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JIU-JITSU AS A TOOL FOR MOTOR AND SOCIAL DEVELOPMENT IN CHILDREN WITH AUTISM SPECTRUM DISORDER (ASD)

JIU-JITSU COMO FERRAMENTA PARA O DESENVOLVIMENTO MOTOR E SOCIAL EM CRIANÇAS COM TRANSTORNO DO ESPECTRO AUTISTA (TEA)

JIU-JITSU COMO HERRAMIENTA PARA EL DESARROLLO MOTOR Y SOCIAL EN NIÑOS CON TRASTORNO DEL ESPECTRO AUTISTA (TEA)

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ABSTRACT

Autism spectrum disorder is a neurodevelopmental condition frequently associated with differences in social communication, self-regulation, sensory processing, and motor development. Physical activity interventions have been investigated as complementary strategies to improve participation, motor competence, and opportunities for social interaction among children with this condition. Martial arts may be particularly relevant because they commonly involve predictable structures, movement repetition, explicit rules, gradual progression, imitation, guided physical contact, and cooperation between partners. This article aimed to analyze the potential of Brazilian Jiu-Jitsu to support motor and social skills in children with autism spectrum disorder, considering that direct evidence regarding this specific modality remains limited. A narrative review of scientific articles addressing Brazilian Jiu-Jitsu, martial arts, physical activity, and motor or social development in autism was conducted. The analyzed studies indicate benefits associated with adapted judo, mixed martial arts, karate, kata, taekwondo, capoeira, Tai Chi Chuan, and structured martial arts games. The most frequently reported outcomes include improvements in balance, coordination, gross motor skills, social interaction, communication, self-esteem, and selected adaptive behaviors. Nevertheless, small samples, intervention heterogeneity, dependence on parental reports, and limited follow-up reduce the strength of the conclusions. Brazilian Jiu-Jitsu may therefore represent a plausible but still experimental intervention whose specific effectiveness should be examined through controlled studies using adapted protocols and standardized outcome measures.

Keywords: Autism Spectrum Disorder. Brazilian Jiu-Jitsu. Martial Arts. Motor Skills. Social Interaction.

RESUMO

O transtorno do espectro autista é uma condição neurodesenvolvimentalista frequentemente associada a diferenças na comunicação social, autorregulação, processamento sensorial e desenvolvimento motor. Intervenções de atividade física foram investigadas como

estratégias complementares para melhorar a participação, competência motora e oportunidades de interação social entre crianças com essa condição. As artes marciais podem ser particularmente relevantes porque comumente envolvem estruturas previsíveis, repetição de movimentos, regras explícitas, progressão gradual, imitação, contato físico orientado e cooperação entre parceiros. Este artigo teve como objetivo analisar o potencial do Jiu-Jitsu Brasileiro para apoiar habilidades motoras e sociais em crianças com transtorno do espectro autista, considerando que a evidência direta sobre essa modalidade específica permanece limitada. Uma revisão narrativa de artigos científicos abordando Jiu-Jitsu Brasileiro, artes marciais, atividade física e desenvolvimento motor ou social no autismo foi conduzida. Os estudos analisados indicam benefícios associados ao judô adaptado, artes marciais mistas, caratê, kata, taekwondo, capoeira, Tai Chi Chuan e jogos de artes marciais estruturados. Os resultados mais frequentemente relatados incluem melhorias no equilíbrio, coordenação, habilidades motoras grossas, interação social, comunicação, autoestima e comportamentos adaptativos selecionados. Não obstante, pequenas amostras, heterogeneidade da intervenção, dependência de relatos parentais e seguimento limitado reduzem a força das conclusões. O Jiu-Jitsu Brasileiro pode, portanto, representar uma intervenção plausível mas ainda experimental cuja efetividade específica deve ser examinada através de estudos controlados usando protocolos adaptados e medidas de desfecho padronizadas.

Palavras-chave: Transtorno do Espectro Autista. Jiu-Jitsu Brasileiro. Artes Marciais. Habilidades Motoras. Interação Social.

RESUMEN

El trastorno del espectro autista es una condición neurodesarrollista frecuentemente asociada con diferencias en la comunicación social, autorregulación, procesamiento sensorial y desarrollo motor. Las intervenciones de actividad física han sido investigadas como estrategias complementarias para mejorar la participación, competencia motora y oportunidades de interacción social entre niños con esta condición. Las artes marciales pueden ser particularmente relevantes porque comúnmente involucran estructuras predecibles, repetición de movimientos, reglas explícitas, progresión gradual, imitación, contacto físico guiado y cooperación entre compañeros. Este artículo tuvo como objetivo analizar el potencial del Jiu-Jitsu Brasileño para apoyar habilidades motoras y sociales en niños con trastorno del espectro autista, considerando que la evidencia directa sobre esta modalidad específica sigue siendo limitada. Se realizó una revisión narrativa de artículos científicos que abordaban Jiu-Jitsu Brasileño, artes marciales, actividad física y desarrollo motor o social en el autismo. Los estudios analizados indican beneficios asociados con judo adaptado, artes marciales mixtas, karate, kata, taekwondo, capoeira, Tai Chi Chuan y juegos de artes marciales estructurados. Los resultados más frecuentemente reportados incluyen mejoras en el equilibrio, coordinación, habilidades motoras gruesas, interacción social, comunicación, autoestima y comportamientos adaptativos seleccionados. No obstante, muestras pequeñas, heterogeneidad de la intervención, dependencia de reportes parentales y seguimiento limitado reducen la solidez de las conclusiones. El Jiu-Jitsu Brasileño puede, por lo tanto, representar una intervención plausible pero aún experimental cuya efectividad específica debe ser examinada a través de estudios controlados utilizando protocolos adaptados y medidas de resultado estandarizadas.

Palabras clave: Trastorno del Espectro Autista. Jiu-Jitsu Brasileño. Artes Marciales. Habilidades Motoras. Interacción Social.

1 INTRODUCTION

Autism spectrum disorder, or ASD, comprises a heterogeneous group of developmental differences, particularly in social communication and interaction, together with restricted or repetitive patterns of behavior, interests, or activities. In addition to these characteristics, children with ASD may experience challenges involving balance, bilateral coordination, motor planning, postural control, imitation, and the acquisition of age-appropriate motor skills. Such differences may restrict participation in play, sports, school activities, and social situations that require the integration of movement, attention, and communication [2-8].

The relationship between motor development and social participation is particularly important. A child who has difficulty running, jumping, throwing, maintaining balance, or following body movement sequences may encounter additional barriers to joining group games and peer activities. Systematic reviews indicate that motor interventions and physical activity programs can positively influence motor abilities, behavior, social interaction, and functional participation, although the magnitude of the results varies according to the activity, training duration, and participant characteristics [3-9].

Martial arts differ from many conventional physical activities because they integrate body movement, codes of conduct, attention to the instructor, technical repetition, spatial organization, and interaction with a partner or group. Studies involving judo, karate, kata, mixed martial arts, taekwondo, capoeira, and Tai Chi Chuan have examined their use among children with ASD and have reported promising motor, social, and behavioral outcomes [2,10-16,18-21].

Brazilian Jiu-Jitsu is a grappling-based combat sport involving body control, transitions between positions, trunk stabilization, changes of base, coordination between the upper and lower limbs, grip strength, flexibility, and continuous responses to a partner's movements [1]. In adapted classes, these demands may be converted into gradual and predictable tasks without requiring competition or the use of potentially dangerous techniques.

Despite the increasing popularity of Brazilian Jiu-Jitsu, scientific research on the sport has primarily focused on adult athletes, competitive performance, and physiological responses [1]. No controlled clinical trials directly examining its motor and social effects in children with ASD were identified within the group of studies reviewed. Accordingly, this article

analyzes the potential of Brazilian Jiu-Jitsu on the basis of evidence from related martial arts while clearly distinguishing therapeutic plausibility from scientifically demonstrated effectiveness.

Methodology

A narrative literature review was conducted to integrate findings from different research designs and intervention modalities. Records indexed in PubMed/MEDLINE and official scientific journal platforms were consulted. Relevant studies were also identified by examining the reference lists of systematic reviews, meta-analyses, and scoping reviews addressing physical activity, motor development, and martial arts among individuals with ASD.

Search combinations included the English terms “autism spectrum disorder,” “children,” “martial arts,” “Brazilian Jiu-Jitsu,” “judo,” “karate,” “kata,” “taekwondo,” “capoeira,” “mixed martial arts,” “motor skills,” and “social skills.” Peer-reviewed studies involving children or adolescents diagnosed with ASD and evaluating motor, social, communicative, behavioral, or functional outcomes were considered. Systematic reviews and meta-analyses relevant to the interpretation of the overall evidence were also included.

Non-peer-reviewed texts, opinion-based materials, dissertations, protocols without results when more informative completed studies were available, and studies restricted to adult athletes without a contribution to the characterization of Brazilian Jiu-Jitsu demands were excluded. Because this was a narrative review, no original meta-analysis or formal risk-of-bias assessment was conducted. The findings were organized according to motor, social, and behavioral effects, possible mechanisms, applicability to Brazilian Jiu-Jitsu, and limitations of the evidence.

Literature Review

2 PHYSICAL ACTIVITY AND MOTOR DEVELOPMENT IN ASD

Motor challenges should not be considered merely peripheral consequences of ASD. They may influence functional independence, physical activity participation, and the ability to engage in shared experiences with other children. Systematic reviews indicate that exercise-based interventions, fundamental motor skill training, adapted sports, and sensory-motor

programs can improve balance, coordination, locomotion, object-control skills, and general motor performance [3,4,6].

Ruggeri *et al.* [6] identified positive outcomes across different categories of motor intervention but emphasized the substantial variability of the protocols and the uneven methodological quality of the studies. Xing and Wu [4] similarly found motor benefits in a considerable proportion of the included investigations, although different interventions improved different dimensions of motor performance. Exercise prescription should therefore reflect each child's individual profile rather than relying solely on the diagnostic category.

Although it was not a martial arts intervention, the SPARK program is relevant because it demonstrated that structured physical activities could simultaneously improve static and dynamic balance, bilateral coordination, and social interaction [17]. This finding supports the hypothesis that increasing motor competence can create additional opportunities for social participation, particularly when tasks include cooperation, imitation, and shared attention.

2.1 EVIDENCE FROM MARTIAL ARTS INTERVENTIONS

A 2025 scoping review identified only a small number of methodologically rigorous studies examining martial arts and ASD. The eligible studies reported improved coordination and balance following kata and Tai Chi Chuan interventions but involved small samples and limited blinding [2]. These findings illustrate why positive results should not be interpreted as definitive confirmation of effectiveness.

In the randomized study conducted by Fu and Shi [10], children who completed 24 weeks of structured martial arts games improved in behavioral and gross motor function measures. The program transformed martial arts movements into playful, progressive tasks governed by clear instructions. Session predictability and the combination of rules, reinforcement, and interaction were proposed as relevant components. Nevertheless, the research was conducted at a single institution, involved a relatively small sample, and did not include long-term follow-up.

Adapted judo programs provide the closest comparison with Brazilian Jiu-Jitsu because both activities involve guided physical contact, balance disruption, postural control, and partner interaction. Morales *et al.* [11] reported improvements in motor skills and psychosocial variables following a long-term adapted judo intervention. Improvements were

observed in components of motor competence and participation-related behaviors, although the study design did not permit all changes to be attributed exclusively to judo.

In an eight-week program, Rivera *et al.* [13] found no statistically significant change in the total score of a standardized behavioral scale. However, family interviews indicated perceived improvements in self-esteem and social skills. The discrepancy between quantitative measures and qualitative reports highlights the importance of using multiple assessment instruments and avoiding conclusions based exclusively on caregiver perceptions.

Lockard *et al.* [14] also described favorable changes in behavior and social skills following judo participation. Nevertheless, the small sample and absence of a comparison group limit the generalizability of the findings. Collectively, judo studies support feasibility and possible benefits but do not establish a uniform therapeutic effect for every child.

2.2 SOCIAL, COMMUNICATIVE, AND BEHAVIORAL OUTCOMES

Phung and Goldberg [12] evaluated a community-based mixed martial arts program for boys with ASD. Following training, participants were reported to display more positive social behaviors and fewer problematic social behaviors. The inclusion of autistic and non-autistic peers may have provided natural opportunities for observation, cooperation, and social practice. However, it is not possible to determine whether the outcomes resulted from the martial arts techniques, physical exercise, peer interaction, or the combined intervention.

In a study of taekwondo combined with music therapy components, parents reported positive changes in the children's physical abilities and social communication [15]. Because the research relied on family narratives, the findings are useful for understanding perceived experiences but do not replace objective assessments or controlled comparisons.

The qualitative study by Lev-Ari *et al.* [16] identified perceived improvements in coordination, balance, body awareness, engagement, and social interaction through capoeira. Capoeira combines rhythm, imitation, movement, and collective participation, which may help organize attention and facilitate interaction. However, the qualitative design does not allow the magnitude of these effects to be estimated.

Karate studies provide additional relevant evidence. Kata training was associated with a reduction in stereotyped behaviors [18], while another karate program reported

improvements in communication-related outcomes [19]. Kata and Tai Chi Chuan interventions also produced positive results for balance and motor skills [20,21]. These programs involve repetition, body sequencing, and predictability but less direct physical interaction than judo or Brazilian Jiu-Jitsu.

2.3 POSSIBLE MECHANISMS AND APPLICABILITY TO BRAZILIAN JIU-JITSU

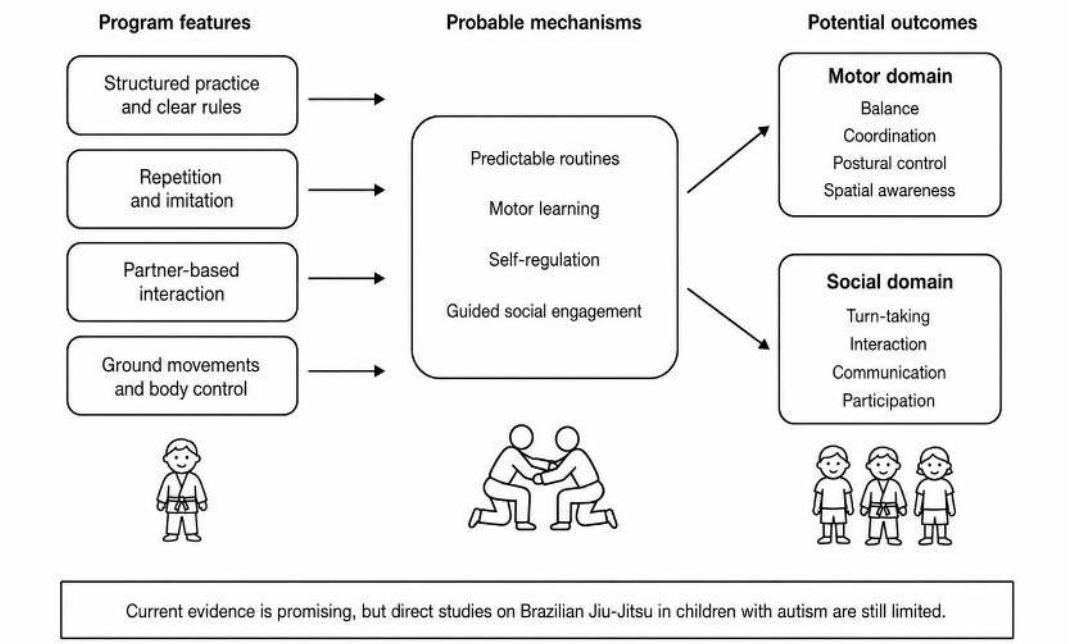
The effects observed in martial arts programs are unlikely to result from a single mechanism. Repeated sequences may support motor learning and task anticipation. Explicit rules reduce ambiguity and clarify expectations. Visual demonstrations provide concrete movement models, while progression from simple actions to more complex combinations permits the level of difficulty to be individually adjusted [6,7,10].

Partner interaction creates opportunities for turn-taking, shared attention, recognition of bodily boundaries, and responses to verbal or nonverbal signals. Rather than requiring abstract and spontaneous conversation, martial arts organize interaction around concrete motor goals. This format may be particularly suitable for children who benefit from predictable routines and visual instruction [7,10-16].

Brazilian Jiu-Jitsu has characteristics that are consistent with these mechanisms. Ground-based movements may stimulate postural control, bilateral coordination, spatial orientation, and continuous adaptation to a partner's position [1]. Nevertheless, results from other martial arts cannot automatically be transferred to Brazilian Jiu-Jitsu. Close physical contact, body pressure, gym noise, and unpredictable situations may be uncomfortable for children with specific sensory sensitivities. The conceptual relationship between the structured characteristics of adapted Brazilian Jiu-Jitsu, its probable mechanisms, and its potential motor and social outcomes is presented in Figure 1.

Figure 1

Conceptual model of how adapted Brazilian Jiu-Jitsu may support motor and social development in children with autism spectrum disorder



Source: Created by author.

Responsible implementation would require an individual assessment, the child's assent, trained instructors, small groups, visual routines, simple language, opportunities for breaks, and a gradual introduction to physical contact. Chokeholds, joint hyperextension techniques, and competitive sparring should not be included in the initial stages of a program intended to evaluate motor and social development. The initial emphasis should be placed on movement patterns, basic positions, balance, cooperative games, body control, and safe communication between partners.

2.4 LIMITATIONS OF THE EVIDENCE

The primary limitation is the lack of sufficiently robust direct evidence concerning Brazilian Jiu-Jitsu in children with ASD. Most conclusions depend on studies of related martial arts that involve partially similar, but not identical, motor and social demands [1,2].

Additional limitations include small samples, broad variation in age and support needs, inconsistent intervention duration, limited blinding, predominance of male participants, and

frequent reliance on questionnaires completed by parents or instructors. Few studies have included follow-up assessments after the intervention, making it difficult to determine whether improvements are maintained or transferred to school, family, and other social settings [2-6,10,13-16].

Conclusion

Available evidence indicates that structured physical activity and martial arts programs may contribute to motor, social, and behavioral development among children with ASD. Favorable findings have been reported for judo, karate, kata, mixed martial arts, taekwondo, capoeira, Tai Chi Chuan, and structured martial arts games. The most frequently described outcomes involve balance, coordination, gross motor function, social interaction, self-esteem, communication, and participation [2-21].

Brazilian Jiu-Jitsu shares characteristics with some of these modalities and has a theoretical basis for investigation as a complementary intervention. However, it should not currently be presented as an established treatment for ASD. The most scientifically appropriate conclusion is that Brazilian Jiu-Jitsu represents a plausible and promising practice whose effectiveness, safety, and acceptability have not yet been directly established.

Future studies should use larger samples, comparison groups, random allocation, blinded evaluators, adapted protocols, and objective measures of motor performance and social interaction. Adverse events, adherence, sensory experiences, and maintenance of outcomes should also be documented. Such research is necessary to determine which children may benefit, what adaptations are required, and whether improvements observed during training generalize to everyday life.

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