

## Effects of Coordination Exercises on Brain Activation: A Functional MRI Study

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The purpose of this study was to examine the effects of coordination exercises on brain activation as measured by functional MRI. In this study, we defined coordination exercises as exercises with a greater [degree](#) of complexity and quality, as compared to the control exercises. We hypothesized that coordination tasks evoke more brain activation than control tasks, based on the attributes of coordination exercises requiring adjustment and judgment. Two experiments were designed to study the differences in the effects of brain activation between the coordination exercises and the simpler movements of the control exercises. The first experiment compared brain activation when subjects viewed video images of the coordination exercises with that when they viewed video images of the control exercises. The second experiment compared brain activation when subjects actually performed the coordination exercises with that when they performed the control exercises. These experiments demonstrated that performing and viewing coordination exercises activated the brain activities related to motor control to a much greater degree than those of the control exercises. The results of this study indicate that coordination exercises contribute to the improvement of motor activities and also cognitive control, lending support to claims for the effectiveness of coordination training in medicine as well as in sports.

**Keywords:** [coordination exercises](#), [functional MRI](#), [motor control](#), [brain activation](#)

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One approach to fitness is to maximize brain activity through balance and coordination movements and design exercises that will incorporate and improve your balance, coordination, muscular strength and cardiovascular system.

The muscles are not separate entities flying around. Each muscle has a nerve terminal sending information back and forth to your nervous system. Therefore, it is crucial to design an exercise program where it is going to take into account this powerful system that we have: **The Neuromuscular System**.

When you do a simple movement as shown in the picture, you have over 35 muscles involved in that movement (28 stabilizing your body, core strength) 4 muscles in the upper extremity and 3 muscles in the lower extremity.

In this way, we will be able to guarantee that people can improve their fitness and also their balance, coordination, muscular strength and their cardiovascular system.

## **Your body and the surprise factor**

The human body adapts incredibly well to surprise. I wanted to incorporate the surprise factor in my exercise program. This element of surprise will be fundamental to build new neural pathways among other benefits. My intention is through continuously surprising and teasing the body with new balance and coordination exercises we will stimulate the brain, the muscles and your nervous system altogether. (see [the brain-muscles connection](#)) That surprising effect will lead to a more efficient workout and you will consider your body as a whole unity. This new routine of exercises are structured in four levels that gradually advance.

**Balance and Coordination play a very important part of your brain functioning more than you think. Take a look of the brain activity when you perform a simple balanced and coordinated movement like in the picture below.**

**Speaking with Neurobiologist Professor Dr Martin I was told that not every single movement requires the same brain activity. The more complicated the movement, the more brain activity you will have. "Your system challenges limbs between limbs so that's why you are influencing brain functioning. I consider Dr Martin my mentor and the person responsible for this obsession I have called The Brain and its**

connection to Fitness.

As Dr Martin said, not every single movement requires the same brain activity. In traditional training, think that in performing just one bicep curl, there is one part of the brain activated which is responsible for voluntary movement. In my brain muscle workout system the movement is very precise and requires proper balance, coordination and muscle timing .

Effects on the brain? This movement will activate not only the area of the brain responsible for voluntary movement but also the area responsible for balance and coordination denominated the cerebellum. In addition there is another part of the brain, the basal ganglia that is involved in motor coordinated movements. And remember that the constant changes in the program will trigger the hippocampus, which is responsible for memory and learning of new movements. This constant learning will promote the creation of new neural pathways

Brain Studies The cerebellum, the area associated with movement, has been found to be a "virtual switchboard of cognitive activity" (Jensen 1998, 83). Interesting data: although the cerebellum accounts for only 10% of the brain's volume, it contains more than 50% of its neurons

In addition, the cerebellum is the area of the brain responsible for voluntary physical movement and is connected by neurons to all parts of the cortex. It is also the area of the brain responsible for higher order thinking. Nearly 80 studies have suggested a strong link between the movement and memory, spatial perception, language, attention, emotion, non-verbal cues, and decision-making (Jensen, 1998).

Further reading:

Books:

"The Executive Brain"

"The Singularity is near"

Magazines:

"Discovery magazine, The Brain", June 2007

Websites:

Happy Neuron

[http://www.sciencedaily.com/news/mind\\_brain/](http://www.sciencedaily.com/news/mind_brain/)