

Brain Gym: An Emerging Occupational Therapy Practise

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Abstract

Cognitive function is known to be enhanced by exercise. While exercise is obviously important, the setting in which it takes place might be equally crucial. Regardless of age, Brain Gym is a fantastic resource for personal development because it facilitates quick transformations and enhances quality of life. Important benefits of brain gym exercise for the elderly include improved blood flow to the brain and body, less anxiety, balanced equilibrium through vestibular stimulation, improved mental health, and a diminished fight-or-flight response. In order for the body to comprehend the main behaviour and learn to coordinate the brain and entire body, the technique necessitates that the participant communicate through a sequence of activities. There are 26 basic motions in Brain Gym that are thought to enhance perception and stimulate the right hemisphere of the brain through neural re-modelling, allowing for better learning across the board. Behavioural issues, social difficulties, and intellectual burdens can be alleviated by finding ways to balance the two sides of the brain. This review demonstrates that regular Brain Gym training has a positive effect on academic performance. The abilities, which encompass numeracy, literacy, and spelling. Furthermore, this research delves into the numerous approaches taken by Brain Gym exercises and how they function to enhance learning capacities. Therefore, this study sheds light on how Brain Gym exercises improve learning and academic performance and points the way for future studies in this field.

Introduction

Promoted and used with a consistent learning purpose, Brain Gym is an academic kinesiological programme that aims to improve cognitive abilities, memory, and psychological perception. It is an interventional type of study that uses a before-and-after design, and its primary objective is to carry out an evaluation of the psychological perception that occurs after the intervention of brain gym exercise. The educational and psychological training system known as Brain Gym was developed in 1970 with the intention of achieving a particular learning goal at the time of its implementation [1].

In order for the body to comprehend the main behaviour and learn to coordinate the brain and entire body, the technique necessitates that the participant communicate with a sequence of activities [2]. Brain Gym consists of 26 fundamental motions that, according to proponents, enhance perception and promote whole-brain learning by activating different parts of the brain through neural re-modelling. Implications for alleviating social and intellectual challenges, as well as behavioural issues, include finding ways to balance the two hemispheres of the brain [3, 4].

As a component of the accountability movement, schools are being asked to provide interventions that are founded on credible scientific research and that offer measurable outcomes for children. This is a growing demand. There is a popular commercial programme called Brain Gym that asserts that following its routine will result in more effective learning in a way that is almost miraculous [5]. On the other hand, a review of the theoretical foundations of Brain Gym and the research studies associated with it that were subjected to peer review did not provide any evidence to support the claims made by those who promote Brain Gym. Educators are strongly encouraged to become knowledgeable consumers of research and to refrain from implementing programming for which there is neither a credible theoretical nor a sound research basis [6]. Brain Gym literature states that laterality, attention, and centring are the three main dimensions that simplify and define the abstract framework that is used to conceptualise brain activity. The ability to read, write, hear, communicate, walk, and think all depend on laterality, which is the coordination of the right and left sides of the brain. Connected to perception and inattention/hyperactivity is the capacity to focus, the brain's ability to process information. In the last part, "centering," we bring together the rational and emotional sides of our brains in the way that is most effective. People with both short-term and long-term disabilities can benefit from brain gym intervention in many ways, including improved health, social engagement, and quality of life .

According to the creators, engaging in brain gymnastics on a daily basis activates and develops different parts of the brain, especially the cortex, which enables better and more organised communication between the left and right sides of the brain, facilitating higher-level thinking [7]. Kulkarni et al. found that the mechanisms of reading, recoding, and comprehension were improved in a study that detected the effects of brain gym exercise on the attention span of young

students. In addition to helping with reading and writing with one's eyes focused on the same point, these exercises also showed improvements in hand control and eye power.

An analysis by Keith J. Hyatt in 2007 of schoolchildren's reading comprehension, communication, self-esteem, memory, analytical thinking, and creative thinking abilities was concluded with a segment describing Brain Gym exercises [8]. The review aims to provide an insight on the benefits of Brain Gym and its relevance as a occupational therapy for better development of brain.

Brain Gym therapy and its Neurological significance

Brain Gym is a series of exercises that are designed to improve and strengthen cognitive functions in order to facilitate learning. The purpose of these exercises is to connect the mind and the body, to stimulate the use of the cerebral hemispheres through both physical and mental strategies, and to improve and strengthen them. This is a component of the field of Kinesiology, and it is the result of research conducted in the field of Applied Neuroscience, which investigates the movements of the body and how they are related to the functioning of the brain. At the same time, it makes it possible to stimulate and activate the cognitive process of an individual [9].

The programme known as Brain Gym is implemented through a process known as PACE, which is an acronym that stands for positive, active, clear, and energetic. It is a sequence that corresponds to the four essential qualities that are necessary for a student to have in order to experience integrated learning in the brain. The selected exercises are utilised in a fundamental manner to preserve equilibrium in one's daily life, with due regard for rhythm and timing. There are three types of movements that originate from the central line, which divides the body into two equal parts: left–right, anterior–posterior, and up–down. These movements are related to the qualities of being energetic, clear, active, and positive. During the process of applying the exercises of Brain Gym, these movements are based on the dimensions that become the pillar base to the understanding of how learning works [10].

Within the framework of the Brain Gym method, it is presupposed that the brain is capable of being trained and improved through the utilisation of motor exercises. In this sense, the brain is analogous to a muscle that requires exercise in order to function more effectively [11]. The exercises that are part of this method help to improve the connection between the left and right hemispheres of the brain, which ultimately leads to the unlocking of neurons and encourages the learning process as well as the formation of neuronal synapses [12]. Figure 1 depicts the areas affected by brain gym [13]

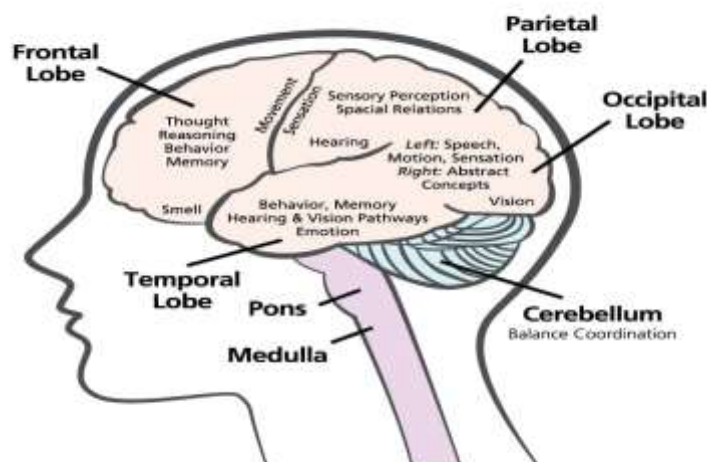


Figure 1: Areas of brain affected by Brain Gym

Fundamentals of Brain Gym

The following five tenets form the basis of the brain gym exercise learning model adapted from Wienni, 2023 [14]:

1. Physical movement can enhance learning capacity and focus by strengthening the connection between the brain and body. This makes movement a crucial component of effective learning.
2. Every person has their own special way of learning. Some people are more visual, some more auditory, and still others more kinesthetic. Brain Gym recognises that every student learns in their own special way and tailors its programmes to suit that.
3. Personalised challenges enhance learning abilities: Brain Gym tailors practical challenges to each user's skill level, enhancing their learning capabilities.

4. Getting people involved: People learn more when they have a hand in shaping their own education.
5. individual variances aid in enhanced learning performance: Brain Gym is cognizant of the fact that people learn at different rates and have different levels of aptitude. Because of this, this learning model includes a variety of activities meant to boost each student's capacity to learn.

Brain Gym for School going children

Ages 10–12 make up the middle stage of children's growth. During this time, the body and nervous system grow and change. The ability to recognise and control one's own emotions, regulate one's mood, inspire oneself, and form and sustain relationships are all developmental milestones that typically occur between the ages of ten and twelve. By the time a child reaches the ages of ten or twelve, they have reached a stage of coordinated physical and motor development. During this stage of development, they exhibit lively motor skills. As a result, this is a great time to hone motor skills like writing, sketching, painting, computing, swimming, and athletics. Along with physical and emotional maturation, children at this age are also able to respond to intellectual stimuli and complete tasks that call for cognitive capacity. An activity that stimulates children's abilities allows them to grow and develop to their full potential [15, 16]. In order to ensure that all students have the opportunity to reach their full academic potential, additional research regarding brain gym should be conducted on a variety of populations, including but not limited to those aged 10–12 and all school-aged children. To improve students' grades, more study on the use of brain gyms in primary schools is necessary [17].

In a study, the Brain Gym would be useful for the research group's experimental group in improving a number of cognitive functions. As an example, research suggests that certain types of exercises can enhance various cognitive abilities, including visual perception, concentration, hearing, problem-solving speed, and motor capacity. The improved performance of the Brain Gym intervention group can be explained by this cognitive difference; this fact encourages us to keep conducting research in support of this technique [18].

Intelligence has a substantial impact on academic performance, according to research conducted by Chandra et.al with 614 students ranging in age from 13 to 17. Children with high IQs outperform their average-IQ peers in the classroom, according to that study [19].

Brain Gym also helps children with social anxiety

Speech eloquence and verbal expression are impaired by stuttering, which involves involuntary airflow. Children with communication issues often have social anxiety at school. Many children with communication deficits are socially inept and prone to social maladjustment, according to reports. This has greatly impacted their thoughts, social behaviour, and emotions. [20]. The results from the above study states that, cognitive behavioural play therapy reduces schoolchildren's social anxiety. Compared to the waitlisted control group, cognitive behavioural play had significant effects on children at different assessment times.

Some people have trouble reading because they have trouble decoding, the process of recognising individual phonemes and their relationships to written words. This condition is known as dyslexia. Anxiety, despair, aggressiveness, and social issues are among the many emotional issues displayed by children with dyslexia. Reading, oral reading, comprehension, memory, and self-esteem are just a few of the many academic domains that could benefit from Brain Gym exercises. Another study of dyslexia treatment using brain gym gave insights on Both the scared-child version and the parent version showed a highly significant difference between the pre- and post-test scores. The scared-parent Version had a mean score of 20.82 (SD=6.487) and a pre-intervention score of 28.5 (SD=8.984), while the scared-child Version had a mean score of 28.5 (SD=8.984) and a post-intervention score of 21.21 (SD=6.822). The p-value for this comparison is less than 0.0001 [21].

Brain Gym benefits for developmental disability in kids

Brain Gym is a time- and energy-intensive programme; therefore, it is critical to confirm its efficacy, particularly for children with developmental disabilities. To aid teachers in making well-informed decisions regarding the use of Brain Gym with this group, Watson conducted a study that provides preliminary evidence. When compared to a baseline (unstructured fine motor activity) and a control (physical activity) intervention, Brain Gym did not significantly improve academic engagement in children with developmental disabilities. Since physical activity in the classroom has been shown to improve students' attention and focus on the task at hand, Brain Gym would have to demonstrate that it is essential by increasing students' academic engagement in ways that go beyond just physical activity [22]. But that wasn't the situation in this research. Interestingly, all three participants in the control condition showed consistently positive trends in academic engagement, whereas only one participant in the Brain Gym group who received only two sessions showed a positive trend. About two months of treatment time was allotted in the study. Brain Gym was done by each participant up to twice weekly, with each movement lasting about 30 seconds. Though more study is needed to determine if longer-term or higher-dose exposure to Brain Gym might have an effect, certain hurdles must be cleared before this can happen. The three individuals in the study failed to demonstrate any enthusiasm for engaging in Brain Gym exercises. On rare occasions, participants resisted engaging in the Brain Gym exercises. Because they may have difficulty following instructions or mimicking models, children with developmental disabilities are at a higher risk of this. Nonetheless, other

outcomes might have resulted from longer durations. Providing a reinforcer for each successful movement (i.e. stickers) could be a motivating solution to this problem [23]. Although Brain Gym has the potential to be an effective intervention on its own, adding reinforcers would significantly alter the intervention and make it impossible to test its efficacy in isolation.

Brain Gym benefits for college going students

Cognitive function, memory, and general brain health can all be enhanced through the practice of brain activation exercises. Playing brain-teasers, crossword puzzles, Sudoku, chess, and engaging in aerobic exercises and yoga on a regular basis can increase blood flow to the brain, which in turn improves cognitive function. Learning something new, whether it's an instrument, a language, or a pastime, is a great way to challenge and excite your brain. The researcher's inspiration for various brain exercises that boost students' cognitive abilities came from this [24]. According to Ratiwi and Pratama (2020), elementary school pupils' ability to focus is greatly improved by using Brain Gym [18]. Brain Gym, according to Anggraini and Dewi (2022), is a form of exercise that involves lightly moving the hands and feet in order to stimulate brain waves. Because the whole brain is involved in learning and concentration, the brain gym's movements can stimulate the brain to help students focus and study more effectively [25]. Improve your memory, multitasking abilities, processing speed, and acuity with visual and auditory stimuli by training at Brain Gym. Brain Gym training is the only way to activate the cognitive process of learning. Evidence suggests that Brain Gym is useful for educational psychology training. Training in educational psychology is effective, according to the experiment. This mode of training improved the student teachers' understanding of psychological concepts compared to the control group. Pedagogy, language in the classroom, teaching and learning, modern India, and other related fields are all reasonable extensions of the observation and inference [26].

Study by assessed the affect of Brain Gym using the DASS-21 scale, the research protocol sought to assess undergraduates' psychological perceptions. We postulated that one's capacity to concentrate and focus would be enhanced. The study's stated goal was to provide evidence that brain gym exercises can alleviate stress and anxiety in students. We decided on the DASS-21 because it provides a comprehensive assessment of a person's mental health and targets issues that today's youth confront, such as stress, anxiety, and depression. Only 149 students met the inclusion criteria and were included in the study. Every day for 30 minutes, for 30 days, they were to perform the following brain gym exercises: marching, cross crawling, positive points, step touching, neck circle, hookup, brain button, thinking cap, lazy eight, trace X. It took longer than 30 minutes on some days due to a small number of students who required counselling beforehand and were unable to concentrate. To finish the study, fifteen more days were needed. In these sessions, the therapist kept a close eye on the patient. Both the pre- and post-treatment scores were calculated using the DASS-21 scale. Participants encountered numerous challenges, including an inability to execute the exercises with correct form and posture [27].

Overall benefits of Brain Gym

Brain gymnastics, according to its creators, activates and develops different regions of the brain, notably the corpus callosum, which facilitates more fluid and flexible contact between the left and right sides of the brain. After all, "activity is necessary for learning" (Hannaford), and the brain is a complicated organ that centres on movement. Neurorehabilitation relies heavily on brain training to lessen the effects of atrophy, lessen the load of white matter lesions, and enhance cognitive function. Due to its improved neural effects on age-related atrophy exacerbated by neuropathology, it is an effective treatment for depression in the elderly. Research has shown that motor learning and skill transfer necessitate increased activity in the motor cortex and activation of regions involved in perceptual processing. To effectively transfer learned motor mechanics in sports, changes within the nervous system are necessary [28]. Whether a person has a temporary or long-term impairment, physical therapy can help improve their health, mobility, social engagement, and overall quality of life. When you combine visual and auditory exercises with kinesthetic and tactile learning strategies, you activate your brain in a way that the right and left sides of your brain work together. Sensory integrity, motor learning, and the brain-body connection are outcomes of brain exercise [29]. Control and decision-making problems have lately attracted more attention to brain-inspired learning. Research has demonstrated that incorporating a mental workout into your routine can improve your metabolism, blood flow, and oxygen levels. Compromised equilibrium, irregular gait habits, and an increased risk of accidents are all associated with diabetic peripheral neuropathy, which includes perception impairment. Brain Gym exercises significantly improve balance and reduce the risk of falls in patients with diabetic neuropathy, according to the studies. Patients with hypertension can benefit from this exercise because it helps them relax, which in turn lowers their blood pressure, increases blood flow, and stimulates brain growth [30]. According to a plethora of research, brain gym is the best non-pharmacological option for geriatric mental health. Deterioration of physiological integrity, a hallmark of ageing, impairs function and increases the risk of many diseases, including cancer, diabetes, heart disease, and neurological disorders [31]. The effectiveness of brain gym training on cognitive performance and fitness levels in elderly patients was examined in a study by José María Cancela et al., who also proposed that brain gym could be a beneficial physical therapy approach for the elderly, as it can positively affect brain functioning. At last, some research has shown that older persons may see a reduction in whole brain and medial temporal lobe atrophy if they increase their

physical activity and fitness levels. This could have a beneficial effect on neuropathologic substrates. There are substantial impacts on cognition and psychological perception, and physiotherapy intervention improves sleep, quality of life, and reduces stress and depression in the elderly. Treatment for neurological dysfunction in children, including autism, ADD/ADHD, dyspraxia, and dyslexia, can benefit greatly from brain gym. Disabilities in social interaction, communication, and behaviour are hallmarks of Autism Spectrum Disorder in children [2]. Brain gym intervention improves quality of life, memory, and concentration power in children with autism spectrum disorder. Additionally, it significantly impacts students who are dealing with stress and depression. Researchers will methodically evaluate performance improvements in each field, even though some work has already begun in these areas. It has been discovered that brain gym exercises are highly effective and convenient for the development of children's brains. Dustin R. Grooms et al. (2018) found that neuronal developmental processes of risk-reducing movement during the transition to sports provide early information that can be used to understand the adaptive mechanisms of neuromotor learning. The enhanced output from the occipital cortex may facilitate the consolidation of motor coordination habits learned through practice and their subsequent transfer to a wide variety of sport-specific activities [12]. Fiction like this lays out the potential neural pathways for neuronal exercise to convey adjustment to sport. Potential initiatives to reduce injury risk-limiting treatments can benefit from this all-encompassing integrative assessment of neuromotor regulation, which spans cognitive mechanisms to neurological performance. The evaluation will zero in on neuronal processes that improve the transfer of procedure adjustments to the sport experience [32, 33].

Conclusion and Discussion

A whole industry has grown up around the idea of "brain-based" learning and similar concepts, which is not new. The integration of recent findings in neuroscience with pedagogical strategies to improve student performance has received a lot of focus. Neuroscience and educational kinesiology are the main tenets of the Brain Gym curriculum. The brain gym uses a series of coordinated, balancing motions that engage the motor and sensory cortices in both sides of the brain. Brain gym exercise is outlined as an important component of physiotherapy in the study. As a result of the "brain-body link" principle, neurons can be trained to process external data in a variety of ways, and they can respond to a "corporate member" of their duty in accordance with specific brain regions that are active during exercise. Brain Gym is utilised in educational systems globally to expedite students' progress towards their goals. Brain Gym is a common tool for employees of varying skill levels in the tech sector to enhance their productivity and efficiency on the job. Athletes also make use of Brain Gym to work on their teamwork and leadership abilities. Brain Gym is an excellent tool for self-improvement because it encourages users to break through mental barriers that may have kept them stuck in the past. Commonly employed for calm and courteous conduct, brain gym training improves children's development via its systematic viewpoint. Improvements in cognitive abilities, motivation, behaviour, perception, self-awareness, concentration, eye-hand coordination, reading and writing proficiency, computation, and confidence are all part of this process. Brain Gym is an excellent resource for self-improvement because it helps people of all ages achieve fast transformations and enhance their quality of life.

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