

## Abstract

# Can Gross Motor Skills Be Trained Through Telehealth-Based Training? Insights From a Randomized Controlled Trial of Creative Movement and Play-Based Interventions in Children With Autism Spectrum Disorder

Catherine Myers<sup>1</sup>, BSc, BA; Sudha Srinivasan<sup>1</sup>, PT, PhD; Bansri Patel<sup>1</sup>; Nidhi Amonkar<sup>1</sup>, PT; Wan-Chun Su<sup>2</sup>; Corina Cleffi<sup>2</sup>; Anjana Bhat<sup>2</sup>, PT, PhD; Sarah Williams<sup>2</sup>

<sup>1</sup>Department of Kinesiology, University of Connecticut, Storrs, CT, United States

<sup>2</sup>Biomechanics and Movement Science Interdisciplinary Program, University of Delaware, Newark, DE, United States

### Corresponding Author:

Sudha Srinivasan, PT, PhD

Department of Kinesiology

University of Connecticut

3107 Horsebarn Hill Road U4137

Storrs, CT, 06268

United States

Phone: 1 8604866192

Email: [sudha.srinivasan@uconn.edu](mailto:sudha.srinivasan@uconn.edu)

## Abstract

**Background:** The motor trajectories of children with autism spectrum disorder (ASD) are often compromised, leading to difficulties in gross motor performance and locomotor skills by late childhood. Our past work has suggested that whole-body movement interventions using rhythmic contexts can facilitate gross motor skills in children with ASD.

**Objective:** This study compares the effects of whole-body movement interventions delivered face-to-face (F2F) versus via telehealth (TH) and compares these effects to those of a standard-of-care, seated play (SP) intervention on the gross motor performance of children with ASD.

**Methods:** A total of 45 children with ASD aged between 5 and 14 years were seen for 10 weeks, with pretests and posttests conducted during the first and 10th weeks. Children were matched based on age, gender, and level of functioning and then randomly assigned to the general movement (GM), creative movement (CM), or SP groups. An equal number of children in each group received the training via F2F and TH modes. Training was provided in 2 sessions per week for 8 weeks, with sessions lasting from 1 to 1.15 hours. The CM and GM groups received whole-body movement training, whereas the SP group engaged in tabletop activities. The gross and fine motor subtests (fine motor precision, fine motor integration, balance, bilateral coordination, running speed and agility, and strength) of the Bruininks-Oseretsky Test of Motor Proficiency were administered at pre- and posttest. We reported standard scores on body coordination, strength and agility, and fine manual control composites.

**Results:** The CM and GM groups showed significant improvements on the body coordination composite (CM group's scores—pretest: mean 35.3, SE 2.1; posttest: mean 40.5, SE 2.7;  $P<.005$ ; GM group's scores—pretest: mean 38.1, SE 3.2; posttest: mean 44.7, SE 3.3;  $P<.005$ ). The GM group's scores (pretest: mean 36.1, SE 2.6; posttest: mean 40.9, SE 3.1;  $P<.001$ ) also improved on the strength and agility composite, and a trend for similar improvements was observed in the CM group's scores (pretest: mean 32.5, SE 2.4; posttest: mean 34.5, SE 2.7;  $P=.09$ ). The SP group did not show any improvements on the gross motor composites. The SP group's scores instead showed significant improvements on the fine manual control composite (pretest: mean 36.4, SE 2.3; posttest: mean 41.6, SE 2.5;  $P<.005$ ). Fine motor skills remained unchanged in the CM and GM groups. In each of the 3 groups, there were no significant differences in the amount of improvements (posttest – pretest) observed for children seen F2F versus via TH for the body coordination (CM group—F2F: mean 4.1, SE 2.6; TH: mean 5.4, SE 1.6;  $P=.70$ ; GM group—F2F: mean 6.5, SE 2.7; TH: mean 5.6, SE 2.5;  $P=.80$ ), strength and agility (CM group—F2F: mean 1.3, SE 1.4; TH: mean 2, SE 1.1;  $P=.70$ ; GM group—F2F: mean 3.7, SE 1.3; TH: mean 5.6, SE 1.5;  $P=.40$ ), and fine manual control composite standard scores (SP group—F2F: mean 2.2, SE 2.8; TH: mean 1.9, SE 1.2;  $P=.80$ ).

**Conclusions:** The findings of our pilot study emphasize the importance of training gross and fine motor skills in children with ASD and suggest that virtual modes of intervention delivery can be used by movement clinicians to train these skills.

**Conflicts of Interest:** None declared.

(*iproc* 2022;8(1):e39426) doi: [10.2196/39426](https://doi.org/10.2196/39426)

## KEYWORDS

autism spectrum disorder; motor performance; movement interventions; telehealth; gross motor skills; fine motor skills

*Edited by S Pagoto; this is a non-peer-reviewed article. Submitted 09.05.22; accepted 25.06.22; published 12.07.22.*

*Please cite as:*

*Myers C, Srinivasan S, Patel B, Amonkar N, Su WC, Cleffi C, Bhat A, Williams S  
Can Gross Motor Skills Be Trained Through Telehealth-Based Training? Insights From a Randomized Controlled Trial of Creative  
Movement and Play-Based Interventions in Children With Autism Spectrum Disorder  
iproc 2022;8(1):e39426*

*URL: <https://www.iproc.org/2022/1/e39426>*

*doi: [10.2196/39426](https://doi.org/10.2196/39426)*

*PMID:*

©Catherine Myers, Sudha Srinivasan, Bansri Patel, Nidhi Amonkar, Wan-Chun Su, Corina Cleffi, Anjana Bhat, Sarah Williams. Originally published in *Iproceedings* (<https://www.iproc.org>), 12.07.2022. This is an open-access article distributed under the terms of the Creative Commons Attribution License (<https://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work, first published in *Iproceedings*, is properly cited. The complete bibliographic information, a link to the original publication on <https://www.iproc.org/>, as well as this copyright and license information must be included.