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SYSTEMATIC MAPPING OF KNOWLEDGE FRONTIER TRENDS IN ADAPTED PHYSICAL ACTIVITY AND HEALTH

MAPEAMENTO SISTEMÁTICO DAS TENDÊNCIAS DA FRONTEIRA DO CONHECIMENTO EM ATIVIDADE FÍSICA ADAPTADA E SAÚDE

MAPEO SISTEMÁTICO DE LAS TENDENCIAS DE LA FRONTERA DEL CONOCIMIENTO EN ACTIVIDAD FÍSICA ADAPTADA Y SALUD

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André Francisco Pugas[1], Lais Mendes Tavares[2], Francine Varlete Leopoldina Barcelos[3], Ane Luyze Izidoro Walkowski[4], Elaine Cristine da Silva[5], Rudney da Silva[6]

ABSTRACT

This study aims to systematically map and critically the main current frontiers of scientific production related to adapted physical activity and health. To this end, a systematic literature review was conducted, based on the PRISMA 2020 recommendations. The studies were organized into thematic axes and analyzed through critical thematic synthesis. Thus, it was observed that the literature from the last five years showed greater scientific density in five main axes: exercise as clinical therapy; mental health and exercise; digital technologies and rehabilitation; aging and functionality; and neuroplasticity associated with exercise. This allows us to conclude that adapted physical activity is being reorganized around a more interdisciplinary agenda, in which functionality, cognition, well-being, technological innovation, and social participation are being treated in an integrated way, despite methodological limitations and low comparability between studies.

Keywords: Adapted Physical Activity. Rehabilitation. Mental Health. Assistive Technology. Special Populations.

RESUMO

Este estudo tem como objetivo mapear de maneira sistemática e crítica as principais fronteiras na atualidade da produção científica relacionada a atividade física adaptada e saúde. Para tanto, foi realizado um mapeamento sistemático da literatura, com base nas

[1] PhD Candidate in Human Movement Sciences. Santa Catarina State University (UDESC).
E-mail: squallafp@hotmail.com. Orcid: https://orcid.org/0000-0001-6705-0342
[2] PhD Candidate in Human Movement Sciences. Santa Catarina State University (UDESC).
E-mail: laismtavares0@gmail.com. Orcid: https://orcid.org/0000-0002-1687-4242
[3] PhD Candidate in Human Movement Sciences.Santa Catarina State University (UDESC).
E-mail: afonofrancine@gmail.com. Orcid: https://orcid.org/0000-0003-4360-531X
[4] Master's Student in Human Movement Sciences. Santa Catarina State University (UDESC).
E-mail: aluyze@gmail.com. Orcid: https://orcid.org/0009-0007-2063-4253
[5] PhD in Human Movement Sciences. Santa Catarina State University (UDESC).
E-mail: Elaine.silva13@edu.udesc.br. Orcid: https://orcid.org/0000-0002-5063-7267
[6] Graduate Program in Human Movement Sciences. Santa Catarina State University (UDESC).
E-mail: rudney.silva@udesc.br. Orcid: https://orcid.org/0000-0002-9386-0039

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recomendações do PRISMA 2020. Os estudos foram organizados em eixos temáticos e analisados por síntese temática crítica. Desse modo, observa-se que a literatura dos últimos cinco anos mostrou maior densidade científica em cinco eixos principais: exercício como terapia clínica; saúde mental e exercício; tecnologias digitais e reabilitação; envelhecimento e funcionalidade; e neuroplasticidade associada ao exercício. O que permite concluir que a atividade física adaptada vem se reorganizando em torno de uma agenda mais interdisciplinar, na qual funcionalidade, cognição, bem-estar, inovação tecnológica e participação social passam a ser tratados de forma integrada, apesar das limitações metodológicas e baixa comparabilidade entre os estudos.

Palavras-chave: Atividade Física Adaptada. Reabilitação. Saúde Mental. Tecnologia Assistiva. Populações Especiais.

RESUMEN
Este estudio tiene como objetivo mapear sistemática y críticamente las principales fronteras actuales de la producción científica relacionadas con la actividad física adaptada y la salud. Para ello, se realizó una revisión sistemática de la literatura, basada en las recomendaciones PRISMA 2020. Los estudios se organizaron en ejes temáticos y se analizaron mediante síntesis temática crítica. Así, se observó que la literatura de los últimos cinco años mostró una mayor densidad científica en cinco ejes principales: el ejercicio como terapia clínica; la salud mental y el ejercicio; las tecnologías digitales y la rehabilitación; el envejecimiento y la funcionalidad; y la neuroplasticidad asociada al ejercicio. Esto nos permite concluir que la actividad física adaptada se está reorganizando en torno a una agenda más interdisciplinaria, en la que la funcionalidad, la cognición, el bienestar, la innovación tecnológica y la participación social se abordan de forma integrada, a pesar de las limitaciones metodológicas y la baja comparabilidad entre los estudios.

Palabras clave: Actividad Física Adaptada. Rehabilitación. Salud Mental. Tecnología Asistiva. Poblaciones Especiales.

1 INTRODUCTION

Scientific production in the field of Adapted Physical Activity (APA) has been consolidating itself as a substantial field at the intersection of rehabilitation, health promotion, social participation, and parasport, particularly due to the evidence-based research and practice trend adopted in recent years. Given the persistent difficulties in access to physical activity (PA) among people with disabilities and other vulnerable groups, this scenario is particularly relevant, since certain segments are less likely to meet the minimum PA recommendations and, consequently, are more exposed to the deleterious effects of physical inactivity, especially noncommunicable chronic diseases (Rimmer & Marques, 2012; Bull et al., 2020). Thus, APA has articulated clinical, educational, sports, and community-based approaches aimed at adapting tasks, resources, and strategies to the functional, psychosocial, and environmental characteristics of different populations (Rimmer & Marques, 2012; Martin Ginis et al., 2021).

No contexto brasileiro, Silva e Silva (2025) apontam que nas últimas décadas as temáticas produzidas no principal periódico da área no país têm se concentrado em temas como transtornos do espectro autista, deficiência, principalmente física, intelectual e visual, e paralisia cerebral, além de diversas outras condições. Já na literatura internacional dos últimos anos pode-se verificar importantes transformações, pois historicamente, parte da produção concentrou-se na funcionalidade motora, na redução de incapacidades e na inclusão em contextos educacionais e esportivos.

In the Brazilian context, Silva and Silva (2025) point out that, in recent decades, the themes published in the country's leading journal in the field have concentrated on topics such as autism spectrum disorders, disability (especially physical, intellectual, and visual disability) and cerebral palsy, among several other conditions. In the international literature of recent years, important transformations can also be observed, since historically part of the production focused on motor functioning, disability reduction, and inclusion in educational and sports contexts. However, it has now become possible to identify a more consistent incorporation of themes such as mental health, digital technologies, participation, neuroplasticity, and therapeutic personalization (Hassett et al., 2024; Liu, Liang, & Sit, 2024). At the same time, advances in adaptive equipment, telehealth, robotics, and other assistive technologies have expanded access, monitoring, and continuity of care (Dawson et al., 2024; Jamieson & Wijesundara, 2025)

In this context, sport and recreation, as demonstrated by recent reviews, have shown benefits for participation, mobility, and quality of life in adults with physical and intellectual disabilities (Hassett et al., 2024). In pediatric populations with neuromotor disabilities, APA

has been associated with improvements in gross motor performance, participation, and quality of life (Faccioli et al., 2025). In children and adolescents with neurodevelopmental disorders, benefits have been predominantly observed in mental health, cognitive function, psychological well-being, and the reduction of internalizing and externalizing problems (Liu, Liang, & Sit, 2024), while in young people with disabilities, positive effects have been reported mainly on cognition and mental health (Leahy et al., 2025).

This body of evidence indicates an expansion of the field's focus toward psychological, cognitive, and relational outcomes, suggesting that APA is not restricted to functional improvement, but rather is becoming a field increasingly sensitive to the emotional, cognitive, behavioral, and contextual dimensions of participation in health (Liu, Liang, & Sit, 2024; Huang et al., 2024). Furthermore, part of the recent literature has brought APA closer to approaches centered on motor learning, functional recovery, and neuroplasticity. Reviews in neurological conditions, especially after stroke, indicate that PA may modulate markers such as brain-derived neurotrophic factor (BDNF), vascular endothelial growth factor (VEGF), and cortical excitability, highlighting the role of PA in neural reorganization, particularly through moderate-to-vigorous aerobic protocols and high-intensity interval training (Montero-Almagro et al., 2024; Cardoso et al., 2024).

The convergence of factors involving therapeutic exercise, technological innovation, biological mechanisms, and participation contexts reinforces the hypothesis that APA is undergoing epistemological and methodological progress, in which different fronts of knowledge are beginning to interact more intensively (Dawson et al., 2024; Cardoso et al., 2024; Jamieson & Wijesundara, 2025; Montero-Almagro et al., 2024). However, despite this growth, the literature still presents numerous gaps regarding populations, contexts, modalities, and outcomes. Recent reviews tend to focus on specific segments, such as sport in adults with disabilities, mental health in neurodevelopmental disorders, APA in pediatric neuromotor populations, or technologies applied to exercise and rehabilitation, which makes it difficult to obtain a systematized view of the field's contemporary transformations (Hassett et al., 2024; Huang et al., 2024).

In this study, the term contemporary frontiers refers to emerging or recently expanding thematic axes in the adapted physical activity literature, characterized by greater density of scientific production, conceptual, methodological, or technological innovation, and potential to reorganize the field beyond traditional motor functioning. Furthermore, identifying the frontiers of knowledge requires recognizing that the field is not organized around a single stable descriptor, but rather around multiple scientific and applied interfaces. Thus, this study was designed as a systematic mapping of the literature, with the aim of analyzing the main

contemporary frontiers of scientific production in adapted physical activity and health, from the perspective of the field's recent transformations beyond traditional motor functioning.

2 METHODS

2.1 STUDY DESIGN

The manuscript was guided by the PRISMA 2020 recommendations (Page et al., 2021), supported by the methodological principles of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins et al., 2019), particularly regarding transparency in the search, selection, and reporting processes. Two complementary stages were carried out: (a) an exploratory mapping of core journals in the field to identify predominant thematic fronts; and (b) an expanded systematic search in databases aimed at verifying the recent density of scientific production within these axes and defining the central fronts of the final synthesis.

Given the nature of this study, which differs from a classical systematic review focused on a single intervention or outcome, the aim was to map the recent organization of the field, identify prominent thematic axes, and discuss methodological and conceptual gaps. This choice is justified by the diversity of populations, interventions, contexts, and outcomes, which makes the quantitative aggregation of the entire corpus into a single effect estimate conceptually and methodologically unfeasible (Higgins et al., 2019; Page et al., 2021).

2.2 SEARCH STRATEGY AND ELIGIBILITY CRITERIA

For the initial stage, the journals *Adapted Physical Activity Quarterly* (APAQ) and *European Journal of Adapted Physical Activity* (EUJAPA) were selected because of their established history and worldwide dissemination of scientific production in the field. This stage had an exploratory and guiding character, functioning as a preliminary procedure for identifying thematic axes and refining the expanded search. Searches were conducted in February 2026, with the main time filter set from 2020 to 2026, as this study aimed to identify contemporary trends. Articles with full text available, published in peer-reviewed journals, and written in Portuguese, English, or Spanish were considered. The complete search strategies (database-specific strings), as well as the applied filters, are fully described in Supplementary Material 1, ensuring reproducibility.

In the second stage, searches were carried out in the following databases: PubMed/MEDLINE, Scopus, and Web of Science, with the aim of verifying which of the previously identified fronts showed greater recent density of scientific production, thus supporting a feasible systematic synthesis. Publications from the last five years were prioritized, in line with the objective of identifying the frontiers of knowledge, while earlier

studies were retained only when relevant for conceptual contextualization or discussion of methodological gaps.

Scientific articles addressing the interface between APA and health in special populations were included, provided they were aligned with at least one of the central axes defined for the final synthesis and contributed to the characterization of contemporary trends in the field. Eligible populations included people with disabilities, neurodevelopmental disorders, neurological conditions, chronic diseases, frailty, and functional limitations related to aging. Opinion articles, documents without accessible full text, duplicates, and studies without confirmed thematic relevance were excluded. Details of the search strategies are presented in the supplementary material.

2.3 STUDY SELECTION PROCESS AND DATA EXTRACTION

After duplicate removal, studies were screened by title, abstract, and full text. Selection was performed independently by two independent reviewers, with disagreements resolved by consensus and, when necessary, by a third reviewer. Organization and traceability were managed using the Rayyan platform (Ouzzani et al., 2016).

Before screening, a pilot calibration was conducted among reviewers to align eligibility criteria. Data extraction involved cross-checking and consensus in cases of disagreement. Thematic classification prioritized the central focus of each study's objective and outcome; in multithemed studies, classification was based on the emphasis of the design or intervention.

Data extraction was standardized based on full-text reading of the studies. For each article, the following information was collected whenever available: (a) author and year; (b) study type; (c) population and sample size; (d) mean age or age range; (e) inclusion criteria; (f) exclusion criteria; (g) intervention or exposure group; (h) control or comparator group; (i) primary outcomes; (j) main findings; and (k) predominant thematic frontier. Data were extracted exclusively from information explicitly reported in the texts; when unavailable, they were classified as not retrieved or not applicable, avoiding inferences.

2.4 SYNTHESIS STRATEGY AND METHODOLOGICAL CONSIDERATIONS

The axes of the final synthesis were defined by the convergence between the exploratory mapping and the expanded search. Although the initial stage identified a broad set of contemporary axes, the distribution of recent production showed greater density in five central axes: (1) exercise as clinical therapy in special populations; (2) mental health and exercise; (3) digital technologies and rehabilitation; (4) aging and functionality; and (5) neuroplasticity and exercise. Axes such as high-performance Paralympic sport and functional

assessment, although identified, were not retained as central axes because of insufficient density in the expanded search.

This review did not aim to estimate a mean effect, but rather to critically map the contemporary organization of scientific production in the field of APA, identify robust axes, and discuss gaps that may guide its future agenda. Thus, the inclusion of different study designs was considered appropriate to the proposal. It should be noted that the analysis prioritized transparency in selection, consistency in extraction, and critical organization of the evidence. A single risk-of-bias tool was not applied due to methodological heterogeneity. However, recurring limitations were discussed throughout the synthesis. The results were organized into narrative synthesis, tables, and figures.

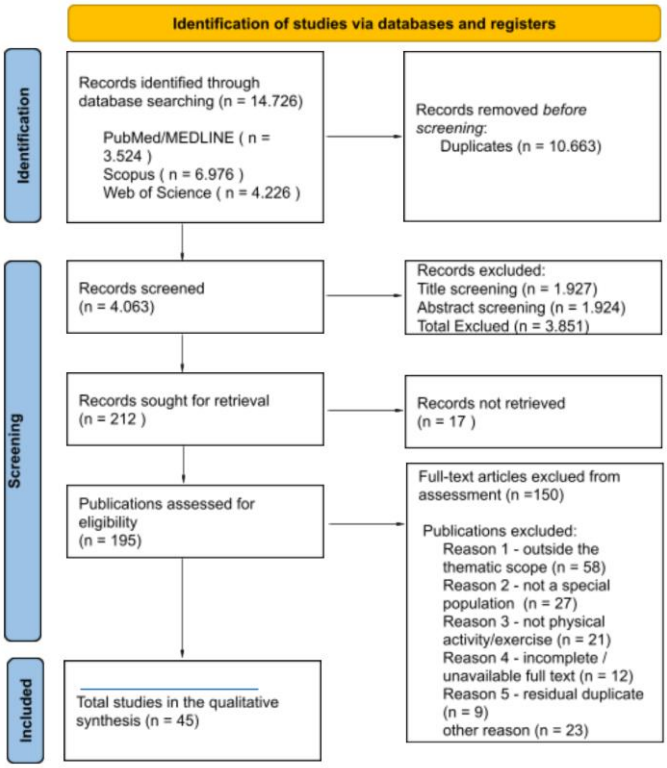
3 RESULTS AND DISCUSSION

3.1 SELECTION AND GENERAL CHARACTERIZATION OF THE STUDIES

After the screening process, 45 studies composed the final synthesis of this review. These studies can be accessed in the supplementary material, and the process of identification, screening, eligibility, and inclusion is presented in the PRISMA flow diagram (Figure 1).

Figure 1

PRISMA flow diagram of the study selection process



Source: Prepared by the authors.

The included studies were then subjected to standardized data extraction and thematic coding by frontiers (axes), with one predominant frontier defined for each study, as described in Section 2. The general characteristics of the studies are summarized in Table 1.

Table 1

Summary synthesis of the thematic frontiers

Frontier	n	Predominant populations	Study types	Predominant interventions / exposures	Predominant outcomes
Exercise as clinical therapy	11	ID, NDD, CP, MS, SCI, T2DM, frail older adults, visual impairment, post-stroke	RCTs, intervention studies, SR, MA	aquatic, resistance, multicomponent, focal vibration, Baduanjin	function, mobility, strength, fatigue, balance, quality of life
Mental health and exercise	9	ASD, ADHD, NDDs, athletes with disabilities, post-stroke	SR, MA, RCTs	PA, cycling, martial arts, exergames, sports programs	sleep, executive functions, inhibition, cognition, psychological well-being

Digital technologies and rehabilitation	7	IDD, ID, frail older adults, SCI, TBI, CP	SR, MA, trials, protocols	telehealth, remote support, home-based video, robotics, FES, RAGT	adherence, feasibility, mobility, strength, cardiorespiratory fitness, motor function
Aging and functionality	5	hospitalized, institutionalized, and community-dwelling older adults	RCTs, pooled analyses, SR, consensus	supervised in-hospital resistance exercise, coaching + monitoring	intrinsic capacity, physical function, falls, steps/day, cognition, mood
Neuroplasticity and exercise	5	post-stroke, SCI, adults with neurological disorders, CP	SR, pilot study	HIIT, aerobic exercise, motor training, exergaming, robotics, neuromodulation	BDNF, VEGF, lactate, cortical excitability, brain activation, functional recovery
Inclusion, participation, and contextual barriers	6	people with disabilities of different ages	SR, qualitative meta-synthesis, scoping reviews	school factors, mainstream sports, outdoor activities, adapted cycling	accessibility, social support, participation, structural and contextual barriers

Note: PA = physical activity; ASD = autism spectrum disorder; BDNF = brain-derived neurotrophic factor; ID = intellectual disability; T2DM = type 2 diabetes mellitus; MS = multiple sclerosis; FES = functional electrical stimulation; HIIT = high-intensity interval training; IDD = intellectual and developmental disabilities; SCI = spinal cord injury; MA = meta-analysis; NDD = neurodevelopmental disorders; CP = cerebral palsy; RAGT = robot-assisted gait training; RCT = randomized controlled trial; SR = systematic review; TBI = traumatic brain injury; ADHD = attention-deficit/hyperactivity disorder; VEGF = vascular endothelial growth factor.
Source: Prepared by the authors.

The included studies showed heterogeneity in terms of methodological design, populations investigated, application contexts, and outcomes analyzed. Protocols, systematic reviews, meta-analyses, scoping reviews, qualitative meta-syntheses, and consensus documents were identified (Shen, Liang, & Sit, 2024a; Shen, Liang, & Sit, 2024b; Formica et al., 2025; Martínez-Velilla et al., 2019; Valenzuela et al., 2025). A predominance of studies involving children and adolescents with neurodevelopmental disorders was observed, with particular emphasis on autism spectrum disorder (ASD), intellectual and developmental disabilities, hospitalized or institutionalized older adults, people with spinal cord injury, and individuals with neurological conditions, especially post-stroke.

A greater concentration was observed in five main axes, which constituted the core of the final synthesis. Four other themes, with lower consistency across studies, were grouped as a complementary frontier of inclusion, participation, and contextual barriers (Figure 2). The thematic synthesis of these frontiers is presented in Table 2, and the main methodological limitations by axis are shown in Table 3.

Figure 2

Distribution of studies by thematic frontier



Source: Prepared by the authors.

Table 2

Thematic synthesis of the knowledge frontiers

Main frontier	n	Predominant populations	Predominant study types	Main interventions/exposures	Main outcomes
Exercise as clinical therapy	11	ID, NDD, CP, MS, SCI, T2DM, frail older adults, visual impairment, post-stroke	RCTs, SRs, meta-analyses	aquatic exercise, resistance training, multicomponent exercise, focal vibration, Baduanjin, lifestyle programs, physical rehabilitation	motor function, mobility, strength, fatigue, balance, QoL, mood, biomarkers, functionality
Mental health and exercise	9	ASD, ADHD, NDDs, athletes with disabilities, post-stroke	SRs, meta-analyses, RCTs	structured PA, aerobic exercise, cycling, martial arts, exergaming, sports programs	sleep, executive functions, inhibitory control, cognition, psychological well-being, internalizing/externalizing symptoms
Digital technologies and rehabilitation	7	ID, IDD, frail older adults, SCI, TBI, CP	SRs, meta-analyses, trials, protocols	telehealth, remote family-school support, home-based DVD, robotics, FES, robot-assisted gait training	adherence, feasibility, mobility, strength, cardiorespiratory fitness, motor function
Aging and functionality	5	hospitalized, institutionalized, and community-dwelling older adults	RCTs, pooled analyses, SRs, consensus	in-hospital exercise, resistance training, supervised exercise in residential care, coaching + monitoring	intrinsic capacity, overall physical function, falls, steps/day, cognition, mood, QoL

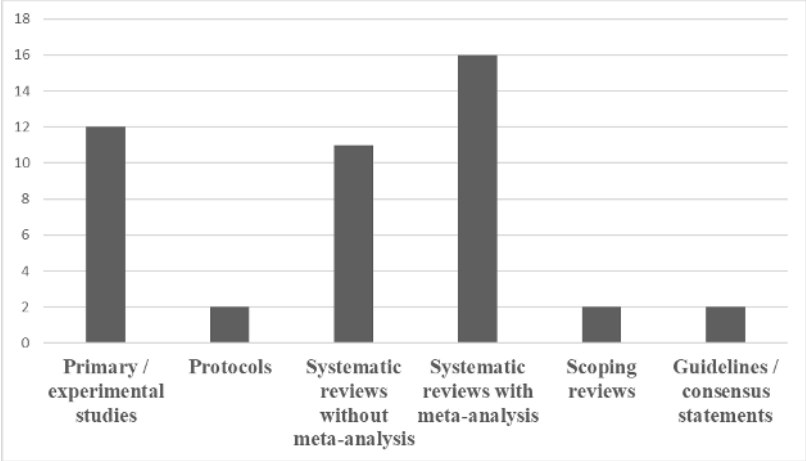
Neuroplasticity and exercise	5	post-stroke, SCI, adults with neurological disorders, children with CP	SRs, pilot study	HIIT, aerobic exercise, motor training, exergaming, robotics, neuromodulation	BDNF, VEGF, lactate, cortical excitability, brain activation, functional recovery
Public policies / participation	3	people with disabilities, adults with mobility disabilities	SRs, scoping review, guideline	adherence to 24-hour guidelines, outdoor PA, accessibility	prevalence of adherence, psychosocial health, barriers/facilitators, universal design
Educational inclusion	2	children and adolescents with disabilities	SRs, qualitative meta-synthesis	school factors, barriers in mainstream sports	physical/social environment, opportunities for practice, attitudinal and structural barriers
Functional assessment	2	adolescents with ID, children/adolescents with neuromotor disabilities	RCT, SR	ICF-based APA, pediatric APA	TGMD, physical fitness, participation, QoL, motor performance
Quality of life	1	people with disabilities using adapted cycling	scoping review	adaptive cycling	physical health, mental health, QoL

Note: PA = physical activity; APA = adapted physical activity; ASD = autism spectrum disorder; BDNF = brain-derived neurotrophic factor; ICF = International Classification of Functioning, Disability and Health; ID = intellectual disability; T2DM = type 2 diabetes mellitus; MS = multiple sclerosis; FES = functional electrical stimulation; HIIT = high-intensity interval training; IDD = intellectual and developmental disabilities; SCI = spinal cord injury; NDD = neurodevelopmental disorders; CP = cerebral palsy; QoL = quality of life; RCT = randomized controlled trial; SR = systematic review; TBI = traumatic brain injury; ADHD = attention-deficit/hyperactivity disorder; TGMD = Test of Gross Motor Development; VEGF = vascular endothelial growth factor.
Source: Prepared by the authors.

Regarding study types, systematic reviews predominated, followed by clinical trials and protocols, as shown in Figure 3.

Figure 3

Distribution of studies by study type



Source: Prepared by the authors.

Table 3

Recurrent methodological limitations and implications for the future agenda by thematic axis

Frontier	Main methodological weaknesses observed	Suggested future agenda
Exercise as clinical therapy	Heterogeneity of protocols; small samples; low comparability between interventions; frequent combination of multiple components	Multicenter trials; minimum standardization of dose, frequency, and duration; more studies by specific clinical condition
Mental health and exercise	High diversity of outcomes; multiple instruments; predominance of ASD/NDDs; few longitudinal studies with follow-up	Expand populations and contexts; standardize mental health outcomes; investigate mediating mechanisms
Digital technologies and rehabilitation	Many feasibility/protocol studies; cost and accessibility of technologies; low standardization of implementation	Pragmatic trials; cost-effectiveness assessment; comparisons between remote and in-person formats
Aging and functionality	Some diffuse overlap with general geriatrics and not only APA; varied outcomes; large differences across hospital, community, and institutional contexts	Stratification by context; greater integration with frailty, intrinsic capacity, and participation
Neuroplasticity and exercise	Varied neurobiological markers; few studies; strong methodological heterogeneity; difficulty comparing techniques	More robust mechanistic studies; comparable protocols; integration between biomarkers and functional outcomes
Inclusion/participation	Predominance of qualitative or scoping studies; lower density of effect studies	More mixed-methods and implementation studies; evaluation of interventions in real-world settings
Public policies/accessibility	Limited intervention research; predominance of cross-sectional studies and ecological reviews	Implementation studies, institutional policies, and program impact evaluation

Source: Prepared by the authors.

3.2 EXERCISE AS CLINICAL THERAPY IN SPECIAL POPULATIONS

This axis included the largest number of studies in the review and encompassed populations with intellectual disability (ID), neurodevelopmental disorders, cerebral palsy,

multiple sclerosis, spinal cord injury, type 2 diabetes, visual impairment, and frail and/or hospitalized older adults.

In populations with neuromotor disabilities, APA was associated with improvements in motor function, participation, and quality of life (Faccioli et al., 2025). In children with cerebral palsy, aquatic exercise showed improvements in gross motor function and reduced muscle tone when compared with routine rehabilitation (Li et al., 2025). In neurodevelopmental disorders, hydrotherapy showed positive effects on motor, social, and adaptive domains, although methodological heterogeneity was observed (Shariat et al., 2024).

In adolescents with ID, APA interventions promoted improvements in fundamental motor skills, components of physical fitness, and quality of life (Shen, Liang, & Sit, 2024a) and, when articulated with school and remote family support, increased moderate-to-vigorous physical activity levels and reduced sedentary behavior (Shen, Liang, & Sit, 2024b). In adults with relapsing-remitting multiple sclerosis, focal muscle vibration was associated with improvements in fatigue, balance, functional mobility, walking, and some cognitive and quality-of-life outcomes (Formica et al., 2025). In hospitalized older adults, studies have shown benefits of multicomponent programs for physical performance, functionality, cognition, mood, quality of life, and intrinsic capacity (Martínez-Velilla et al., 2019; Valenzuela et al., 2025).

In patients with post-stroke depression, the combination of Baduanjin exercise, pharmacological treatment, and rational-emotive therapy produced improvements in sleep, mood, inflammatory biomarkers, and functionality (Liu et al., 2024). In visual impairment, the favorable effects of physical activity were observed in functional capacity, mobility, and fall-related outcomes (Sweeting et al., 2020). In people with spinal cord injury, meta-analytic reviews indicated positive effects of resistance training on muscle strength (Santos et al., 2022), as well as advances in early cardiometabolic rehabilitation and functional training (Balthazaar et al., 2025; Handlery et al., 2024).

Therefore, APA appears to be consolidating itself as a therapeutic resource, taking shape not only as a variety of protocols, but also as a measurable intervention that is increasingly aligned with an evidence-based practice model, in which adaptation is not merely an operational adjustment of the task, but a constitutive component of therapeutic prescription.

3.3 MENTAL HEALTH AND EXERCISE IN SPECIAL POPULATIONS

This axis focused particularly on studies addressing neurodevelopmental disorders, sleep, executive functions, cognition, and psychological well-being. A multilevel meta-

analysis in children and adolescents with neurodevelopmental disorders showed positive effects of physical activity on overall mental health, cognitive function, psychological well-being, and the reduction of internalizing and externalizing problems (Liu, Liang, & Sit, 2024).

In systematic reviews and meta-analyses on ASD, favorable effects of physical activity were identified on executive functions, especially cognitive flexibility and inhibitory control (Liang et al., 2022), as well as on motor skills, social competence, communication, and overall executive function (Li et al., 2025), in addition to improvements in sleep, including sleep resistance, duration, and efficiency (Liang et al., 2024; Qiu & Liang, 2024). Similarly, in children with attention-deficit/hyperactivity disorder (ADHD), Qiu and Liang (2024) reported that, after physical activity, reduced sleep latency was associated with improved cognitive flexibility. In athletes with physical disabilities, the available systematic review showed a positive association between sports participation and psychological well-being, particularly regarding autonomy and environmental mastery (Zabala-Dominguez et al., 2024).

Furthermore, the recurrence of studies on sleep, cognition, and psychological well-being indicates that APA is not limited to physical or motor gains (Liu, Liang, & Sit, 2024; Liang et al., 2024; Zabala-Dominguez et al., 2024), which may represent one of the most remarkable shifts in the recent literature, reinforcing a more multidimensional understanding of health.

3.4 DIGITAL TECHNOLOGIES AND REHABILITATION

The strategies identified in this axis included telehealth, audiovisual home-based programs, remote support between school and family, robotics, functional electrical stimulation, and robot-assisted gait training (Dawson et al., 2024; Banyai & Brisan, 2024; Máté et al., 2023). In older adults with frailty, mobility limitations, or cognitive impairment, the systematic review with meta-analysis on telehealth interventions demonstrated good adherence, feasibility, and acceptability, with modest effects on mobility, strength, and balance (Dawson et al., 2024). In adolescents with intellectual and developmental disabilities, remote support between school and family was shown to increase physical activity levels and reduce sedentary behavior (Shen, Liang, & Sit, 2024b), and home-based video programs produced greater volumes of physical activity than audio-only formats, suggesting the relevance of the visual component and behavioral modeling (Banyai & Brisan, 2024).

In the field of physical rehabilitation, systematic reviews showed that robotic systems have been applied in different scenarios, with significant results for motor function, coordination, dexterity, and autonomy, although still limited by issues related to cost, accessibility, and the need for specialized training (Banyai & Brisan, 2024). In people with

spinal cord injury or other neurological conditions, the combination of functional electrical stimulation and arm crank exercise demonstrated improvements in cardiorespiratory indicators compared with some isolated modalities (Máté et al., 2023). In a pilot study with children with cerebral palsy, robot-assisted gait training showed functional improvements and changes in patterns of brain activation (Picelli et al., 2026).

The studies in this axis addressed technologies applied to rehabilitation, access, monitoring, and continuity of care. The incorporation of digital and assistive technologies has emerged as one of the main frontiers of innovation in the field (Dawson et al., 2024; Jamieson & Wijesundara, 2025; Banyai & Brisan, 2024). More than therapeutic tools, these technologies act as mediators of access, adherence, and continuity of care, shifting the focus toward issues of implementation, feasibility, and sustainability (Dawson et al., 2024; Dawson et al., 2024; Balthazaar et al., 2025).

3.5 AGING AND FUNCTIONALITY

This axis brought together evidence from clinical trials, systematic reviews, meta-analyses, and consensus documents. For example, it was found that adults over 80 years of age who received individualized interventions involving resistance exercise, balance training, and walking during hospitalization had better health outcomes compared with standard care (Martínez-Velilla et al., 2019). Likewise, in-hospital exercise was also associated with improvements in total intrinsic capacity and its domains (Valenzuela et al., 2025).

In institutionalized older adults, one systematic review showed that exercise may improve overall physical function (Valenzuela et al., 2023), as well as depressive symptoms, quality of life, and muscle strength (Khodadad Kashi et al., 2023). Among community-dwelling older adults, interventions involving coaching, home visits, and monitoring may increase the number of steps per day, moderate-to-vigorous physical activity, and well-being, while reducing disability (Oliveira et al., 2024).

Taken together, this axis highlights a relatively consolidated field. However, the studies indicate a paradigm shift, moving the focus away from decline and frailty (Martínez-Velilla et al., 2019; Valenzuela et al., 2023; Valenzuela et al., 2025) and bringing the field closer to an agenda that is less centered on decline and more oriented toward preserving capacity and promoting participation.

3.6 NEUROPLASTICITY AND EXERCISE

The neuroplasticity frontier was concentrated on neurological conditions, especially stroke and spinal cord injury. Systematic reviews indicate that moderate-to-vigorous aerobic

exercise and high-intensity interval training (HIIT) are associated with changes in biomarkers and neurophysiological measures related to neural reorganization (Cardoso et al., 2024; Montero-Almagro et al., 2024; Penna et al., 2021). In people after stroke, these same forms of exercise showed positive effects on biomarkers and neurophysiological measures related to functional recovery (Montero-Almagro et al., 2024; Penna et al., 2021). Notably, protocols with longer session duration, higher weekly frequency, and greater total intervention duration tend to show more consistent results (Cardoso et al., 2024).

In spinal cord injury, there is evidence of both spontaneous and induced brain plasticity through different neurorehabilitation strategies, including motor training, virtual reality, neuromodulation, and paired stimulation (Calderone et al., 2024; Santos et al., 2022). In children with cerebral palsy, the pilot study using robot-assisted gait training also indicated functional and brain activation changes, suggesting growing interest in the interface between motor rehabilitation and neuroimaging (Picelli et al., 2026).

The studies in this axis focus on biomarkers, neurophysiological measures, and outcomes related to neural reorganization and functional recovery, configuring a contemporary frontier that is still in the process of consolidation. They highlight APA as a potential modulator of physiological, neuromotor, and functional processes related to functional recovery (Cardoso et al., 2024; Penna et al., 2021). Although limited by protocol variability and small samples, this axis broadens the understanding of the neurophysiological bases of APA (Cardoso et al., 2024; Penna et al., 2021).

3.7 INCLUSION, PARTICIPATION, AND CONTEXTUAL BARRIERS

Finally, this axis showed lower quantitative density but high conceptual relevance. In the school context, a qualitative meta-analysis identified that physical activity participation among children and adolescents with disabilities is associated with the physical and social environment, opportunities for practice, and the characteristics of the activity itself (Deng et al., 2025). In addition, prejudice and ableism, insufficient professional training, poor accessibility, transportation limitations, as well as costs and failures in information circulation, stand out as barriers to sports participation in this population (Elipe-Lorenzo et al., 2025).

Scoping reviews on outdoor physical activity and adapted cycling further highlighted the importance of social support, universal design, accessible infrastructure, appropriate equipment, and institutional support for participation (Derakhshan et al., 2024; Mosser et al., 2025). From a population perspective, the review on 24-hour movement guidelines showed low overall adherence among people with disabilities, especially when physical activity, sedentary behavior, and sleep were considered simultaneously (Huang et al., 2024).

Moreover, the studies indicate that the effectiveness of APA depends not only on the technical quality of the intervention, but also on conditions of access, retention, and belonging (Deng et al., 2025; Huang et al., 2024; Liang et al., 2022; Mosser et al., 2025), reinforcing an approach that goes beyond the biomedical perspective and must involve greater accessibility, social support, professional training, and responsive environments.

The asymmetry in maturity among the identified frontiers constitutes one of the most relevant findings of the review, since while axes such as mental health, therapeutic exercise, and functional aging already show greater consolidation of syntheses and relatively convergent findings, others, such as neuroplasticity, advanced technologies, and the participation agenda, still depend on exploratory studies, protocols, or scoping reviews (Liu, Liang, & Sit, 2024; Dawson et al., 2024; Banyai & Brisan, 2024).

Another relevant aspect concerns the concentration of production in neurodevelopmental disorders, older adults, spinal cord injury, and neurological conditions (Liu, Liang, & Sit, 2024; Martínez-Velilla et al., 2019; Valenzuela et al., 2025). This pattern reveals where the field has invested most intensively, but it also points to gaps. Populations with sensory disabilities, rare diseases, contexts of greater social vulnerability, specific modalities of adapted sport, and less structured community environments remain underrepresented. This suggests that progress in the field will require not only deepening the already consolidated cores, but also expanding the diversity of populations and contexts.

4 FINAL CONSIDERATIONS

In light of the results, it was possible to observe that recent scientific production is not only expanding, but also reorganizing itself around more integrated scientific and applied priorities, indicating that the frontier of knowledge in the field tends to move beyond adaptation to functional limitations and begins to articulate functionality, cognition, well-being, accessibility, and personalization. In addition, it is worth noting that the two-stage methodological strategy proved useful by combining exploratory mapping and an expanded search based on thematic density, thereby avoiding dependence on a single descriptor and the dispersion of broad searches, and favoring the identification of a more consistent thematic core aligned with the recent literature.

As a contribution, this review organizes a still dispersed body of production into a more coherent interpretative framework, highlighting an agenda centered on the articulation between therapeutic intervention, mental health, technological innovation, functionality, and participation, while providing support for more equitable research, practices, and policies. It also reinforces the need for personalized and contextually feasible interventions, pointing to

a field that is progressively more interdisciplinary, translational, and sensitive to the multiple dimensions of health.

Finally, it was possible to identify that the literature presents limitations, such as methodological heterogeneity, low comparability between protocols, and concentration of evidence in specific populations, indicating that the challenge is not only to expand production, but also to consolidate APA as a social and clinical technology for the promotion of health, autonomy, and inclusion.

However, it should be emphasized that this study chose to include only the journals Adapted Physical Activity Quarterly (APAQ) and European Journal of Adapted Physical Activity (EUJAPA), which naturally limits the mapping of the entire scientific production in Adapted Physical Activity (APA), given that this field is also represented in numerous other journals across subareas such as sport, rehabilitation, education, among others, especially within the biological sciences, social sciences and applied social sciences, and medicine and health. Nevertheless, it is understood that focusing on APAQ and EUJAPA makes it possible to qualitatively identify some of the main current trends at the frontier of knowledge in APA worldwide, given their consolidated histories and their capacity for scientific dissemination.

REFERENCES

BALTHAZAAR, S. J. T.; HODGKISS, D. D.; CHIOU, S. Y.; LUCAS, S. J. E.; STATHI, A.; KALLA, M.; et al. Time is of the essence: upper-body aerobic exercise to improve cardiovascular health during inpatient rehabilitation within the first year following spinal cord injury - protocol for a randomised clinical trial. BMJ Open, v. 15, n. 4, p. e089868, 2025. DOI: 10.1136/bmjopen-2024-089868.

BANYAI, A. D.; BRISAN, C. Robotics in physical rehabilitation: systematic review. Healthcare (Basel), v. 12, n. 17, p. 1720, 2024. DOI: 10.3390/healthcare12171720.

BULL, F. C.; AL-ANSARI, S. S.; BIDDLE, S.; BORODULIN, K.; BUMAN, M. P.; CARDON, G.; et al. World Health Organization 2020 guidelines on physical activity and sedentary behaviour. British Journal of Sports Medicine, v. 54, n. 24, p. 1451-1462, 2020. DOI: 10.1136/bjsports-2020-102955.

CALDERONE, A.; CARDILE, D.; DE LUCA, R.; QUARTARONE, A.; CORALLO, F.; CALABRÒ, R. S. Brain plasticity in patients with spinal cord injuries: a systematic review. International Journal of Molecular Sciences, v. 25, n. 4, p. 2224, 2024. DOI: 10.3390/ijms25042224.

CARDOSO, S. V.; FERNANDES, S. R.; TOMÁS, M. T.; NUNES, C. Therapeutic importance of exercise in neuroplasticity in adults with neurological pathology: systematic review. International Journal of Exercise Science, v. 17, n. 1, p. 1105-1119, 2024.

DAWSON, R.; MCKAY, M.; GEERTS, M.; KWOK, W. S.; COLE, J.; HASSETT, L.; et al. Exercise interventions delivered through telehealth to improve physical functioning for older adults with frailty, cognitive, or mobility disability: a systematic review and meta-analysis. Telemedicine and e-Health, v. 30, n. 4, p. 940-950, 2024. DOI: 10.1089/tmj.2023.0177.

DENG, Y.; LI, X.; HUANG, J.; HAEGELE, J. A.; SMITH, B.; WILLIAMS, T. L.; LI, C. School-based factors influencing physical activity participation in children and adolescents with disabilities: a qualitative systematic review and meta-synthesis. Disability and Health Journal, v. 18, p. 101707, 2025. DOI: 10.1016/j.dhjo.2024.101707.

DERAKHSHAN, P.; MILLER, W. C.; BUNDON, A.; LABBÉ, D.; BOLT, T.; MORTENSON, W. B. Adaptive outdoor physical activities for adults with mobility disability: a scoping review. Frontiers in Rehabilitation Sciences, v. 4, p. 1331971, 2024. DOI: 10.3389/fresc.2023.1331971.

ELIPE-LORENZO, P.; DIEZ-FERNÁNDEZ, P.; RUIBAL-LISTA, B.; LÓPEZ-GARCÍA, S. Barriers faced by people with disabilities in mainstream sports: a systematic review. Frontiers in Sports and Active Living, v. 7, p. 1520962, 2025. DOI: 10.3389/fspor.2025.1520962.

FACCIOLI, S.; AVOLA, M.; MANGANO, G. R. A.; SGHEDONI, S.; SASSI, S. Gross motor performance, participation and quality of life after adapted physical activity interventions in pediatric populations with neuromotor disability: a systematic review. Children (Basel), v. 12, n. 7, p. 815, 2025. DOI: 10.3390/children12070815.

FORMICA, C.; LATELLA, D.; BONANNO, L.; LOMBARDO FACCIALE, A.; PALADINA, G.; LEO, A.; et al. The role of VibraPlus on fatigue in multiple sclerosis patients: a randomized controlled trial. Journal of Clinical Medicine, v. 14, n. 11, p. 3990, 2025. DOI: 10.3390/jcm14113990.

HANDLERY, R.; HANDLERY, K.; KAHL, D.; KOON, L.; REGAN, E. W. High intensity functional training for people with spinal cord injury and their care partners. Spinal Cord, v. 62, n. 7, p. 357-366, 2024. DOI: 10.1038/s41393-024-00977-8.

HASSETT, L.; MCKAY, M. J.; COLE, J.; MOSELEY, A. M.; CHAGPAR, S.; GEERTS, M.; et al. Effects of sport or physical recreation for adults with physical or intellectual disabilities: a systematic review with meta-analysis. British Journal of Sports Medicine, v. 58, n. 5, p. 269-277, 2024. DOI: 10.1136/bjsports-2023-107123.

HIGGINS, J. P. T.; THOMAS, J.; CHANDLER, J.; CUMPSTON, M.; LI, T.; PAGE, M. J.; WELCH, V. A. (ed.). Cochrane handbook for systematic reviews of interventions. 2. ed. Chichester: John Wiley & Sons, 2019.

HUANG, J.; LI, X.; LI, G.; HAEGELE, J. A.; ZOU, L.; CHEN, S.; et al. Prevalence of meeting 24-hour movement guidelines and its associations with health indicators in people with disabilities: a systematic review and meta-analysis. Disability and Health Journal, v. 17, n. 3, p. 101616, 2024. DOI: 10.1016/j.dhjo.2024.101616.

JAMIESON, A. R.; WIJESUNDARA, H. D. A review of adaptive equipment and technology for exercise and sports activities for people with disabilities. Disability and Rehabilitation: Assistive Technology, v. 20, n. 1, p. 33-45, 2025. DOI: 10.1080/17483107.2024.2372323.

KHODADAD KASHI, S.; MIRZAZADEH, Z. S.; SAATCHIAN, V. A systematic review and meta-analysis of resistance training on quality of life, depression, muscle strength, and functional exercise capacity in older adults aged 60 years or more. Biological Research for Nursing, v. 25, n. 1, p. 88-106, 2023. DOI: 10.1177/10998004221118604.

LEAHY, A. A.; ROBINSON, K.; EATHER, N.; SMITH, J. J.; HILLMAN, C. H.; BEACROFT, S.; et al. School physical activity interventions for children and adolescents with disability: systematic review and meta-analysis of effects on academic, cognitive, and mental health outcomes. Journal of Physical Activity and Health, v. 22, n. 9, p. 1064-1075, 2025.

LI, C.; PAN, H.; ZHOU, T.; LI, X.; CUI, W.; LI, D. Effects of physical activity on motor, communication, social, and executive function in children with autism spectrum disorder: a meta-analysis of randomized controlled trials. European Journal of Pediatrics, v. 185, p. 5, 2025. DOI: 10.1007/s00431-025-06636-1.

LI, F.; HUANG, W.; LI, H.; LIU, Z.; FENG, L. Rehabilitation effect of aquatic exercise on motor function in children with cerebral palsy: systematic review of randomized controlled trials. Journal of Back and Musculoskeletal Rehabilitation, v. 38, n. 4, p. 662-673, 2025. DOI: 10.1177/10538127251313951.

LIANG, X.; HAEGELE, J. A.; TSE, A. C. Y.; LI, M.; ZHANG, H.; ZHAO, S.; et al. The impact of physical activity intervention on sleep in children and adolescents with autism spectrum disorder: a systematic review and meta-analysis. Sleep Medicine Reviews, v. 74, p. 101913, 2024. DOI: 10.1016/j.smrv.2024.101913.

LIANG, X.; LI, R.; WONG, S. H. S.; SUM, R. K. W.; WANG, P.; YANG, B.; et al. The effects of exercise interventions on executive functions in children and adolescents with autism spectrum disorder: a systematic review and meta-analysis. Sports Medicine, v. 52, n. 1, p. 75-88, 2022. DOI: 10.1007/s40279-021-01545-3.

LIU, C.; LIANG, X.; SIT, C. H. P. Physical activity and mental health in children and adolescents with neurodevelopmental disorders: a systematic review and meta-analysis. JAMA Pediatrics, v. 178, n. 3, p. 247-257, 2024. DOI: 10.1001/jamapediatrics.2023.6251.

LIU, Y.; CHEN, C.; DU, H.; XUE, M.; ZHU, N. Impact of Baduanjin exercise combined with rational emotive behavior therapy on sleep and depressive symptoms in patients with post-stroke depression. Medicine (Baltimore), v. 103, n. 19, p. e38180, 2024. DOI: 10.1097/MD.0000000000038180.

MARTIN GINIS, K. A.; VAN DER PLOEG, H. P.; FOSTER, C.; LAI, B.; MCBRIDE, C. B.; NG, K.; et al. Participation of people living with disabilities in physical activity: a global perspective. Lancet, v. 398, n. 10298, p. 443-455, 2021. DOI: 10.1016/S0140-6736(21)01164-8.

MARTÍNEZ-VELILLA, N.; CASAS-HERRERO, A.; ZAMBOM-FERRARESI, F.; SÁEZ DE ASTEASU, M. L.; LUCIA, A.; GALBETE, A.; et al. Effect of exercise intervention on functional decline in very elderly patients during acute hospitalization: a randomized clinical trial. JAMA Internal Medicine, v. 179, n. 1, p. 28-36, 2019. DOI: 10.1001/jamainternmed.2018.4869.

MÁTÉ, S.; SINAN-FORNUSEK, C.; DHOPTE, P.; FIATARONE SINGH, M.; HACKETT, D.; FORNUSEK, C. Effects of functional electrical stimulation cycling combined with arm cranking exercise on cardiorespiratory fitness in people with central nervous system disorders: a systematic review and meta-analysis. Archives of Physical Medicine and Rehabilitation, v. 104, p. 1928-1940, 2023. DOI: 10.1016/j.apmr.2023.03.026.

MONTERO-ALMAGRO, G.; BERNAL-UTRERA, C.; GERIBALDI-DOLDÁN, N.; NÚÑEZ-ABADES, P.; CASTRO, C.; RODRÍGUEZ-BLANCO, C. Influence of high-intensity interval training on neuroplasticity markers in post-stroke patients: systematic review. Journal of Clinical Medicine, v. 13, n. 7, p. 1985, 2024. DOI: 10.3390/jcm13071985.

MOSSER, N.; NORCLIFFE, G.; KRUSE, A. The impact of cycling on the physical and mental health of people with disabilities: a scoping review. Frontiers in Sports and Active Living, v. 6, p. 1487117, 2025. DOI: 10.3389/fspor.2024.1487117.

OLIVEIRA, J. S.; SHERRINGTON, C.; RISSEL, C.; HOWARD, K.; TONG, A.; MEROM, D.; et al. Effect of a coaching intervention to enhance physical activity and prevent falls in community-dwelling people aged 60+ years: a cluster randomised controlled trial. British Journal of Sports Medicine, v. 58, p. 382-391, 2024. DOI: 10.1136/bjsports-2023-107027.

OUZZANI, M.; HAMMADY, H.; FEDOROWICZ, Z.; ELMAGARMID, A. Rayyan-a web and mobile app for systematic reviews. Systematic Reviews, v. 5, n. 1, p. 210, 2016. DOI: 10.1186/s13643-016-0384-4.

PAGE, M. J.; MCKENZIE, J. E.; BOSSUYT, P. M.; BOUTRON, I.; HOFFMANN, T. C.; MULROW, C. D.; et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ, v. 372, p. n71, 2021. DOI: 10.1136/bmj.n71.

PENNA, L. G.; PINHEIRO, J. P.; RAMALHO, S. H. R.; RIBEIRO, C. F. Effects of aerobic physical exercise on neuroplasticity after stroke: systematic review. Arquivos de Neuro-Psiquiatria, v. 79, n. 9, p. 832-843, 2021. DOI: 10.1590/0004-282X-ANP-2020-0451.

PICELLI, A.; VANGELISTA, A.; CACCIATORI, C.; TAMBURIN, S.; BONETTI, P.; FILIPPETTI, M.; et al. Robot-assisted gait training and changes in motor function and brain activation in children with cerebral palsy: preliminary findings from a pilot study. NeuroRehabilitation, v. 58, n. 2, p. 310-318, 2026. DOI: 10.1177/10538135251410611.

QIU, H.; LIANG, X. Change in sleep latency as a mediator of the effect of physical activity intervention on executive functions among children with ADHD: a secondary analysis from a randomized controlled trial. Journal of Autism and Developmental Disorders, v. 54, p. 3069-3077, 2024. DOI: 10.1007/s10803-023-06018-2.

RIMMER, J. H.; MARQUES, A. C. Physical activity for people with disabilities. Lancet, v. 380, n. 9838, p. 193-195, 2012. DOI: 10.1016/S0140-6736(12)61028-9.

SANTOS, L. V.; PEREIRA, E. T.; REGUERA-GARCÍA, M. M.; OLIVEIRA, C. E. P.; MOREIRA, O. C. Resistance training and muscle strength in people with spinal cord injury: a systematic review and meta-analysis. Journal of Bodywork and Movement Therapies, v. 29, p. 154-160, 2022. DOI: 10.1016/j.jbmt.2021.09.031.

SHARIAT, A.; NAJAFABADI, M. G.; DOS SANTOS, I. K.; ANASTASIO, A. T.; MILAJERDI, H. R.; HASSANZADEH, G.; et al. The effectiveness of aquatic therapy on motor and social skill as well as executive function in children with neurodevelopmental disorder: a systematic review and meta-analysis. Archives of Physical Medicine and Rehabilitation, v. 105, n. 5, p. 1000-1007, 2024. DOI: 10.1016/j.apmr.2023.08.025.

SHEN, B.; LIANG, X.; SIT, C. H. P. An adapted physical activity program for adolescents with an intellectual disability: an International Classification of Functioning, Disability and Health perspective. Life (Basel), v. 14, n. 10, p. 1314, 2024a. DOI: 10.3390/life14101314.

SHEN, B.; LIANG, X.; SIT, C. H. P. Impact of remote collaboration-based family physical activity intervention on physical activity and quality of life in children with intellectual and developmental disabilities. Frontiers in Public Health, v. 12, p. 1464099, 2024b. DOI: 10.3389/fpubh.2024.1464099.

SILVA, R.; SILVA, E. C. A produção científica brasileira em atividade motora adaptada nas últimas décadas: histórico e tendências atuais. In: SILVA, R. Atividade Motora Adaptada: reflexões passadas, presentes e futuras (org.). Florianópolis: Editora Udesc, 2025.

SWEETING, J.; MEROM, D.; ASTUTI, P. A. S.; ANTOUN, M.; EDWARDS, K.; DING, D. Physical activity interventions for adults who are visually impaired: a systematic review and meta-analysis. BMJ Open, v. 10, p. e034036, 2020. DOI: 10.1136/bmjopen-2019-034036.

VALENZUELA, P. L.; SACO-LEDO, G.; MORALES, J. S.; GALLARDO-GÓMEZ, D.; MORALES-PALOMO, F.; LÓPEZ-ORTIZ, S.; et al. Effects of physical exercise on physical function in older adults in residential care: a systematic review and network meta-analysis of randomised controlled trials. Lancet Healthy Longevity, v. 4, n. 6, p. e397-e409, 2023. DOI: 10.1016/S2666-7568(23)00071-2.

VALENZUELA, P. L.; SACO-LEDO, G.; ZAMBOM-FERRARESI, F.; CASAS-HERRERO, A.; SÁEZ DE ASTEASU, M. L.; RAMÍREZ-VÉLEZ, R.; et al. Exercise effects on intrinsic capacity in acutely hospitalized older adults: a pooled analysis of two randomized controlled trials. Age and Ageing, v. 54, n. 4, p. afaf082, 2025.

ZABALA-DOMINGUEZ, O.; LÁZARO FERNÁNDEZ, Y.; RUBIO FLORIDO, I.; OLASAGASTI-IBARGOIEN, J. Psychological well-being of young athletes with physical disabilities: a systematic review. Behavioral Sciences (Basel), v. 14, n. 9, p. 822, 2024. DOI: 10.3390/bs14090822.