

A Case Study: Brain Gym Activities for a Child with Autism

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Abstract

➤ *Background:*

Autism Spectrum Disorder (ASD) is characterized by core deficits in social communication, restricted behaviors, and frequent challenges with sensory processing and motor coordination. Despite the common use of Brain Gym®, an organized set of movement-based exercises, as a supplemental therapy to improve cognitive, motor, and behavioral performance, robust empirical support for its efficacy remains limited.

➤ *Objective:*

This single-case study aimed to assess the effects of a structured Brain Gym training program on attention, sensory modulation, behavioral engagement, and functional participation in a child diagnosed with ASD.

➤ *Methods:*

A 6-year-old boy with clinically confirmed ASD participated in a structured Brain Gym intervention over eight weeks, comprising three 30-minute sessions per week. Pre- and post-intervention evaluations utilized the Canadian Occupational Performance Measure (COPM), the Sensory Processing Measure (SPM), and detailed therapist-based observation diaries.

➤ *Results:*

The intervention yielded notable improvements, including a significant increase in attention span (+40%) and task engagement (+35%), alongside a substantial reduction in behavioral outbursts (-45%). COPM scores demonstrated clinically significant gains in both performance and satisfaction. Furthermore, parental feedback noted improved responsiveness, smoother transitions between activities, and enhanced eye contact.

➤ *Conclusion:*

Brain Gym activities appear to have beneficial effects on sensory regulation, attention, and functional participation for the child in this study. While the findings support further controlled trials to establish generalizable efficacy, these results encourage the use of movement-based interventions to address sensorimotor challenges in children with ASD.

Keywords: *Autism Spectrum Disorder, Brain Gym, Occupational Therapy, Sensory Processing, Case Study, Motor Skills, Child Development.*

I. INTRODUCTION

Autism Spectrum Disorder (ASD) is a neurological difference that fundamentally shapes how individuals interact, communicate, behave, and process sensory information (American Psychiatric Association, 2022). For children with ASD, it's common to see difficulties with motor coordination, using both sides of the body (bilateral

integration), maintaining focus (attention regulation), and higher-level executive processes. These hurdles seriously affect their ability to participate fully in daily routines and activities.

Given these challenges, movement-based therapies have emerged as appealing complementary treatments because of their potential to boost both behavioral and

cognitive outcomes. One such approach is Brain Gym®, an organized suite of 26 exercises developed by Paul Dennison (Dennison & Dennison, 1989). The program is designed to get children ready for learning by enhancing the way the two sides of the brain communicate (interhemispheric communication) and by actively engaging different brain regions.

Even though Brain Gym is widely integrated into educational and therapeutic settings, including within occupational therapy to sharpen attention, support sensory integration, and improve posture, the scientific evidence remains limited and sometimes inconsistent.

However, the specific design of Brain Gym directly targets the common difficulties faced by children with ASD. These difficulties include trouble managing sensory input, a short attention span, struggling to follow directions, poor bilateral coordination, and stress when moving between tasks (resistance to transitions). Exercises like "Cross Crawl," "Lazy 8s," and "Hook-Ups" are specifically chosen to address these issues by strengthening core functions: hemispheric integration (brain teamwork), proprioceptive feedback (body awareness), vestibular regulation (balance/movement tolerance), and overall readiness for learning.

Therefore, systematically documenting the outcomes of these interventions through a rigorous clinical case study is crucial. This detailed record helps solidify the practices used in occupational therapy and significantly contributes essential evidence to the broader academic literature.

➤ *Aim:*

To investigate how Brain Gym activities can improve a child with ASD's functional performance and sensory modulation.

➤ *Objectives:*

The primary objectives for methodically recording the effects of the intervention were fourfold: first, to evaluate changes in attention and task engagement; second, to assess behavioural regulation and sensory modulation; third, to document improvements in occupational performance using the Canadian Occupational Performance Measure (COPM); and finally, to observe parental feedback regarding functional changes and improvements in the child's daily activities.

II. CASE DESCRIPTION

This case study centered on a 6-year-old boy who had been formally diagnosed with Autism Spectrum Disorder (ASD) based on the established DSM-5 criteria. He was referred to the study by his Paediatric Neurologist. The presenting concerns, which significantly impacted his daily function, included poor eye contact, hyperactivity, prominent sensory seeking behaviours, difficulty sitting for tasks, echolalia, poor fine-motor coordination, and difficulty crossing midline. It's important to note that the child was already engaged in regular occupational therapy for a period of three months leading up to the commencement of this specific Brain Gym intervention.

➤ *Baseline Assessment*

The following tools were used:

Table 1 Baseline Assessment

Domain	Tool	Baseline Findings
Occupational Performance	COPM	Low performance (2/10), low satisfaction (1/10)
Sensory Processing	SPM	Definite dysfunction in planning, body awareness, and social participation
Behavioural Observations	Session Log	Poor adaptability, frequent self-stimulation, inability to sustain attention > 3 minutes
Motor Skills	Clinical Observation	Difficulty in bilateral coordination, poor postural stability

The child demonstrated readiness for movement-based intervention.

III. METHODOLOGY

➤ *Study Design*

A single-case experimental design (N=1) with pre- and post-intervention evaluation.

➤ *Intervention Structure*

The intervention was meticulously structured as an 8-week program, with sessions held at a frequency of three times per week. Each session was kept to a focused 30-minute length. The entire program was delivered by a Certified Occupational Therapist (who also authored the

study), and all sessions consistently took place within a dedicated Paediatric Occupational Therapy Centre.

➤ *Brain Gym Protocol Used*

The specific Brain Gym protocol was carefully chosen to meet the therapeutic goals of the child. It was organized into two primary categories of movements. The first was the mandatory preparatory sequence known as PACE, which consisted of four core activities: Drink Water, Brain Buttons, Cross Crawl, and Hook-Ups. The second category included a selection of Core Brain Gym Activities, which involved exercises such as Lazy 8s, Double Doodle, Gravity Glider, The Owl, Think of an X, Arm Activation, and Balance Buttons.

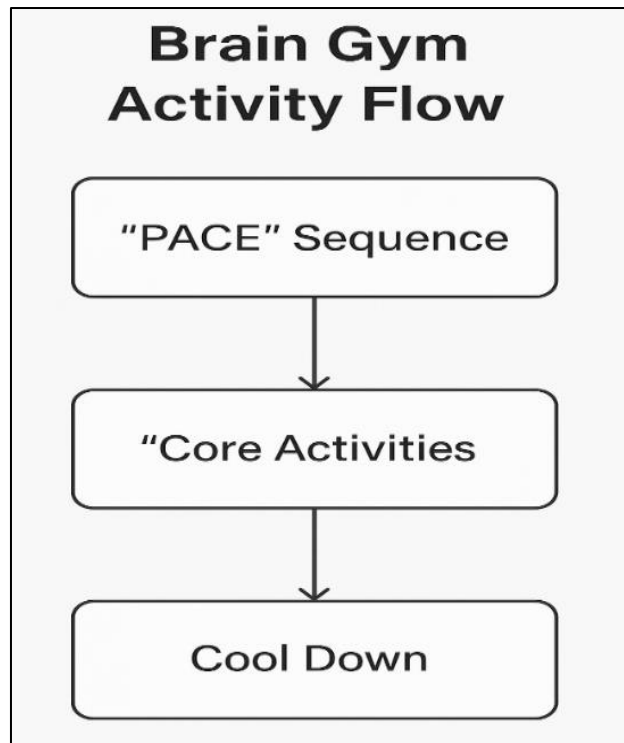


Fig 1 Brain Gym Activity Flow

➤ *Structure of Each Session*

Each 30-minute session followed a consistent three-part structure. It began with a 5-minute Warm-up focused on breathing and sensory preparation. This was followed by the main 20-minute segment, dedicated to the Brain Gym Activities guided by the therapist. Finally, a 5-minute Cool-down segment was used for deep pressure techniques and preparing for transitions. Additionally, parental training was integrated into the protocol to ensure the continuity of the exercises and therapeutic gains at home.

IV. RESULTS

➤ *Quantitative Outcomes*

Table 2 COPM Scores:

Measure	Pre	Post	Improvement
Performance	2/10	6/10	+4 points
Satisfaction	1/10	7/10	+6 points

A change >2 points is considered clinically significant; therefore, improvements are meaningful.

Post-intervention assessment using the Sensory Processing Measure (SPM) revealed notable positive changes. The results indicated a significant improvement in body awareness, a reduced auditory defensiveness, and enhanced vestibular tolerance. Overall, the child demonstrated an increased number of adaptive responses to sensory input following the intervention.

➤ *Behavioural and Functional Outcomes*

Table 3 Observed Changes Across 8 Weeks:

Parameter	Baseline	Post-Intervention
Attention Span	2–3 min	8–10 min
Task Engagement	Poor	Good
Eye Contact	Minimal	Frequent, spontaneous
Transitions	Resistant	Improved
Behavioural Outbursts	5–6/day	2–3/day
Bilateral Coordination	Poor	Noticeably improved

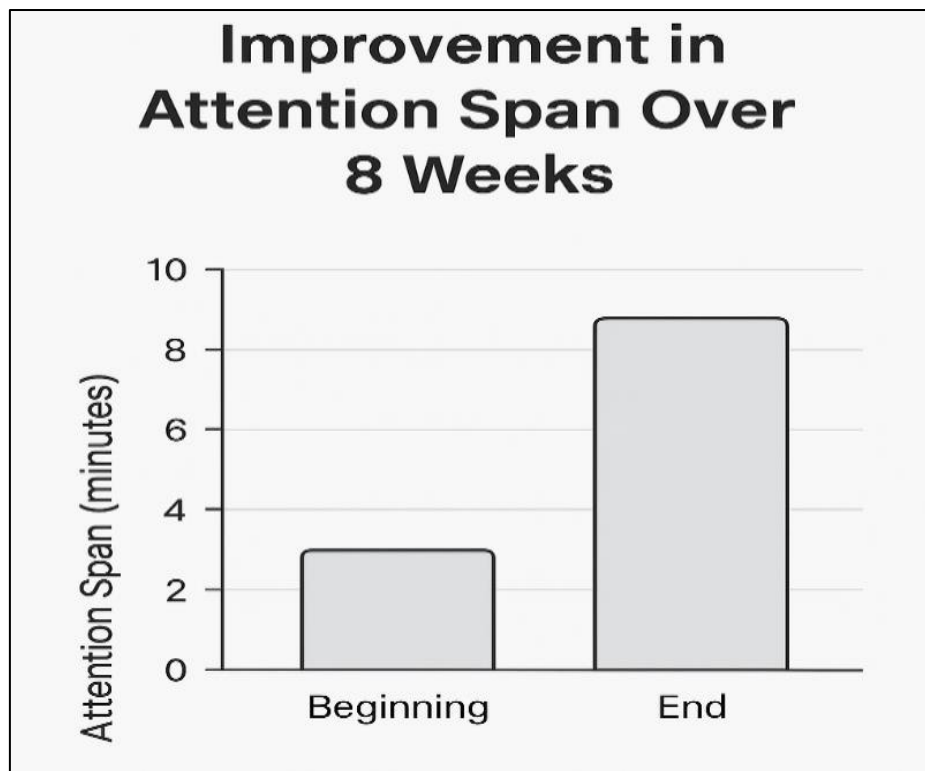


Fig 2 Improvement in Attention Span Over 8 Weeks

Parental feedback confirmed improvements in home routines, engagement, and communication.

useful for addressing the needs of sensory seeking children and those presenting with poor bilateral coordination.

V. DISCUSSION

The overall conclusions of this case study lend strong credence to Brain Gym's therapeutic potential for children with ASD. The observed improvements in sensory modulation and bilateral integration are consistent with the principles of sensorimotor learning, suggesting improved brain organization following the intervention. The study proposes several potential change mechanisms: Cross-Lateral Movements (like Cross Crawl) work to improve midline crossing and interhemispheric integration; Proprioceptive and vestibular stimulation enhance bodily awareness and self-control; Visual-Motor Integration Exercises (such as Double Doodle and Lazy 8s) promote hand-eye coordination, attentiveness, and ocular tracking; and techniques like Hook-Ups and Deep Pressure facilitate relaxation by triggering parasympathetic reactions. While some literature reports conflicting results, the findings of this study align with existing research that points to enhanced behavior and attentiveness (Abdullah et al., 2020), improved control of emotions (Beigel, 2009), and increased preparedness for school (Williams & Shellenberger, 2019), thus supporting the benefits of movement-based interventions in ASD.

VI. CLINICAL IMPLICATIONS

The findings support the conclusion that Brain Gym can be effectively integrated into occupational therapy sessions, serving as a valuable tool. It is particularly effective when used as a preparatory activity to significantly improve a child's readiness for more focused learning tasks. Furthermore, the protocol is especially

VII. LIMITATIONS

The limitations of this study should be acknowledged, primarily that its single-case design inherently limits the generalisability of the findings to the broader ASD population. Furthermore, the absence of a control or comparator intervention makes it difficult to definitively isolate the effects of Brain Gym. It is also important to consider that some observed improvements may partially reflect natural developmental progression. Finally, the reliance on measures that incorporate therapist and parental observations introduces the potential for subjective bias.

VIII. CONCLUSION

A youngster with ASD showed notable gains in attention, behaviour, sensory modulation, and functional ability after participating in Brain Gym activities. The integration of organised movement-based therapies into the practice of paediatric occupational therapy is supported by this case. It is advised to do more controlled studies with bigger sample sizes.

➤ Ethical Considerations

Throughout the study, all ethical standards were strictly maintained. Written informed consent was formally obtained from the child's parent prior to the intervention. Confidentiality was preserved by ensuring that all personal details were anonymized. The intervention itself was deemed to pose minimal risk and adhered rigorously to established occupational therapy practice standards.

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