

# Brain Fitness

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By Dave Shaw, Chairman  
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It used to be that we thought about human mental and physical capabilities as having their own separate channels. In other words, physical conditioning would improve physical performance and mental conditioning would improve cognitive performance and "never the twain shall meet." Recent scientific studies, however, have shown that these lines *are, indeed*, tightly interwoven. Most of us have now learned that physical training will improve both fitness and sports performance as well as *cognitive function*. But, what is truly revolutionary is the discovery that mental conditioning, or mind training, will also improve physical fitness and sports performance.

Fitness centers and trainers are now seeking programs that double up or even triple up on benefits for member time invested. Such multidimensionality is one of the reasons for the exploding popularity of yoga -- in a single session, practitioners gain strength, flexibility, and stress reduction. Time-sensitive Boomers want this multi-dimensionality because they only want to allocate a minimum amount of time per week in the gym.

## The Final Frontier in Fitness

Mind Training - final frontier in fitness is tying it all together. So how do we make the stronger muscles, the longer endurance, and the better flexibility combine to create better total human performance?

The key, of course, to "tying it all together" is the brain. It is the brain that controls all of these functions in harmony. It is the communication between the brain and the body that determines whether all of this physical training is just for "looks" or whether we can truly improve human performance. It is the trainers' job and the clubs' responsibility to give their clients the opportunity to tie it all to together. This is mind training and it is the final frontier in personal fitness.

## The Importance of Neuron Connections

The connection between brain and body is made possible by neurons, a highway of cells. It's the state of this connection that determines a person's quickness, reaction time and mental acuity. Unfettered, this "highway" will atrophy and become very slow and inefficient. The fact is, as we get older, we push ourselves less and less – both mentally and physically – causing our neurological highway to steadily decay.

Not surprisingly, the antidote to decaying neuron connections is to exercise them. How is this done? In a similar fashion to exercising our muscles. We stress these connections and make them stronger by incorporating highly specific movements that are directly related to associated mental stimuli.

"Free weights, protein shakes and strength coaches have revolutionized training in the last two decades. But that revolution may pale compared to what's coming...weight training changed athletes as we know them, but mind training will change sports as we know them."

- Brad Hatfield, Kinesiology Professor,  
Univ. of Maryland

## The Release of BDNFs

Mind training exercises trigger the release of Brain-Derived Neurotropic Factors (BDNF) that enable one neuron to communicate with another. People who sit for longer than twenty minutes experience a decrease in the flow of BDNFs. Mind training, or any type of learning, has a decreased effectiveness under sedentary conditions. Why are BDNFs important? Well, they have been shown to actually re-grow neurons – something thought to be impossible only a few years ago!

Cognitive processing, such as visual and auditory stimulation, combined with coordinated, related exercise is the key to successfully rebuilding the neurological highway.

*Simply put, being active, in a specific way grows new brain cells.*

## Studies Show Physical Activity Provides Faster Mind Training

In early studies in 1991, William Greenough discovered that rats that exercised in enriched environments had a greater number of synaptic connections than sedentary counterparts. In another study, Dr. Marion Diamond showed that rats in enriched environments had greater density in the cortex and were better problem solvers.

Mind training exercises strengthen key areas of the brain like the basal ganglia, cerebellum, and corpus callosum. Applied to people, these studies suggest that physical activity creates an active, safe environment for learning. Simply put, being active grows new brain cells.

## Integration of Movement is Critical To Mind Training

Over the years, science has proven that the integration of movement combined with mind training greatly improves the cognitive learning process -- more than 40%. So, the concept of mind training itself is not totally new.

## Cross Lateral Movement Organizes Brain Functions

Twisting or lateral movements are particularly important because this type of movement “crosses the midline” and integrates brain hemispheres to enable the brain to organize itself.

When students perform cross lateral activities, blood flow is increased in all parts of the brain making it more alert and energized for stronger, more cohesive learning. Movements that cross the midline unify the cognitive and motor regions of the brain: the cerebellum, basal ganglia, and corpus callosum while stimulating the productions of neurotrophins that increase the number of synaptic connections. Most all of the activities we do in physical education cross the midline and require coordination of body systems for mastery at any level. Daily quality physical education then becomes essential for optimum learning.

## So... How Do You Do Mind Training?

### Enter Makoto

Now there is a new program on the scene that greatly enhances sports and mental performance as well. It's called *Makoto*. It synthesizes all the new advances in the sciences of physiology, kinesiology and sports training. It's an exercise that brings together: stronger muscles, longer endurance and better flexibility, and mental acuity. In short, it provides the multi-dimensionality that health and fitness clubs are seeking.



Makoto is designed to enhance *whole body wellness*. Whole body wellness is more than just physical health and appearance; it is a combination of physical health, emotional health and mental sharpness that results in a dramatic improvement in overall performance and sense of well-being.

### **What Is Makoto?**

Makoto is a triangular arena, 8 feet on each side with towers at each point of the triangle. Each tower has a series of lights and speakers driven by a sophisticated computer program to provide optimal randomness. The player stands in the center of the arena with the objective of hitting the targets as they light up. Because the arena is a triangle and the player can't see all of the targets, the towers will sound with a tone to cue the target's location. The player then turns to the active tower, looks for the light, then moves in to strike it. Listen, look, move, connect....it's kind of like Simon meets Whack-a-Mole.

*“The Makoto sport arena takes a large step towards closing the gap between human potential and human performance. It's a system that engages all the important actions for enhancing youthful living.”*

**- Joseph Brady, University of Denver,  
Gerontology Department**

As players strike the targets, the arena is recording their reaction time between the initial signal and the physical contact (like shutting off your alarm clock). An overall average reaction time is shown at the end of the session, along with the total number of targets that were successfully hit out of the total number of targets presented. Players can track their progress through eleven different speed levels ranging from 3 seconds per target to as fast as 3/4<sup>th</sup> of a second per target.

During a session of Makoto, the player must twist around to face the various towers, as well as move up and down to reach the different levels of targets. Throughout a session the player's body will cross just about every possible plane of movement. These movements, along with the lights and sounds which heighten the senses, are what bring about enhanced physical and mental performance.

When we review and apply the results of the aforementioned various studies on mind training to Makoto, we find that Makoto training helps rebuild the connection between the brain and the body. Its lights and sounds, coupled with the coordinated movements which cross the body's midline, provide the mental stimulation to produce BDNFs, as well as left-right brain integration. Best of all, people enjoy playing Makoto because it's like being in a video game – body and soul.

### **Summing It Up**

With mind training, tremendous results in human performance can be obtained in a very short period of time. Improvement in hand-eye coordination, mental quickness, balance, reaction time and many other aspects of life come with increasing the communication between your brain and your body.

*“I think that Makoto and the whole concept of mental training will revolutionize sports performance training”*

**- Steve Hess, Strength and Conditioning Coach  
The Denver Nuggets**

The fitness centers that adopt these notions sooner rather than later will certainly have a competitive advantage and will also be providing their members a great service.