention of Equine Therapy, can be minimized (Alves *et al.*, 2016).

Studies are currently being carried out with children, showing that equine therapy has provided numerous benefits for its practitioners, using the horse as an agent to promote physical, psychological and educational gains (Graup *et al.*, 2006) (Cabral *et al.*, 2014).

Inclusion is achieved by promoting interaction and integration with the horse and with other practitioners. This socialization is carried out through handling the animal (brushing, combing the animal, taking care of the riding gear), as well as by fetching or taking the horse to the stall (Cabral *et al.*, 2014).

According to Anunciação and Peixoto (2002), the main foundations of equine therapy promote the neuropsychomotor development of its practitioners and benefit the personal development and social inclusion of children with special educational needs (SEN). Equine therapy seeks psychological and physical gains, which are necessary for the performance of people with SEN, encouraging them

to use their capacity for self-fulfillment. It is necessary to sharpen and compel, but respect limits, because they need not only to recognize themselves, but, like any human being, to be recognized by others (Cabral *et al.*, 2014).

## RESULTS AND DISCUSSION

A table has been put together showing the studies, their authors, the year of publication, the title of the article, the study method, the results and the conclusion. This table constitutes the results presented in this course conclusion.

Hintz (2017) prepared an article consisting of a case study, the aim of which is to analyze how equine therapy acts on the development, coordination and concentration of individuals with Down Syndrome. The study took place in Santa Maria - RS, at the location selected by the interviewees, who were the subject's psychologist and mother, respectively (S1) and (S2), through a structured interview with the aid of a questionnaire.

According to the survey, both subjects agree that there has been an improvement in the motor coordination of the individual with DS. For S1, the fact that the practitioner has been doing horse-assisted therapy for years has helped him correct his posture and strengthen his muscles, corroborating with S2, who noted that in addition to motor skills, there have been psychological improvements. The mother and the psychologist emphasize that interaction with the horse promotes concentration and stimulates communication between the person and the animal, as well as fostering the development of autonomy and affection during the activity (Hintz, 2017).

Piva; Galeano; Carolino (2022), carried out a case study that verified the contentment and well-being, related to quality of life, of children with DS who practiced horse-assisted therapy. This study was carried out in Cascavel - PR, in the Equine Therapy sector of APAE, with the



Author/ Year	Title	Methodology	Results	Conclusion
LAGE <i>et al.</i> , 2020.	Effect of Riding Equipment on Trunk and Lower Limb Muscle Activity in Equine Therapy	It consists of a cross-sectional, analytical and quantitative case study carried out with 15 individuals aged between 15 and 18, divided equally into three groups of individuals with Down Syndrome (DS), Cerebral Palsy (CP) and Intellectual Disability (ID).	The use of the riding equipment, with the blanket without the feet in the stirrups, promotes greater activation of the trunk and lower limb muscles in the SD and DI group, which differs from the PC group, in which there was greater activation with the feet in the stirrups.	Riding equipment influences muscle activity differently depending on the diagnostic group.
COSTA <i>et al.</i> , 2017.	Effect of Equine Therapy on Global Motor Coordination in Subjects with Down Syndrome	A case study was carried out with 41 subjects with Down's Syndrome, of both sexes, aged between 6 and 12, 20 of whom practiced equine therapy and 21 of whom did not.	Individuals who undergo equine therapy show better dynamism in activities involving balance, laterality, strength and speed.	Individuals who have been practicing horse-assisted therapy for longer and are younger have better results.
ESPÍN-DULA <i>et al.</i> , 2016.	Effects of Equine Therapy on the Posture of Individuals with Down Syndrome	A case study was carried out with five individuals with Down's Syndrome who were assessed using the SAPO application for postural analysis, both before and after twenty-seven sessions. A descriptive qualitative analysis was conducted using the Cluster method and the statistical analysis was carried out using the Sigma Start 2.0 software.	Progress was seen in the positioning of the shoulders, head, hips and lower extremities, as well as a reduction in the excessive curvature of the upper back and the projection of the head.	Participants with Down's Syndrome showed favorable changes in physical functioning, culminating in improvement in the standing position, after the period of intervention in equine therapy.
SANTOS, 2022.	Equine Therapy for Children with Special Educational Needs: The Experience of the Superação Project in Paulo Afonso - BA	A case study was carried out at the Superação Equine Therapy Center, located in Paulo Afonso - BA. Data collection was based on a questionnaire answered by the pedagogical coordinator, who also acts as the center's equine therapist and cynotherapist.	Equine therapy provides beneficial results for trisomic children. It contributes positively to balance, motor coordination, improved learning, as well as promoting interaction between the horse and the practitioner.	The practice is of paramount importance for therapeutic rehabilitation as it enables motor and cognitive gains.
HINTZ, 2017.	Equine Therapy in the Development of People with Down Syndrome - A Case Study in Santa Maria-RS	A case study was carried out with a 25-year-old man, diagnosed with Down's Syndrome and living in the city of Santa Maria, RS.	Equine therapy promoted improvements in the participant's concentration and attention. Progress was noted in aspects of motor development, postural control and muscle strengthening.	The equine therapy intervention led to a significant improvement in development, agility and balance, promoting autonomy and agility between the animal and the practitioner.
COSTA <i>et al.</i> , 2015.	Equine Therapy and Respiratory Muscle Strength in Children and Adolescents with Down Syndrome	A study was carried out with 41 children diagnosed with Down's Syndrome, aged between 7 and 13, 20 of whom took part in equine therapy and 21 who did not.	Participants undergoing equine therapy showed improvements in respiratory muscle strength, max PI and max PE.	It shows that equine therapy promotes advantages in respiratory muscle endurance in people with DS, with younger participants achieving more favorable results.
PIVA; GALEANO; CAROLINO, 2022.	Quality of Life of Children with Down Syndrome undergoing Treatment in Equine Therapy	A case study was carried out with eight children aged between 4 and 12 at APAE in Cascavel (PR), between April and June 2021. The AUQEI questionnaire was used to measure the perception of well-being.	The results indicated that all the children involved in the Equine Therapy treatment achieved a satisfactory level of quality of life.	It can be deduced that equine therapy is a crucial resource in caring for and promoting the well-being of children with DS, offering positive experiences and improving their overall quality of life.

Table 1: Title, authors, year, method, results and conclusion of the articles that make up the research findings.

Source: Authors (2024).

participation of 08 children aged between 04 and 12, of both sexes. A quality of life questionnaire (AUQEI) was administered with 26 questions on family, function, leisure and autonomy. Collaborating with the findings of Hintz (2017), the results showed that the participants achieved a satisfactory quality of life, with an average score of 65.37 on the AUQEI, with the highest average scores in the family and leisure domains and the lowest averages in the function and autonomy domains.

Costa *et al.* (2015) analyzed the effects of equine therapy on respiratory muscle strength in children with trisomy 21, in 41 subjects, divided into two groups of equine therapy practitioners and non-practitioners, of both sexes and between 7 and 13 years old. To measure respiratory strength, the subjects used a manovacuometer and were instructed to practice maximum expiration and inspiration maneuvers.

The authors concluded that both groups showed respiratory muscle weakness, due to muscle hypotonia which is associated with trunk muscle weakness, resulting in a deficit in respiratory muscle strength. However, it was found that the individuals in the group who practiced equine therapy had higher max PI and max PE values compared to the non-practicing group (Costa *et al.*, 2015).

Costa *et al.* (2017) carried out another study with the participation of 30 individuals with DS, aged between 6 and 12 years, for 12 weeks, with the aim of analyzing the performance of motor coordination in trisomic children. The participants were divided into two groups: an intervention group, which underwent equine therapy, and a control group, which underwent conventional occupational therapy, without additional treatment; the subjects who underwent equine therapy showed better dynamism in activities involving balance, laterality, strength and speed, demonstrating that equine therapy has a sig-

nificant relationship with respiratory muscle strength in individuals with DS, corroborating their previous studies (Costa *et al.*, 2015) (Costa *et al.*, 2017).

Lage *et al.* (2020) wrote an article with the aim of analyzing the impact of the riding equipment used in equine therapy on the muscular activity of the trunk and lower limbs of individuals with various pathologies, including DS. Conducted as part of a research project, the study involved 15 participants divided equally between the three groups (DS, CP and DI). The data was recorded during equine therapy sessions using a saddle and blanket, with and without the support of the feet in the stirrups.

The results showed fruitful effects on the participants; the authors also report that the equipment used in equine therapy had a different impact on muscle activity, depending on the clinical diagnosis of the participants in the groups. In the case of the SD and DI groups, greater muscle activation was observed with the use of the blanket, without support in the stirrups; in the PC group, greater activation occurred with the saddle and with the support of the feet in the stirrups. These results highlight the importance of selecting the appropriate equipment to maximize the therapeutic benefits of riding, taking into account the individual needs of the participants (Lage *et al.*, 2020).

Santos (2022), verified the contributions of equine therapy in the cognitive and motor spheres, in children with disabilities, especially DS, in the city of Paulo Afonso - BA, at the Superação Equine Therapy Center. During the research, interaction between the child and the horse was provided, contributing to well-being, communication and autonomy, which corroborates the studies by Hintz (2017) and Piva, Galeano, Carolino (2022). These authors agree that horse therapy contributes to motor coordination, balance and cognitive stimulation.

Espíndula *et al.* (2016) carried out an article that analyzed the impacts of equine therapy on the body posture of individuals with DS. In this study, five participants underwent 27 sessions of equine therapy over a given period, and their body positions were assessed before and after treatment.

The results revealed significant improvements in specific body position measures, such as posterior muscle chain extension and various angles related to the spine and lower limbs. This suggests that equine therapy has a positive impact on the body position of individuals with DS, especially on the extension of the posterior muscle chain and the alignment of the spine. The authors conclude that equine therapy has a positive influence on the posture of individuals with DS (Espíndula *et al.*, 2016).

## CONCLUSION

Therefore, it can be inferred that Down's Syndrome, a condition caused by a chromosomal anomaly, has become an object of study and intervention over the years, as it requires a comprehensive approach to promote the well-being and quality of life of affected individuals.

## REFERENCES

- ALVES, G.; NUNES, R. **Equoterapia no desenvolvimento motor de portadores de Síndrome de Down**. Centro Universitário Luterano de Palmas, 2016.
- ARAKI, I.; BAGAGI, P. **Síndrome de Down e o seu desenvolvimento motor**. Revista Científica Eletrônica de Pedagogia - ISSN: 168-300x, ano XIX, N.23, janeiro de 2014.
- ARARUNA, E.; LIMA, S.; PRUMES, M. **Desenvolvimento Motor em Crianças Portadoras da Síndrome de Down com o Tratamento de Equoterapia**. Revista Pesquisa em Fisioterapia, ago.; 5(2) 143-152, 2015.
- ANUNCIAÇÃO, D.; PEIXOTO, I. **Os efeitos psicológicos da equoterapia na autoestima de portadores de necessidades educacionais especiais**. Associação Nacional de Equoterapia ANDE-BRASIL, n.6, p.12-13, dezembro. 2002.
- BORSSATTI, F.; ANJOS, E.; RIBAS, D. **Efeitos dos exercícios de força muscular na marcha de indivíduos portadores de Síndrome de Down**. Fisioter. Mov., Curitiba, v. 26, n. 2, p. página 329-335, abr./jun. 2013.
- BRASIL. MINISTÉRIO DA SAÚDE. **Diretrizes de atenção à pessoa com Síndrome de Down**. Ministério da Saúde, Secretaria de Atenção à Saúde. Brasília: Ministério da Saúde, 2013.
- BRASIL. MINISTÉRIO DA SAÚDE. **Diretrizes de estimulação precoce crianças de zero a 3 anos com atraso no desenvolvimento neuropsicomotor**. Ministério da Saúde, Secretaria de Atenção à Saúde. Brasília: Ministério da Saúde, 2016.

From the first records in the 19th century to contemporary advances, understanding of the syndrome and its implications for motor and cognitive development has evolved. Therapeutic approaches, including physiotherapy and equine therapy, have shown promise in promoting the overall development and quality of life of people with DS. These interventions have provided significant improvements in motor coordination, muscle strength, posture, balance and, consequently, in the autonomy and social interaction of these individuals.

Through early and multidisciplinary interventions, it is possible to enhance their abilities, promoting motor and cognitive development that allows them to lead more independent and fulfilling lives.

Considering these advances, it is essential to continue investing in research and therapeutic practices aimed at maximizing the development potential and well-being of people with Down's Syndrome, because, despite the scarcity of studies, equine therapy shows the potential to offer considerable advantages to trisomic individuals, and more research is needed to elucidate its relevance as a therapeutic method.

BRASIL. MINISTÉRIO DA SAÚDE (2020). Biblioteca Virtual em Saúde. **Não Deixe Ninguém Para Trás: Dia Internacional da Síndrome de Down 2019**. Acesso em: <https://bvsms.saude.gov.br/não-deixe-ninguem-para-tras-dia-internacional-da-sindrome-de-down-2020/>. Aceso em 21 de jan. de 2024.

CABRAL, A.; SOARES, C. **A utilização da equoterapia no tratamento da Síndrome de Down**. Getec, v.3, n.6, p.68-77 /2014.

CHAVES, L.; ALMEIDA, R. **Os Benefícios da Equoterapia em Crianças com Síndrome de Down**. Revista Brasileira Ciência e Movimento, 26(2);153-159, 2018.

CLARA, L. **Síndrome de Down e o tratamento fisioterapêutico desde a infância**. Pós-graduação em Fisioterapia em Pneumologia e Fisioterapia em Ortopedia e Traumatologia pela Universidade Federal de São Paulo. Atual Doutoranda pela Faculdade de Medicina da USP (FMUSP). Disponível em: <https://www.dicasdefisioterapia.com/sindrome-de-down-trissomia-21/#PAPEL-DAFISIOTERAPIA-NASINDROME-DE-DOWN> Acesso em: 20 de set. 2024.

COELHO, C. **A Síndrome de Down**. O Portal dos Psicólogos, 2016.

COPPEDE, A.; CAMPOS, A.; SANTOS, D.; ROCHA, N. Ad. C. F. **Desempenho motor fino e funcionalidade em crianças com síndrome de Down**. Fisioter. Pesq.;19(4):363-368, 2012.

COSTA, V.; SILVA, H.; ALVES, E.; COQUERE, P.; SILVA, A.; BARROS, J. **Equoterapia e força muscular respiratória em crianças e adolescentes com Síndrome de Down**. Fisioterap. Mov., abril/junho; 28(2):373-381, 2015.

COSTA, V.; SILVA, H.; AZEVEDO, M.; SILVA, A.; CABRAL, L.; BARROS, J. **Efeito da equoterapia na coordenação motora global em indivíduos com Síndrome de Down**. Fisioterap. Mov., 30: 229-240, 2017.

COUTINHO, K.; BECHER, T.; JUNIOR, L.; MEINERZ, C.; PACHECO, R. **Síndrome de Down, genética e prole uma revisão de literatura**. Brazilian Journal of Health Review, Curitiba, v.4, n.4, p. 17935-17935 jul./aug., 2021.

ESPÍNDULA, A.; RIBEIRO, M.; SOUZA, L.; FERREIRA, A; FERRAZ, M.; TEIXEIRA, V. **Efeito da equoterapia na postura de indivíduos com Síndrome de Down**. Fisioter. Mov., july/Sept.; 29(3): 497-505, 2016.

FERREIRA, A.; FREITAS, S.; OLIVEIRA, W.; CABANELAS, L; MOUSSA, L. **Benefícios da Fisioterapia Aquática na Reabilitação de Indivíduos com Síndrome de Down: uma revisão de Literatura**. Pesquisa e Ação, v.4, n.2, nov. de 2018.

FRANÇA, L.; TEIXEIRA, M.; SOUZA, O.; OLIVEIRA, P.; CASTILHO, N.; LIRA, J. **Síndrome de Down: aplicação da equoterapia como recurso terapêutico**. Rev. Saberes, Rolim de Moura, vol. 8, n. 2, jul./set, 2018.

FREIRE, R. *et al.* **Aspectos neurodesenvolvimentais e racionais do bebê com Síndrome de Down**. Av. Psicol. Latioam., Bogotá, v.32, n.2, Aug. 2014.

GALLAHUE, D.; OZMUM, J.; GOODWAY, J. **Compreendendo o Desenvolvimento Motor: Bebês, Crianças, Adolescentes e Adultos**. 7<sup>2</sup> ed. Porto Alegre, AMGH Editora LTDA, 2013.

GRAUP, S.; OLIVEIRA, R.; LINK, D.; COPETTI, F; MOTA, C. **Efeito da Equoterapia Sobre o Padrão Motor da Marcha em Crianças com Síndrome de Down: uma Análise Biomecânica**. Revista digital, v. 11, n. 96, maio., 2006.

HALBERSTADT, B.; MORAIS, A.; SOUZA, A. **Avaliação de crianças com Síndrome de Down através da CIF-CJ; comparação da visão dos pais e das terapeutas**. DistúrbComun, São Paulo, 31(3); 454-464, set. de 2019.

HASEGAWA, J.; LIMA, D.; CASTRO, F; TORRES, G.; PEREIRA, T.; MELLO, T. **Atuação da fisioterapia no desenvolvimento da criança com Síndrome de Down: uma revisão bibliográfica**. Revista Ciência Atual, Rio de Janeiro, vol. 11, n. 1, p. 02/14, 2018.

HINTZ, T. **A Equoterapia no desenvolvimento do sujeito com Síndrome de Down – Um Estudo de Caso em Santa Maria-RS**. Trabalho de Conclusão de Curso – Universidade Federal de Santa Maria, Rio Grande do Sul, 2017.

LAGE, J.; RIBEIRO, M.; TEIXEIRA, V.; ROSA, R.; FERREIRA, A.; ESPINDULA. **Efeito do equipamento de equitação na atividade muscular do tronco e membros inferiores em terapia assistida por equinos**. Revista de Ciências, Ciências da Saúde, v.42, e52739, 2020.



LOPES, J.; PRIETO, A.; SANTOS, J; SAMAILI, S.; BARBOS, P; FILHO, G. **Efetividade da Equoterapia na marcha de crianças com Paralisia Cerebral**. Revista Brasileira de Neurologia, v.55, nº1, jan.-fev.-mar., 2019.

MARINHO, M. **A intervenção Fisioterapêutica no Tratamento Motor da Síndrome de Down; Uma Revisão Bibliográfica**. Revista Campo do Saber, v. 4, n.1, p. 67, jan/jun de 2018.

MATA, C; PIGNATA, M. **Síndrome de Down: aspectos históricos, biológicos e sociais**. Congresso de Pesquisa, Ensino e Extensão Universidade Federal de Goiás, 2014.

MARTINEZ, Sabrina. **Fisioterapia na Equoterapia**. São Paulo: Ideias e Letras 2005.

MUSSALEM, M; SILVA, A.; COUTO, L.; MARINHO, L.; FLORENCIO, A.; ARAÚJO, V.; SILVA, N. **Influência da mobilização precoce na força muscular periférica em pacientes na Unidade Coronariana**. ASSOBRAFIR Ciência, 2014; 5(1): 77-88. PAZ LP, et al. Papel do fisioterapeuta em unidade de pronto atendimento e emergência. Braz. J. Hea. Rev., 2019; 2(4): 3762-3773.

OLIVEIRA, M.; SILVA, F.; BOFI, T.; CARVALHO, A. **O desempenho da linguagem e organização espaço-temporal em crianças com Síndrome de Down por meio da escala de desenvolvimento motor**. Colloquium Vitae, v.6, n.2, p.94-101, 2014.

PEREIRA, W.; RIBAS, C.; JUNIOR, E.; DOMINGOS, S.; VALERIO, T.; GONÇALVES, T. **Fisioterapia no tratamento da síndrome da trissomia da banda cromossômica 21 (Síndrome de Down). Revisão Sistemática**. Revista Eletrônica Acervo Saúde/EJCH, vol. 28, p. 1-11, 2019.

PIVA, E.; GALEANO, F.; CAROLINO, W. **Qualidade de Vida de Crianças com Síndrome de Down em Tratamento na Equoterapia**. Revista Varia Scientia - Ciências da Saúde, [S. l.], v. 8, n. 1, p. 23–33, 2022.

PRADO, E. **Efeitos da Fisioterapia Aquática em Pacientes Portadores de Síndrome de Down: uma Revisão de Literatura**. Trabalho de Conclusão de Curso. Universidade Federal de Uberlândia, 2019.

RAMOS, B.; MÜLLER, A. **Marcos motores e sociais de crianças com síndrome de Down na estimulação precoce**. Revista Interdisciplinar Ciências Médicas, 4(1): 37-43, 2019.

SANTOS, D. **A equoterapia para crianças com necessidades educativas especiais: a experiência do Projeto Superação em Paulo Afonso – BA. 2022**. Trabalho de Conclusão de Curso (Licenciatura em Pedagogia) – Universidade Federal de Alagoas, Delmiro Gouveia, 2022.

SCHWARTZMAN, J. S. **Síndrome de Down**. São Paulo Mackenzie, 1999.

SILVA, F; RIBEIRO, M. **O efeito da equoterapia no tratamento de crianças com síndrome de down: revisão de literatura**. 2015. Orientador: Marcio Rodrigues de Matos. Bacharel em Fisioterapia - Fundação Universitária Vida Cristã, Pindamonhangaba – SP, 2014.

SILVA, C.; SANTOS, C.; SCHIAVON, M. **Fisioterapia em uma criança com Síndrome de Down e cardiopatia congênita: um estudo de caso**. Revista científica do Unisaesiano, v.7, n.15, p. 577-586, Jul/Dez, 2016.

SILVA, N.; DESSEN, M. **Síndrome de Down; etiologia, caracterização e impacto na família**. Interação em Psicologia, 2002, 6(2), p. 167—176.

SOCIEDADE BRASILEIRA DE PEDIATRIA. Departamento científico de genética. **Diretrizes de atenção à saúde de pessoas com Síndrome de Down**. São Paulo, SP: SBP, 2020. 25 p.

SOUZA, D.; SANTO, E.; BORGES, T.; VIEIRA, M. **A importância da Terapia Ocupacional na estimulação precoce em crianças com Síndrome de Down**. Revista da Faculdade União Goyazes, Trindade (GO), v.12, n.1, jan.-jul. 2018.

SOUZA, J.; ALVES, M. **A Inclusão da pessoa com Síndrome de Down na Sociedade e no Âmbito Escolar**. Trabalho de Conclusão de Curso – Universidade Federal da Paraíba, João Pessoa, 2016.

TRINDADE, A.; NASCIMENTO, M. **Avaliação do Desenvolvimento Motor em Crianças com Síndrome de Down**. Rev. Bras. Ed., Marília, v.22, n.4, p.577-588, out.-dez., 2016.