

The practice of capoeira by people with Down syndrome: a literature review

A prática da capoeira por pessoas com síndrome de Down: uma revisão da literatura

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ABSTRACT

Down syndrome (DS) is characterized by the presence of an extra chromosome 21, which imposes psychomotor developmental delay. Capoeira is a physical activity whose main characteristic is body control and it demands motor coordination, aerobic and muscular endurance, rhythm and speed. Physical activity programs, such as Capoeira, adapted to people with Down syndrome, are conducted to enhance the development or improvement of the physical abilities and motor skills of practitioners. **Objective:** The objective of this review was to disclose studies that proposed the practice of Capoeira by people with DS and to discuss their results. **Method:** Books with publications released from 2007 to 2014, and the databases Medline, SciELO, PUBMED, Lilacs, Bireme and Dedalus were searched in Portuguese and English languages with the descriptors Down syndrome, intellectual disability, Capoeira, physical activity. **Results:** Nine articles which met the inclusion criteria were found and included. **Conclusion:** There is evidence that people with Down syndrome who practiced Capoeira reached improvement in postural balance, motor coordination and cognition and that these people became more independent in the daily activities after Capoeira lessons.

Keywords: Down Syndrome, Intellectual Disability, Exercise Therapy

RESUMO

A Síndrome de Down (SD) é caracterizada pela presença de um cromossomo 21 extra, o que estabelece atraso no desenvolvimento psicomotor. A capoeira é uma prática corporal que tem como principal característica o controle do corpo, realizada por meio de atividades de coordenação motora, resistência aeróbia e muscular, ritmo e velocidade. Programas de atividade física como a capoeira, adaptada às pessoas com síndrome de Down, buscam auxiliar no desenvolvimento ou na melhora das capacidades físicas e habilidades motoras de seus praticantes. **Objetivo:** Encontrar estudos que propuseram a prática da capoeira por pessoas com SD, e verificar quais os resultados alcançados. **Métodos:** Foram realizadas pesquisas nas bases de dados Medline, SciELO, PUBMED, Lilacs, Bireme e Dedalus. Os descritores utilizados foram: síndrome de Down, deficiência intelectual, capoeira, atividade física, nos idiomas português e inglês, além de livros com publicações no período de 2007-2014. **Resultados:** Nove artigos incluídos nessa revisão da literatura. **Conclusão:** Verificou-se que as pessoas com síndrome de Down que praticavam capoeira obtiveram melhora no equilíbrio postural, coordenação motora e cognição e que também, essas pessoas tornaram-se mais independentes nas atividades cotidianas.

Palavras-chave: Síndrome de Down, Deficiência Intelectual, Terapia por Exercício

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INTRODUCTION

Capoeira is a plural cultural manifestation, that may be considered a type of dance, or a music style, or a party, or a joyful leisure, a type of poetry, a folklore feature, a sport, a game and also a form of martial art.^{1,2}

Some authors say that this practice originated in Brazil among the slaves, whereas others believe that capoeira was in fact brought to Brazil by black slaves from different regions of Africa and that, due to African cultural influences, these slaves created capoeira, not only as a symbol of resistance and freedom, but also a mean to preserve their traits and to praise their ancestors.³⁻⁷

Over the years, the practice of capoeira has conquered different spaces such as theaters, gyms, schools and universities, increasing its number of practitioners. Currently, capoeira is present in more than 150 countries.⁸

Provided that it is adapted to their limitations, people with different types of disability, whether physical or intellectual, may also join in this activity, either by playing an instrument, singing, clapping or playing, once it may contribute to psychomotor, cognitive and affective-social development, by the rhythm and game inherent to this activity.⁹⁻¹²

Down syndrome (DS) is the most common chromosomal alteration in humans and the main cause of genetic deficiency. It is no longer considered a disease but a way of being part of the world. Its incidence is estimated to be 1:1000 births.¹³⁻¹⁶

DS can cause some comorbidities such as atlantoaxial instability, ligament laxity, congenital heart disease, cardiorespiratory deconditioning, obesity, muscle hypotonia and psychomotor retardation.^{17,18}

The psychomotor retardation of individuals with DS may compromise the acquisition of motor skills, which may reach satisfactory development, depending on the stimuli and the environment in which they live. Thus, encouraging physical activity for people with DS is important because it aids their motor development, enhancing their their autonomy.¹⁹

With this perspective, the practice of capoeira contributes to the improvement of motor development, postural balance, motor coordination, agility, muscle strength and endurance, flexibility, body awareness, as well as improvement in social and family life, learning and autonomy.^{10,20-22}

Capoeira

The word “capoeira” is originated in the *tupy* language, a native language which is spoken by some Brazilian tribes. Originally *caá-puêra* (transcribed into Brazilian Portuguese as *capoeira*), this is a phrase which means lawn (*caá*) and ‘gone’ (*puêra*). It is believed that such word was used to describe a type of basket the slaves used for carrying vegetables and chicken.²⁸

Therefore, there are many questions about when and how capoeira, as a fight or dance, emerged. Regarding possible remote origins, Adorno²⁸ cites an interesting transcript from Albano de Neves e Souza who wrote from Luanda, Angola, to Luiz da Câmara Cascudo, stating that capoeira originates in a dance called zebra dance or N`Golo. This dance would be a rite of passage from puberty to adulthood where men danced or fought each other, and the winner was granted the right to choose the most beautiful woman to marry.²⁸

Nevertheless, capoeira emerged as a symbol of resistance of the black culture by praising what was taught by the ancestors. Thus, it has a very strong relationship with the social context in Brazil in the colonial period where blacks were forcibly brought from different regions of Africa to serve as slave.²⁹

Considered a body practice that embraces dance, fight and joy, its main feature is the control of the body, by working different physical qualities such as agility, dynamic and static forces, flexibility, coordination, aerobic and muscular endurance, rhythm, and reaction and displacement speed. It also contributes to the psychomotor development of the individual by involving cognitive, affective and emotional aspects of those who practice it.^{29,30}

Cognitive aspects are required by the need for quick action or reaction during the game and, combined with motor coordination, the player also interacts with the group by joining in the singing ring, clapping and following the pace imposed by the ring itself. Regarding the affective aspect, this is due to the understanding of equality between peers within this social group formation that is capoeira, besides favoring the transmission of values, self-esteem, confidence, personality, courage and character.^{29,30,31}

Besides being composed of a diversity of movements, having as its main element the body swing, as with other body practices, capoeira has some specific terms such as guard, dodge, head strike and *áú* that are commonly used in game situations.^{1,32, 33}

One of the resources used for the teaching of capoeira is playfulness, understood as a state of mindfulness where the person surrenders completely, whether in game, play or any activity that provides joy, pleasure and integration, involving action, cognitive and affective aspects.³⁴

The playful resource, through game and fun, has important pedagogical value, because it allows relating the real world to an imaginary world, by developing vocabulary and gesture language in a spontaneous and creative way. Playing capoeira for both children and adolescents, as well as adults, with or without disabilities, grant them the experience with different movements with the body, and provides stimuli for the development of strength, agility, the notion of time and space; moreover the idea of strengthened collectivity is present in the essence of capoeira.²⁰

Hence, it is in conjunction with the “whole” with is composed by the playmate and musical instruments, that one can find the teachings of the long-lasting principles and fundamentals of capoeira, a knowledge that contributes to the physical, social and affective aspects of life.^{28,31}

Down Syndrome

Down Syndrome (DS) is the most common chromosomal alteration in humans and the main genetic cause of intellectual disability. John Langdon Down, in 1866, made the first clinical description, and thus this set of symptoms was named Down Syndrome as a tribute.^{15,36}

In his first description, John Langdon Down considered the possible etiology maternal syphilis. The explanation that DS could be due to a chromosomal alteration was first proposed in 1932 by the Dutch ophthalmologist Waardenburg and, two years later, in 1934, Adrian Bleyer in the United States, suggested that this alteration could be due to a trisomy.³⁷

In 1956 Tijo and Levan established that the appropriate number of chromosomes in the human species was 46 and then in 1959 Jerome Lejeune and colleagues described, almost simultaneously with Patricia A. Jacobs and colleagues, the presence of an extra chromosome in the pair 21 of people with DS.³⁷

It is known that from the second half of the 20th century, the life expectancy of people with DS increased. Before, in 1900, people with DS lived between 9 and 11 years old and nowadays is between 49 and 56 years old. This is due to advances in health and education, increased

scientific research and better understanding of society concerning this disability. Therefore, after the understanding the potentials of people with DS, several programs were developed towards schooling, professional future, autonomy and quality of life.^{15,38}

However, a sedentary lifestyle associated with metabolic factors and poor diet contributes to the increase of obese people, and obesity is now considered an epidemic pathology, which has become one of the major public health concerns, with a higher prevalence in patients with DS.¹⁸ In this context, the proper health care provided to people with DS should also focus on the acquisition of a healthy lifestyle, which includes physical activity.¹⁹

Capoeira and Down Syndrome

The psychomotor retardation present in children with DS may compromise the acquisition of motor skills, but these individuals may reach a satisfactory development depending on the stimuli they are given and on the environment in which they live. Therefore, encouraging the practice of physical activity for people with DS, from childhood to adulthood is important once it helps their motor development, and contributes to their independence.^{39,40}

Physical activity programs, adapted to people with disabilities, are intended to assist in the development or improvement of their physical abilities and motor skills.⁴¹

The practice of capoeira by people with DS contributes to the improvement of physical fitness, emotional aspects, reduced risk of chronic diseases, as well as favoring socialization. Also, when capoeira is initiated in childhood, it enables better interaction of motor, psychic and perceptual functions of the body itself and, when introduced in a playful way, it greatly contributes to the development of motor skills.⁴²⁻⁴⁵

Comorbidities present in people with DS such as atlantoaxial instability and muscle hypotonia do not contraindicate physical activity once it contributes to the improvement of muscle strength and endurance. Regarding atlantoaxial instability, international protocols for treating people with DS suggest clinical and imagery investigation before they attend competitive sports activities or those that require cervical spine movements such as rolling, swimming, artistic gymnastics and jumping.^{15,46,47}

OBJECTIVE

The objective of this literature review was to find studies that proposed the practice of capoeira among people with DS, and to analyze the findings.

METHODS

A literature review of articles and books published between 2007 and 2014 was conducted in the databases Medline, Pubmed, Scielo, Lilacs, Bireme and Dedalus. The searches included the Portuguese and English languages, and the descriptors used were Down Syndrome, cognitive disability, capoeira, and physical activities.

The articles were included according whenever they met the inclusion criteria,

which was the presence of the following subjects:

- Down Syndrome and capoeira;
- Down Syndrome and physical activities;
- Cognitive disability (CD) and capoeira.

After searching the databases, the articles were selected in the following order: title, abstract / keywords, full text. We excluded articles that failed to identify their studies participants with Down syndrome or cognitive disability in the title and abstract / keywords, and that did not identify in the full text the participation of people with Down syndrome. The flowchart of this process is presented in Figure 1.

The selected articles were read in a structured manner, from which the following data were collected: study population, number and demographic characteristics of participants (age, gender), objectives and study design, methodology and results.⁴⁸

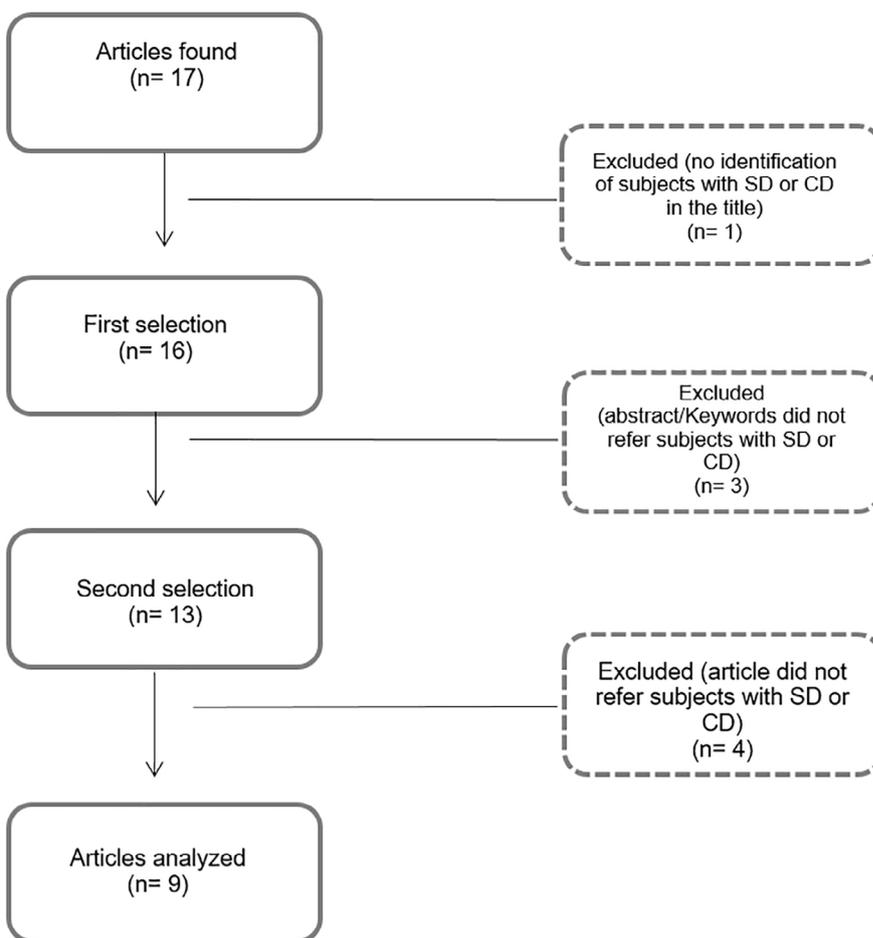


Figure 1. Flow of identification and inclusion of articles

RESULTS

Nine studies addressing the practice of capoeira by people with DS were included. Six studies were experimental, one was cross-sectional, another was descriptive and one was also a literature review. Six of these studies applied capoeira classes and analyzed the results regarding motor development, body awareness, cognitive, social and affective aspects obtained by the participants. One study verified behavioral changes with an observational design and one study applied a questionnaire to the parents of capoeira class participants in an educational institution to analyze changes in interpersonal relationships, motor development, autonomy, as well as performance in school.

The literature review study analyzed the psychomotor benefits of people with DS who practiced capoeira in publications that included children, adolescents and adults, aged 8 to 60 years.

In all the studies found, practitioners had benefits on improved postural balance, motor coordination, cognition and autonomy (Chart 1).

DISCUSSION

This literature review analyzed the practice of capoeira by people with Down syndrome. The literature found shows that this practice contributes to the physical, motor, affective and social aspects of this population.^{10,20-27}

It was found that people with DS, by practicing capoeira, were granted improvements in their skills and motor coordination, as well as improvement in behavior and interpersonal relationship.^{10,20-27}

Bezerra Neto²², who conducted a literature review to evaluate the psychomotor benefits of capoeira for people with DS, reports that this practice allows the stimulation of different physical abilities, including balance, which improved their mobility skills.²²

Monteiro and Pacheco,²⁴ on their turn, applied a questionnaire with subjective questions to the parents of participants of a capoeira program in a city in the Midwest region of Brazil. The questions were about the perceived changes in daily life, sleep, autonomy to perform household chores, benefits in motor and social development after the beginning

of capoeira practice by their children. These parents reported improvements in motor development such as gait ability, behavior, interpersonal relationship and autonomy to perform daily activities.

Additionally, Brito²¹ found that specific movements of capoeira, as well as the handling of the instruments, contributed to the improvement of motor coordination and visual-manual coordination of individuals with DS and moderate cognitive disability. The subjects aged 8 to 39 years, and they underwent capoeira program for 14 weeks.

The practice of capoeira also contributed to the improvement of cognitive development and self-esteem, as reported by Palmas et al.²⁶ and Rosa.²³

Palmas et al.²⁶ analyzed the contributions of capoeira on learning development by students with DS and others with nonspecific cognitive disabilities. In this publication, they observed that the practice of capoeira by people with CD was important for motor and cognitive development, because learning the basic movements allowed better coordination, understanding and enhancement of body

Chart 1. List of studies found: Articles reporting practice of capoeira by patients with Down Syndrome, published from 2007 to 2014

AUTHOR (YEAR)	POPULATION	OBJECTIVE	STUDY DESIGN	METHODS	RESULTS
Pereira ²⁰ (2007)	N = 40 (23 men and 17 women) with DS and CD	Study the contribution of capoeira on social domains	Descriptive study	Structured questionnaire	Improved self-esteem, learning development, social interaction
Brito 21 -2008	N = 20, (12 men, 8 women), 8-39 years of age, DS and moderate CD	Evaluate the effects of capoeira over motor coordination	Experimental	45-minute capoeira lessons twice a week for 14 weeks	Motor coordination improvements
Bezerra Neto ²² (2010)	People with DS	Comprehend the capoeira and its psychomotor benefits for patients with DS	Literature review	Critical analysis of scientific articles	Improvements in psychomotor, balance, laterality, and rhythm domains, and better corporal awareness
Rosa ²³ (2010)	N = 06, average of 20 years of age, patients with DS	Apply the capoeira methodology for students with DS in a scholar setting	Experimental	35-minute capoeira lessons twice a week for 6 months	Improvements in affective, emotional, motor, social and motor aspects
Reis Filho & Schuller ¹⁰ (2010)	N = 06 (04 men, 02 women), 11-13 years of age, patients with DS	Analyze of the influence of capoeira training on motor coordination	Experimental	50-minute capoeira classes, three times a week for 10 weeks	Improvements on gait, balance, and fine motor coordination
Monteiro & Pacheco ²⁴ (2010)	N = 07, both genders, 10-18 years of age, patients with DS	Verify the benefits of capoeira among the practitioners	Experimental	Questionnaires applied the parents of patients with DS	Improvements on speech, deglutition, learning, behavior, gait, interpersonal relationships and autonomy
Nascimento et al. ²⁵ -2012	N = 10 (03 men, 07 women), 10-60 years of age, with DS and CD	Verify the profile of students with DS and CD and its benefits on physical, social, and psychological aspects.	Cross-sectional	50-minute capoeira classes, twice a week, for 10 months	Improvements on motor, social, affective and psychological domains
Palma et al. ²⁶ -2012	N = 11, 11-31 years of age (01 patient with DS and 10 com CD)	Analyze the contributions of capoeira on learning development	Experimental	60-minute capoeira lessons, twice a week for 2 months	Improvements in motor and cognitive development, understanding, body awareness and autonomy
Mello et al. ²⁷ (2014)	N = 29 (19 men, 10 women), 12-38 years of age, DS, CD and Cerebral Palsy	Analyze the role of CD on the process of learning capoeira	Experimental	120-minute capoeira lessons, once a week for 12 months	The rhythm / musical dimensions were the most valued aspect by the practitioners

DS, Down Syndrome; CD, cognitive disability.

awareness, as well as improvements of independence.

Rosa²³ investigated the application of the fundamentals of capoeira to students with DS in Physical Education classes of an educational institution. The activity, applied with playful strategies and adapted movements, showed improvement in students' self-esteem, as well as increased interest in other proposed school activities. Family members also reported that there was effective learning of the proposed content, as well as of the pedagogical, motor, social, affective and emotional subjects.

In addition, capoeira improved agility, strength, endurance, as described by Nascimento et al.²⁵ who, with a closed-ended questionnaire, assessed the motor, social and psychological aspects of people aged 10 to 60 years with DS and other types of cognitive disabilities, after a 10-month capoeira program. The authors did not report how this questionnaire was applied, or whether the parents or the participants answered the questionnaire, but they reported that the participants improved agility, strength, endurance, flexibility, autonomy to perform daily tasks, family life relationships and socialization.

Reis Filho and Schuller,¹⁰ with the Motor Development Scale (MDS), analyzed the influence of capoeira training on motor coordination, fine and global mobility, and balance of people with DS. Improvement in gait, balance and fine motor coordination were observed. For these authors, capoeira may provide these patients with the necessary tools for improving of motor skills.

CONCLUSION

The aim of this literature review was to find studies that proposed the practice of capoeira by people with DS, and to analyze the results achieved.

The studies have shown that the practice of capoeira contributes to the improvement of physical, affective, social, psychological and motor aspects, as well as of improvement of postural balance, motor coordination and cognition. We also observed that it also promotes socialization and provides greater autonomy of children and adults, either in specific programs or in school settings.

The practice of capoeira should properly performed and adapted to the limitations of its practitioners, according to international protocols for people with DS, so that inappropriate movements for this population are avoided.

Capoeira can be an interesting strategy as a practice of physical activity, also for people

with DS, because it provides, in addition to body work, musicality, rhythm, fun and socialization, therefore it contributes to adequate social inclusion and autonomy of these subjects.

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