

2-1-2013

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Recommended Citation

Grosse, Susan J. (2013) "Brain Gym in the Pool," *International Journal of Aquatic Research and Education*: Vol. 7 : No. 1 , Article 7.

DOI: 10.25035/ijare.07.01.07

Available at: <https://scholarworks.bgsu.edu/ijare/vol7/iss1/7>

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Brain Gym in the Pool

Susan J. Grosse

Brain gym is both a concept and a trademark commercial program. Exercising the body can provide numerous benefits to the brain, and exercising the brain can easily be incorporated into aquatics. This article identifies key concepts of brain gym in both contexts. More importantly, this article provides practical information on why and how brain gym activities can be integrated into aquatic programming. For individuals with disabilities, as well as for individuals in regular aquatic instruction and/or exercise programs, brain gym activities have the potential to enrich aquatic experiences. Resources are provided for additional detailed information.

The brain is like a muscle. When you use it, it grows and our mind produces results. As you develop your mental capabilities, you learn things more easily. When you first use a muscle that hasn't been exercised much, it gets sore. But, if you keep doing your exercises, it adapts and gets stronger. This also applies to the brain. (Blyth, 2002, p. 7)

The terminology "brain gym" means different things to different people. For individuals interested in puzzles, brain gym time means working on brain teasers and crosswords (Navigator, 2009). For the dancer working on developing a modern piece based on an ancient fairy tale, brain gym means developing the intellectual story through bodily movement (Van Pelt, 1996). For the physical education teacher, brain gym means integrating cognitive concepts with physical education activities. For the educational kinesiologist, brain gym is a specific program of exercises, trademarked Brain Gym® (Dennison & Dennison, 1986; Hyatt, 2007). For each of these individuals, use of the brain is a key factor. For most of these individuals, physical activity is the second part of the equation. For the aquatic specialist, the concepts underlying brain gym can have very appropriate applications in the aquatic environment (Stein, 2004).

Brain gym is both a generic concept and a trademark commercial program. This duality can be confusing for an aquatic professional. It is important to recognize the similarities as well as differences and be able to select activities from both constructs to enhance applications in regular as well as therapeutic aquatics. Existing brain gym programs differ in the specific physical activities used and the ability to empirically document the beneficial results.

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Brain Gym as a Concept

Brain gym, as a general concept, has come to the fore out of the area of physical education. Striving to bring research justification to the desire for quality daily physical education, researchers looked at the effects of movement, physical activity, and exercise on learning and cognitive development. What they found was more than sufficient justification in support of physical activity contributing to increased attention span, improved focus, better behavior management, and better learning (Blyth, 2002; Hendy, 2000; Lautenschlager et al., 2008). As a concept, brain gym is expressed as a formula: physical activity + brain activity = better cognitive functioning.

The deeper foundation for the practices of brain gym lies in theories of neural plasticity. Researchers have found that if certain key pathways are blocked, the brain uses other pathways to get around them, thus establishing new pathways (Doidge, 2007). In rehabilitation, reestablishing pathways can be accomplished by turning everyday activities into purposeful exercises (Stein, 2004).

When the physical activities included emphasis on cognitive tasks, the research results were even better. Add academic learning to physical tasks and specific academic gains occurred (Doraiswamy, 2010; Hendy, 2000). Increase problem solving, attention to detail, focus on specific parts of a task, and quality of deep practice and even more positive results were evident (Coyle, 2009). Today, physical education means more than learning the game. Quality physical education means brain gym. By extrapolation, if a physical activity performed in the gymnasium can be cognitively beneficial, that same, or similar, activity performed in the pool can also have potential for beneficial results.

Brain Gym as a Trademarked Program

The trademark Brain Gym program began in the 1970s with the work of Paul and Gail Dennison (1986; Brain Gym® International, 2012; Wikipedia, 2009). They believed if a child with a learning disability could repeat or relearn crucial developmental stages he or she would have normally gone through in the course of infant and toddler development, learning problems would be remediated. Therefore, the Dennisons (1986) designed a program of 26 specific exercises. Regular participation in these exercises takes the child through the presumably missed developmental stages and/or provides experiences comparable to those missed. While there is a great deal of scientific research to substantiate implementation of the concept of brain gym in education, there is virtually no scientifically valid research to substantiate the trademark program Brain Gym (Hyatt, 2007; Hyatt, Stephenson, & Darter, 2009). However, within the trademark program are numerous activities and relaxation techniques that can be quite useful and helpful to a variety of individuals with or without explicit validation. Comparisons of the brain gym concept and Brain Gym® as a registered trademark can be further detailed in Table 1.

Brain Gym Implementation

While both brain gym concepts began with work with children, implementation has expanded to all age groups. The idea of improving cognition through structured movement, physical activity, and exercise experiences has meaningful application

Table 1 Brain Gym vs. Brain Gym®

Brain Gym®	Commonalities	Brain Gym
<p>Registered trademark program.</p> <p>Founded by Paul and Gail Dennison with beginning work in the 1970s.</p> <p>Part of the broader area of Educational Kinesiology (Edu-K)</p> <p>Commercial program with teacher training.</p> <p>A program of 26 specific pattern exercises</p> <p>Origins in work with children with disabilities to solve specific learning problems.</p> <p>Repetition of the specific exercises is key to success.</p>	<p>Use of terms—brain for cognitive functioning and gym for organized activities.</p> <p>Precursors to the Dennisons included Kephart (1966), Muska Mosston (1973); Doman and Delacato (1968) among others. Movement and cognition has been studied for centuries.</p> <p>Movement basis in kinesiology.</p> <p>Professional training will enhance implementation.</p> <p>The movement patterns in the 26 exercise program exist in the broader range of activities, as the general concept of brain gym encompasses all motor activity.</p> <p>Both are finding wider usage in a variety of age groups and for a variety of purposes.</p> <p>Activities from the “26” can be included, and will often occur, in the larger group of potential activities.</p>	<p>General concept upon which activity is based.</p> <p>Roots of the value of movement to human growth and development go back centuries, i.e., Turnverein “sound mind in a sound body” (Hoffman, 2007).</p> <p>A broad concept, in and of itself related to how human movement can enhance cognition.</p> <p>Noncommercial program. Training is readily available within the field of physical education and recreation.</p> <p>A wide variety of activities including those using music and dance, as well as large muscle movement exploration and perceptual motor activities.</p> <p>Applied to all individuals, all ages, all abilities.</p> <p>Activities are not repetitive, not limited to a specific “26.” Additional concepts such as iso, entraining, practice patterns, and interval training may be applied.</p>

(continued)

for adults with cognitive delays, traumatic brain injury, cerebral vascular accident, Alzheimer's, and the general effects of aging, to name just a few populations (Mindandbodycoach, 2009; Van Pelt, 1996).

Brain gym activities are implemented through a structure that takes the individual to the limits of his or her present capability and then presents problems the solution to which assists the individual in making the neural connections for future development of knowledge and skills. Repeatedly solving problems in a variety of contexts brings about neurophysiologic changes in the brain (Coyle, 2009; Jensen, 2000). These changes more specifically increase myelin layering, which enhances speed of transmission of electrical impulses, thereby improving brain function.

The concept of increasing myelin layering is fairly new because the ability to view and measure myelin accurately has only been possible in this century (Doidge, 2007). The implications for how individuals learn, as well as how individuals with illness, impairment, and/or disability relearn knowledge and skills, is potentially very significant. Where historically, brain injury and/or lack of cognitive development has been viewed as absolute, now brain function is viewed as much more plastic and variable, with the brain having great untapped capacity for change.

Brain Gym in Aquatics

Implementing brain gym in the aquatic environment is very similar to implementing brain gym, whether brain gym the concept or Brain Gym® activities on land. In both environments, brain gym activities involve the following concepts and tasks.

- Problem solve. Establish a questioning situation rather than a directive one. Ask “Can you?” or “How can you?” (Grosse, 2007)
- Identify critical components of a task. Select the specific parts of a task that an individual finds challenging and build the brain gym activity around those tasks.
- Provide motivation and “ignition” for the activity. Supply the individual with reasoning behind why mastering the challenges and/or increasing practice are important and will lead to achieving established goals.
- Pair physical activity with cognitive engagement (Hendy, 2000). Have each activity include a cognitive challenge as well as a physical one. Count exercises, multiply repetitions, recite while moving, and/or move different body parts in opposing directions.
- Use entrainment. Entrainment is a physical and cognitive trait often associated with perception of music. When a person uses entrainment, he or she moves body parts to the beat of the music (Campbell, 1997; Levitin, 2007; Summa-Chadwick, 2009). Having music readily available during activity capitalizes on music providing a setting for entrainment for establishing a pace,

spacing a gait, repeating an exercise, or otherwise controlling nonrhythmic movement.

- Plan tasks that involve using both sides of the brain at the same time. Move both arms, but in opposite directions at the same time, walk forward while moving arms to the side, or jump up and down while moving arms to the side, alternating with forward and backward.
- Establish midline and cross lateral patterns. Stand and perform figure 8 arm circles that cross the body midline—arms can move in the same direction or opposing directions (Dennison & Dennison, 1996). Stand and perform forward leg kicks diagonally to the side opposite to the standing leg.
- Provide a variety of task challenges at varying levels of difficulty. Change tasks frequently; this challenges the brain. Repeating more difficult challenges often allows for practice and accomplishment.
- Include visual focus points for activities. Give feedback to participants, highlighting areas that need improvement. Quality error correction and repeated practice can improve task mastery and help train the brain (Coyle, 2009).
- Provide progression in a number of task components. Begin with single part tasks and then as mastery increases, gradually add parts to the sequence. Increase speed gradually as quality and control of movement increases.

The chart, Brain Gym Pool Activities, Table 2, lists typical activities that represent brain gym and Brain Gym® applications that can be conducted in the aquatic environment. The column labeled “Target” identifies the general area of development that the activities support.

Conclusion

Combining the potential to generate thicker myelin as well as more neural synapses to increase brain function with activities to take advantage of neural plasticity has great potential for many therapeutic interventions. Utilizing as many different activities as possible, including those of Brain Gym®, may bring greater opportunities to achieving tasks and enhancing development. Particularly in therapeutic aquatics, quality activity means having a wide selection of treatment modalities to select from in order to meet the needs of individual clients. This is particularly true for programming for individuals with some form of cognitive impairment and/or impairment in brain function.

Blending brain gym activities into any aquatic program not only can enhance the learning of the specific aquatic skills in question, but also can contribute to the overall intellectual well-being of the individual. As warm-up activities, breaks from more traditional drill and practice activities, or just for challenging fun, brain gym can enhance any pool activity.

Table 2 Brain Gym Pool Activities

Brain Gym Concept Pool Activity	Brain Gym® Adapted for Pool (Dennison & Dennison, 1986)	Target
Standing/walking reciprocal arm/leg:	Cross Crawl: <ul style="list-style-type: none"> • Poly spot walk w/ fc arms • Imaginary ladder/tree climb • Marching to music 	Reciprocal action of arms and legs moving at same time, engaging both sides of the brain.
• Elbows to knees		
• Hands to toes		
• Any right hand arm to left leg/foot in a reciprocal manner		
Crossing midline:	Rhythmic 8s:	Crossing midline
Body part writing (vary body parts, size of writing, use dominant and non-dominant side.	<ul style="list-style-type: none"> • Ribbon 8s, arms together • Finger tip 8s • 8s with each hand individually • 8s with different body parts 	
Entrainment:	Skip Across:	Engaging both sides of the brain.
Skip or march and focus to music	<ul style="list-style-type: none"> • Skip and reach with opposite arm • Vary visual focus – look at arm that is high 	
Core fitness:	Double Doodle:	Engaging both sides of the brain.
• Hanging on side of pool, using both legs to write and draw.	Air writing with both hands at the same time	
• Breast stroke arms with forward stride.		

(continued)

Table 2 (continued)

Brain Gym Concept Pool Activity	Brain Gym® Adapted for Pool (Dennison & Dennison, 1986)	Target
<p>Core fitness and flexibility: Air writing with glued body parts, using both sides of the body and visual focus on limbs performing the task.</p>	<p>Elephant Lazy 8s: Left arm up and point across room, feet stationary knees bent, head to left upper arm. Use rib cage to move body to point and draw 8 with top of head, holding head, arm, and trunk together. Look past fingers.</p>	<p>Problem solving.</p>
<p>Measured breathing: • Long step on each inhale and each exhale. • Walk and reach up with inhale and around with each exhale. • Walk, reach, breath with music. • Stretch and collapse with each breath on count of 3</p>	<p>Belly breathing: Place hand on abdomen. Exhale old air in short puffs. Take breath and feel abdomen rise like a balloon. Repeat.</p>	<p>Relaxation and breath control</p>
<p>Activity variation/everyday activities: • Movement change of with unexpected change of direction cue. • In water obstacle course with varying movement patterns</p>	<p>Integration of specific activities into pool environment: Any Brain Gym program activity that does not require paper/pencil.</p>	<p>Relationship to functional daily life.</p>

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