

THE BENEFIT OF A HEALTHY LIFESTYLE ON THE NERVOUS SYSTEM.

Our focus today is to discuss how diet, exercise and the healthy lifestyle in general all have a massive influence on the health and functioning of the nervous system.

The nervous system is generally broken into two divisions - the Central Nervous System (CNS), being the brain and spinal cord, and the Peripheral Nervous System (PNS), being all other nerves that branch from the spinal cord to the rest of the body. Together, these divisions process information from our environment to help us make sense of our world. It does this through sensory receptors, which we know as our five senses, and through perception, which is our thinking and interpretation of stimuli from these senses. It is considered so vital because it controls, consciously or unconsciously, all the other systems via the brain, spinal cord and nerves.



Balance and Coordination

What most people don't realise is the complexity of our senses. It is often thought that sight, sound, taste, smell and touch are the only sense receptors and are pretty simple matters. What is not always understood is that firstly, there are many other senses, such as those for pain, temperature, balance, and proprioception, and that each of these has an intricate communication network between the brain and body that flows back and forth to be able to understand and function in the world around us.

Let's take sight for instance. Our eyes might take in light signals from an obstacle in our path, send them to the brain via the optical nerve, our brain then makes its own interpretation of what that light stimulus is, or means, and then sends a responsive message down the respective nerves and muscles to produce the required movement to side-step the danger. Most of which is unconscious in a reflexive movement.

Earlier, I mentioned the sense of balance. This refers to the awareness of the body's movement, acceleration and position relative to the outside world. Even if you were blind you could still tell if you were upside down!

Proprioception, on the other hand, coming from the Latin word '*proprius*' meaning 'ones own' and '*perception*', is the kinaesthetic sense that provides information on the relative position of the parts of the body. For example, you can probably quite easily close your eyes and touch the tip of your nose with the tip of your finger and not lose awareness of where the hand is even though you can't see it, touch it, etc.

There are specific types of proprioceptors in our muscles and tendons that indicate how stretched or tense a muscle is and can cause a reflexive response to contract certain muscles based on the perceived need. That is why you can stand on one leg with your eyes shut and the minor tremors in your foot keep you balanced. The proprioception in the foot and ankle FEELS for changes in muscle length and tension to signal to then signal to the brain that you're falling one way or another and reflexively fires a response to the muscles to pull you back in alignment. That is, if you train correctly for good balance. Otherwise you end off like many of the elderly that suffer fractures and falls from insufficient balance and strength.

So we know there is an intricate interplay between these sensory nerves that run TO the CNS from the sensors in the skin/muscles/eyes etc, and the effector nerves, those that run FROM the CNS to the effecting organ/muscle. Therefore, when we exercise or are regularly active it is literally practicing movement and this promotes a more 'in-tune' communication between the sensory input and the muscles. There are also more and better receptors which means better balance, coordination, easier movement patterns and ultimately less falls and breakages.

Stress and Fatigue

CNS fatigue is a common problem in this day and age and can sometimes be a result of chronic stress, rampant in our society today. Many do not realise that fatigue is not just something that only comes from lengthy activity, or muscle fatigue, or lack of sleep. It is also a condition that can almost wipe a person out if their nervous system is on full throttle, like stress or intense workloads, for long periods of time without reprieve.

Essentially, stress is a response to a perceived situation that leads to the 'Sympathetic' response in the nervous system. We commonly know of this mode of neural function as 'Fight or Flight', where adrenalin and peripheral blood flow dominate, readying you to respond physically to a threatening situation. The opposite of this is the 'Parasympathetic' mode of nervous function which is when our mind and body are in a state most conducive to resting, recuperating, eating, sleeping and higher brain function (rather than impulse thinking), as blood is no longer primarily in the arms and legs but in the gut and cerebral areas.

One of the great reasons why exercise is fantastic for helping with stress is due to the contrastive effect that it has on physical tension. To explain further, when we experience long-term tension or stress that is slightly above normal levels, which is all that is required for one to feel 'stressed out', a great way to dissipate this is to massively crank up the tension for a short period of time. It's a bit like raising your heart rate and blood pressure periodically to improve fitness which eventually results in lowering them in the end. Likewise, elevating tension and physical energy periodically through exercise results in a contrastive relaxation at the conclusion of the bout that, in comparison, feels like 'letting go' to the body and mind.

Using exercise as a stress relief and change of state is important for the health of the body and mind. Keep in mind though, if one were to exercise intensely and go back to a stressed job or 'worked-up' state for the rest of the week they are probably doing more harm than good. We MUST have the cycling between the 'turned on' mode of Sympathetic function and the 'turned off' mode of Parasympathetic recovery.

Cognitive function and psychological pathology

The brain is the master commander of this system and the brain needs plenty of glucose and oxygen from constant, healthy blood flow. When we improve blood circulation through movement and activity we help provide more glucose, nutrients and oxygen to the brain. Sufficient glucose is so important for logical reasoning, impulse control and concentration, for without sufficient levels the cortex of the brain responsible for these higher functions reverts back to our primitive 'quench-my-desire-at-all-cost' impulsive behaviour.

It is also considered that one of the reasons why the elderly tend to suffer some decrease in cognitive function is in part due to a reduction in blood flow to the brain.

Studies show activity improves memory, decreases Alzheimer's, and improves learning ability, concentration and abstract reasoning. In many cases exercise has shown significantly better

improvements than even medication in the higher mental processes that involve planning, organization, and the ability to mentally juggle different intellectual tasks at the same time.

There is an old saying – “use it or lose it!” It applies to almost all contexts, including habits, character, skill-sets, muscles, nerves, emotions – you name it! And of course it also applies to the brain, both in cognitive function as well as physically, losing neural connections and physical brain matter when there is insufficient stimulus to sustain it.

Movement itself requires large amounts of cognitive function especially from the regions of the brain responsible for coordination and movement. The more complex the movement the more cognitive function is required to coordinate the interplay between sensory information (balance, proprioception, position, etc) and muscle recruitment at the right time with the right force.

Exercises that involve large body movements and many joints like sport, dancing or functional exercises, for example, are fantastic for promoting extra stimulus to the brain and hence better cognitive function and even better health.

Do you know how many neural stimuli, number of muscles and muscle contractions are involved in simply putting your food-laden fork into your mouth? It's certainly more than I could possibly detail. Now imagine standing on one leg while pressing a light dumbbell 45 degrees out to the side above your head while squatting on that one leg and trying to touch the floor with the other hand. Your brain is going CRAZY! This is great for maintaining cognitive function. 'Use it, and you will actually GAIN it!'

Depression

Depression is another rampant disease today. It effects a growing population of people and an even larger un-diagnosed populace. There has always been evidence that exercise helps with mood and depression, but even more evidence is continually appearing proving that exercise, nutrition, quality sleep and a healthy lifestyle all play a gigantic role in radically improving physiological state, emotions, depression and general mood. In fact, a study done at Duke University Medical Centre found that an aerobic exercise program decreased depression and improved the cognitive abilities of middle-aged and elderly men and women just as effectively as the leading medication.

The nervous system is powerful and absolutely vital. A well functioning one is essential to maintaining good health and longevity.

Train your system, train it well. It will certainly pay off in the end!

Luke Dimasi, 2010

For tips and advice on how you can most effectively incorporate functional training for best neural effect contact Conan Fitness at www.conanfitness.com