CA-LEND Leadership Project
Final Presentation

Effect of Motor Interventions on Motor Outcomes for children diagnosed with Autism Spectrum Disorder: A Systematic Review and Meta-Analysis

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Abstract

Title: Effect of Motor Interventions on Motor Outcomes for Children Diagnosed with Autism Spectrum Disorder: A Systematic Review and Meta-Analysis

Authors: Aimee St. Martin, PT, DPT; Meera V. Bucklin, PT, DPT; Amy Chatfield, MLIS; Anneliese Rugerri Juhasz, PT, DPT; Barbara Sargent, PhD, PT, PCS

Background: Autism affects 1 in 31 children in the United States. Eighty-seven percent of children with ASD are at risk for motor impairments (Bhat, 2020, *Phys Ther*).

Purpose: To systematically review current evidence on motor interventions on motor outcomes in children with ASD.

Methods: Eight databases were searched for studies that informed the effects of motor interventions on motor outcomes in children with ASD. Studies were appraised for risk of bias and quality.

Results: 50 randomized control trials (RCTs) were included. The interventions were categorized accordingly: aquatic, dance, early intervention, exercise program, exergaming, hippotherapy, motor skills, occupational therapy, physical activity, school-based, sensory integration, sports, and yoga. Results from the RCTs support exergaming and aquatic therapy interventions improve motor outcomes.

Conclusion: Motor interventions such as exergaming and aquatic therapy are recommended to improve motor function in children with ASD. More high quality RCTs are needed to improve evidence on motor interventions.

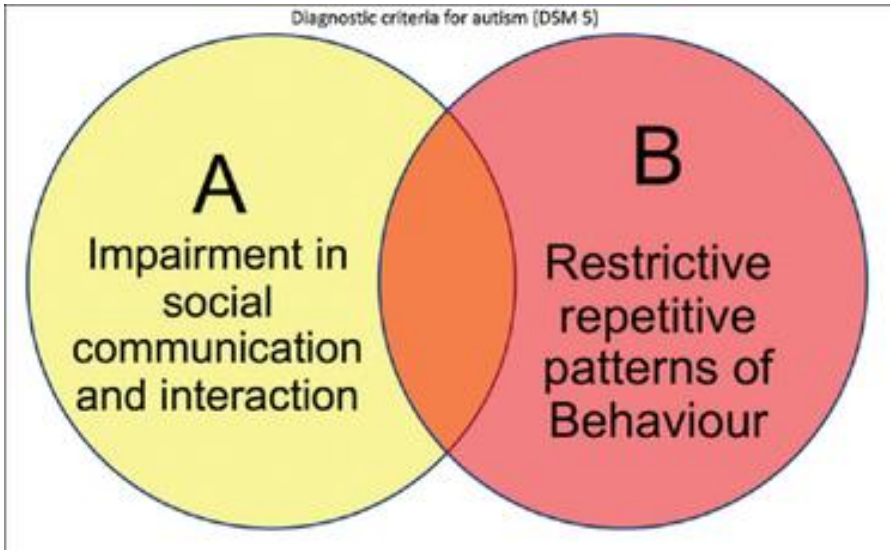
Funding Source: Children's Hospital Los Angeles California-Leadership in Neurodevelopmental Disabilities Training Program under award number T78MC00008.

Project Plain Language Summary

This study looks at how exercise and movement activities help kids with Autism Spectrum Disorder (ASD) improve their motor skills. Fifty studies were reviewed. The goal of our research is to find out which activities work best to improve motor skills. So far we have found that aquatic, yoga, exergaming, and exercise programs support motor skills. This research can help teachers, healthcare workers, and therapists choose the right exercises and movement activities to better help children with ASD.

Background

ASD is a Neurodevelopmental condition defined by the Diagnostic and Statistical Manual of Mental Disorders version 5 (DSM-V)



ASD and Motion!

- General motor impairment is not a part of the core criteria for ASD diagnosis, however research has shown as much as 87% of children with ASD are at risk for motor impairments (Bhat 2020, *Phys Ther*)

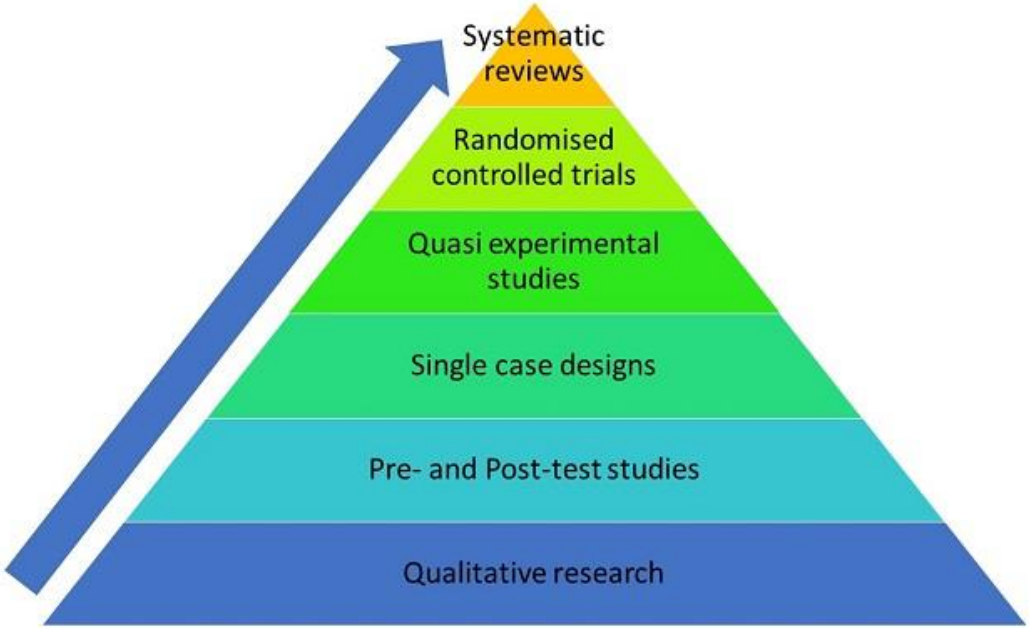
Project Description

- **Proposed Product**: Published systematic review with meta-analysis
- **Intended Audience**: Healthcare and educational professionals who work with children with ASD
- **Impact**: inform care and best practice to improve quality of life for those with ASD
- **Dissemination**: Annual Physical Therapy conference and publishing review
  - **Barriers**: deadlines and dates for submission

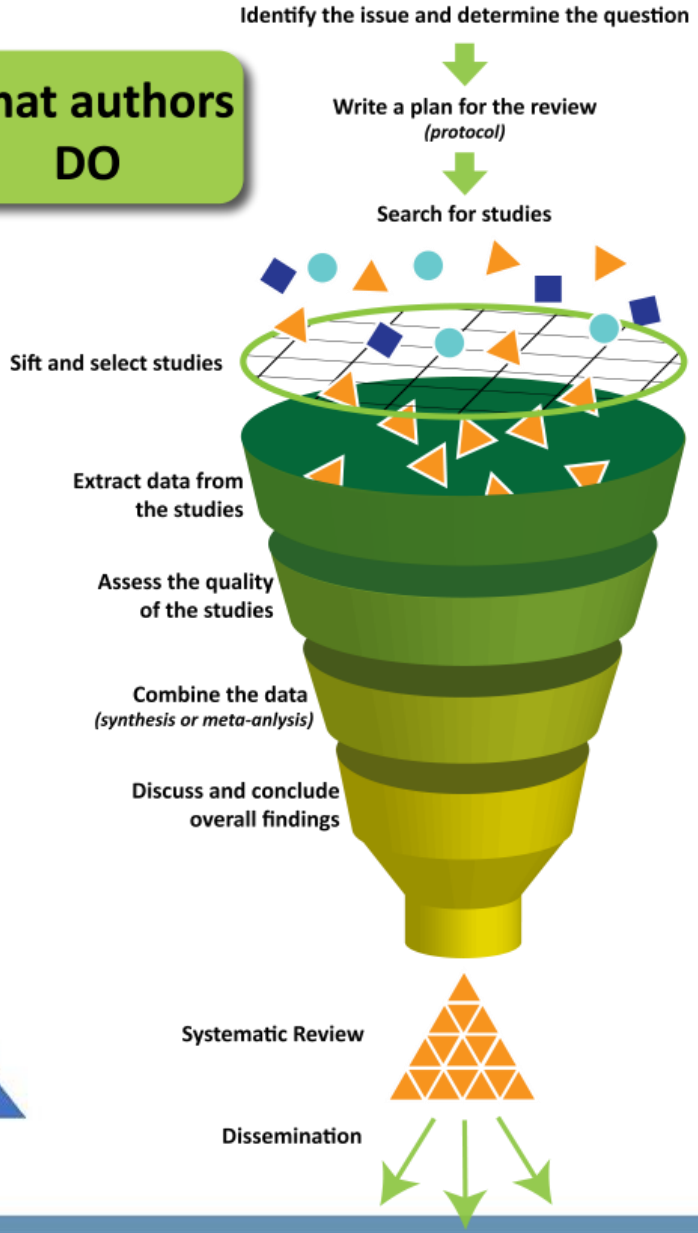
Purpose

To systematically review current evidence on the effect of motor interventions on motor outcomes in children with ASD in order to inform practice and create a source of information for clinicians, researchers, families, and relevant parties to reference when discussing the role of motor intervention in the care of children with ASD.

Process of Systematic Review

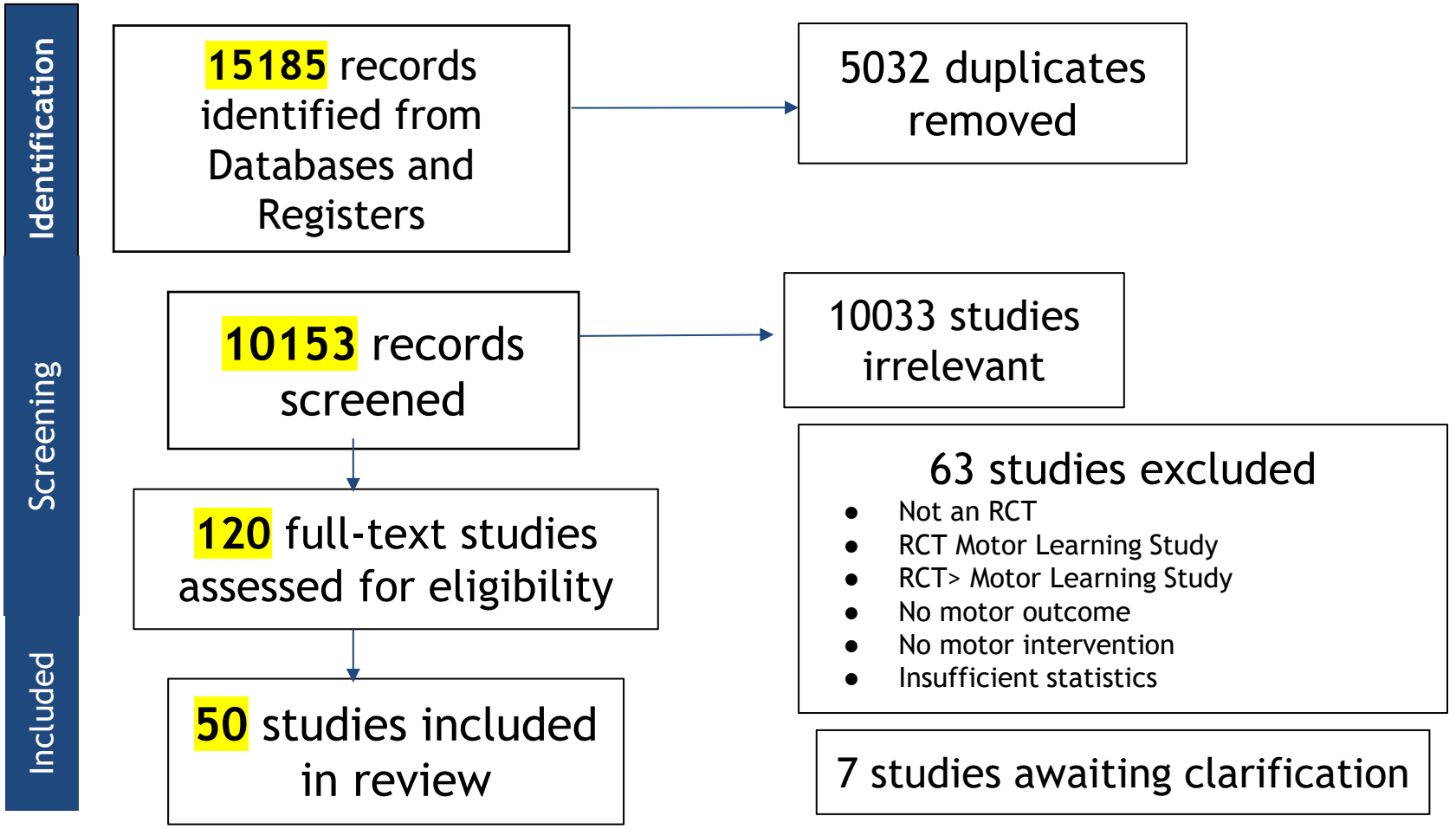


What authors DO



PRISMA Flow Diagram

Identification of PRISMA



Categories of Interventions

Aquatic (4)

Early Intervention (8)

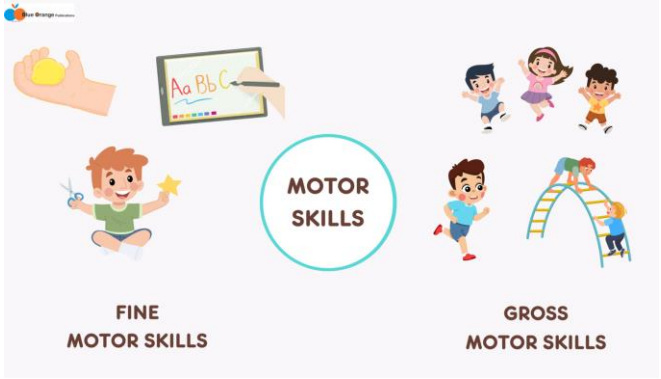
Dance (3)

Exercise and Physical Activity (6)

Categories of Interventions

Hippotherapy (6)

Exergaming (4)

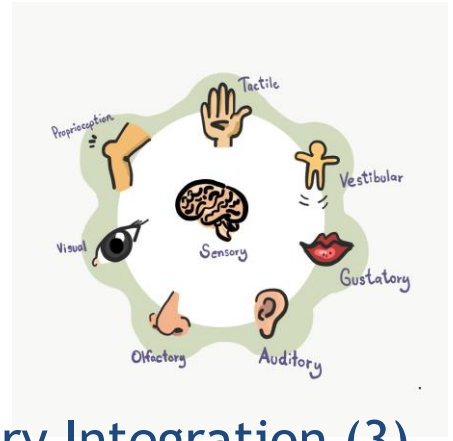


Motor Skills (5)

Occupational Therapy (2)

Categories of Interventions

School-Based (5)



Sensory Integration (3)

Sports (2)

Yoga (2)

Results

- Levels of evidence ranged from some concerns to high risk according to a ROB-2 done from at least 2 reviewers
  - 19 some concerns (38%)
  - 31 high risk (62%)
- Ages included 9 months to 16 years old, with male and female participants
- Males were more prevalent than females as participants
- DSM-IV and DSM-V were used to confirm a diagnosis of ASD in 7 and 19 articles respectively (52%)

Conclusions

- Quality of evidence found overall is low
  - Need more high quality RCTs.

Aquatic

Exergaming

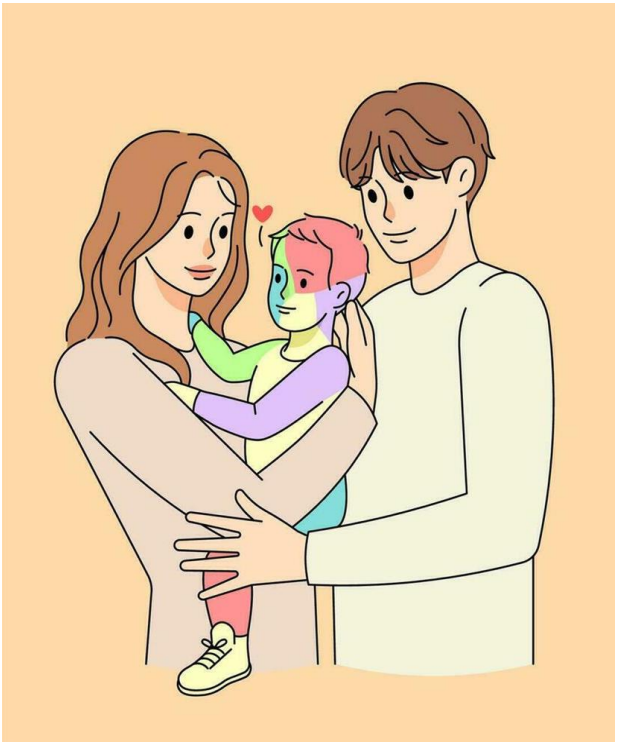
Yoga

Exercise Programs

Family and Interdisciplinary Perspective

- **Family**
  - Collaborate with scholars to discuss caregiver advocacy and how to access resources
  - Lived Experience Panels

- **Interdisciplinary Perspective:**
  - Interdisciplinary care at school (teachers, aides, OT, ST)
  - Parental/Self advocacy
  - Navigating health care system



DEI Perspective

- Disparities in access to care, referral frequency, number of service hours and proportion of unmet service needs (Smith et al., 2020 *Pediatrics*)
- Disparities in screening/referral, diagnosis, health care services, care coordination, and medication (Lindsay et al., 2024 *Disability and Rehabilitation*)
- In the U.S., ASD prevalence is lower among white children than other racial and ethnic groups (Shaw et al., 2022 *MMWR Surveill Summ.*)
- 22% of articles with NO females participants (11/50 articles)

Community (Title V) Agency Interface

- School System
  - ASD is a diagnosis eligible for school services

- Regional Center
  - ASD is a primary diagnosis

Lessons Learned

- Challenges Faced:
  - Time commitments
  - Novel experience
  - Consistency of inclusion criteria and appraisal categorization

- Lessons Learned:
  - Ask questions
  - Organization of information effectively
  - Importance of team dynamic and roles

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USC University of Southern California

Next Steps

- Run updated article search
- Complete meta-analyses
- Continue to write the systematic review
- Submit abstract for poster presentation at CSM- July 2025
- Submit for publication - August 2025

APTA **Combined Sections Meeting**
Feb 12-14 / Anaheim, CA

APTA American Physical Therapy Association

Acknowledgments

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Acknowledgments








Questions for Audience/ Invitation for Feedback

- In your experience working with children who have ASD what barriers to care have you observed? How can we work to address these barriers from our different perspectives?
- What strategies do you suggest for effectively promoting our systematic review to ensure maximum reach and impact?