

Retrain Your Brain with Exercise

Did you know that your brain is plastic? The brain can change at any age; it can remodel, rewire, and adapt to trauma or a disease process, like Parkinson's Disease (PD). Neuroplasticity is the brain's ability to reorganize itself by forming new nerve connections. This is a life-long process that occurs continually as you learn new behaviors, memorize new data, and as your brain develops. It is a way for your brain to fine-tune itself for efficiency by modifying existing nerve pathways in the brain.

Brain reorganization and repair takes place by mechanisms such as "axonal sprouting" in which undamaged nerve networks grow new nerve endings to reconnect neurons whose links were damaged. This "rewiring" of the brain helps define new nerve pathways to accomplish lost functions. What does this mean for people with PD? Dopamine depletion occurring in PD leads to a loss of habitual learning and loss of automatic motor control. It appears that the brain can repair itself and these behaviors may be relearned!

Research is showing that exercise enhances this process of neuroplasticity. Exercise promotes increased blood flow to the brain and the upregulation, or increased production of a brain chemical called BDNF, Brain Derived Neurotrophic Factor. BDNF is a growth factor that acts like "Miracle Gro" for the brain and may slow the progression or even reverse symptoms by improving the efficiency of dopamine. It acts to protect the brain from further degeneration. The concentration of BDNF in blood increases in proportion to the intensity of the exercise. So make your workout vigorous to get the most bang for your buck. Additionally, exercise strengthens the immune system which may also play a role in managing this disease.

But plan on sweating a little bit each day. The best kind of exercise to change the way your brain functions is rigorous, intense (heart rate elevation/become slightly breathless) and goal directed. In other words, practice your weakness. If you have trouble walking, practice perfect walking. Trouble with getting in and out of bed? Practice getting in and out of bed in the middle of the day, when you really don't need to get into bed. As an Olympic athlete practices his sport with perfect form, repeat perfect movement over and over and your brain will relearn it.

What is the best time for the brain to relearn? It is immediately after a short burst of aerobic activity. So get those heart rates up (with your doctor's permission)! It is proven that one single bout of aerobic exercise promotes the perfect brain environment for optimal relearning / neuroplasticity. So if you struggle with getting in and out of the car, get your heartrate up for about 2 minutes. Use 30 second intervals of jumping in place, running, biking or fast squats, followed by 15 seconds rest; repeat for 2 minutes. After you catch your breath, practice getting in and out of the car 5 times. This is a very "sticky" time for your brain to rewire because BDNF concentration stays high for about 2 minutes after the exercise interval. The brain's ability to repair itself with exercise and potentially improve PD symptoms is called "neurorestoration". There is compelling evidence in the animal research model that proves this and human research is not far behind.

Bottom line is that to promote optimum brain changes, your exercise agenda must follow this recipe:

- Make it **intense** with episodes of aerobic activity when you become slightly breathless. This promotes increased “Miracle Gro” in the brain for use in growing new synapses.
- Be **specific** to the task you are trying to relearn, practice what you want to get good at. Stay engaged and make your practice perfect. Repeat good movement over and over so that your brain relearns it.
- Daily is better. This exercise must be **ongoing** and regular for it to be meaningful. This is the best chance for regaining automatic behaviors such as upright posture, heel strike walking and rotation.
- Choose activities that are **difficult** for you, with **complex** activities using multi-tasking skills. Experiment with group exercise that makes you think, and is hard for you to master.

In our Delay the Disease group classes, we practice a pattern of core work, cardio intervals, and Parkinson’s specific “brain work” exercises. We get heart rates up frequently during our class for short intervals, then practice a PD-specific activity such as perfect walking with 10 big loud steps, handwriting, or getting up and down from the floor. We use the agility ladder as a complex multi-tasking activity using controlled foot patterns combined with voice and arm movements. Our Delay the Disease participants find a source of camaraderie, optimism and hope in every class. Our research study published in 2014 proved that our classes remarkably improved depression. Oh, and at the same time we are fighting PD and gaining independence and confidence. If you have PD, please join one of our classes. Follow us at www.delaythedisease.com or on Facebook.

References

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