

Core training and its relevance for sport

In this article, we will attempt to educate the reader about the fundamentals of Core and body control and its relevance to athletic performance.

In recent years, a great deal has been written about Core training but many athletes that I work with still seem to struggle to see the importance of fully integrating Core training into their weekly training routine. If an athlete's daily training is strictly overseen by a club or Strength and Conditioning professional, the individual is often "made" to do these sessions, however reluctant they may be. Often you will find that an athlete that has previously been injured will have a totally different approach to Core training as they know only too well the risks for neglecting such a vital component of the overall training package.

When I work with an athlete, I always explain what I am asking the person to do and more importantly, WHY! It is vital that the athlete understands why he or she is being asked to perform a task if they are to "buy into" the training. It is also this educating of the athlete that will promote adherence to the training program and any subsequent success.

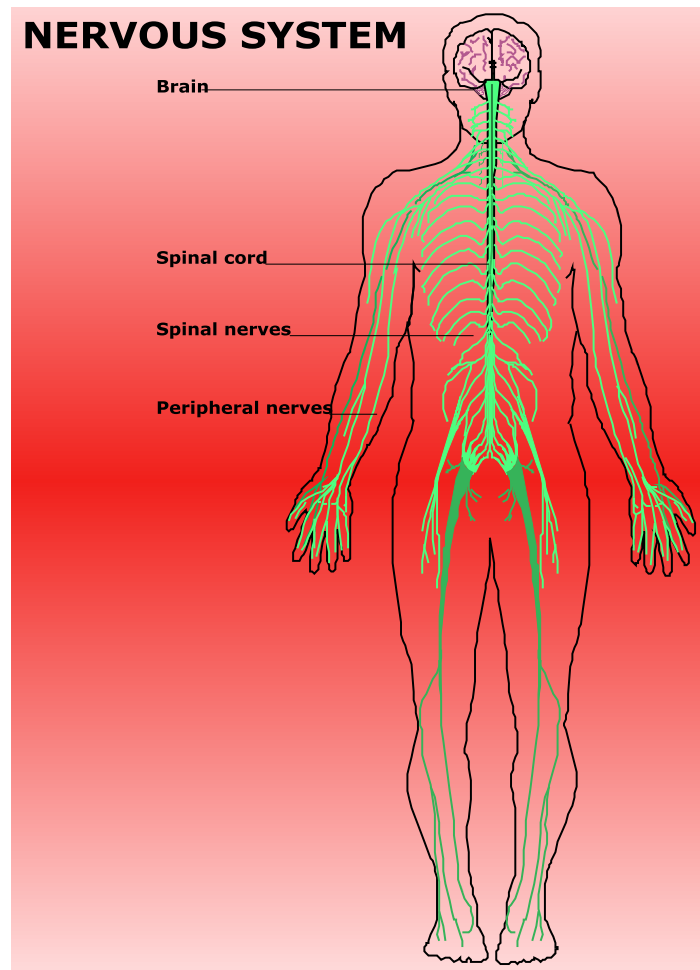
In order to understand how movement is achieved and regulated by the body we first need to take a look at the Nervous System.

The Nervous system is one of the three elements that make up the kinetic chain and also its controlling element. Not only does it allow us to learn and store movement patterns, it also monitors our environment and our reaction to it whilst regulating and monitoring the functioning of the body.

The Nervous system does much more than simply allowing us to learn movements and make improvisations to suit the task at hand. It is the body's "control centre" and as such is constantly assessing data through the senses and nerves in order to control the body and react accordingly to internal and external stimuli.

A simple example of this is that if we went out into the snow in a T-shirt, our body would assess that we were cold through our temperature receptors known as, "Thermoreceptors". This information would be relayed back, assessed and the correct response activated, e.g. we would start to shiver and then seek extra warmth.

Sportspeople rely heavily on sensory feedback to tell us if we are in pain, if our muscles are being stretched too far or how fast/powerful a movement should be performed.



Structure of the nervous system

The Nervous system can be thought of as the:

Central nervous system (CNS)

Brain and the Spinal cord

The brain is made up of two main hemispheres which are the Cerebrum and Cerebellum. It is the Cerebellum that controls the skeletal muscle; stores learnt skills and controls balance.

The Hypothalamus is a part of the brain that regulates the pituitary gland and in turn, this regulates and controls the Endocrine system.

The spinal cord is the communication link to and from the brain. It acts on commands from the brain to achieve movement and also receives and responds to information from the Peripheral Nervous system.

The Spinal cord is rather like a Platoon of troops. Whilst it is ultimately controlled by the General, it can also react to threats effectively without first seeking orders.

Peripheral nervous system (PNS)

Whilst the functions of the PNS are vast, as sportspeople we are primarily interested with the elements that enable us to learn and perform our techniques, movements and apply them as necessary. We are therefore chiefly concerned about coordinating our muscles whilst receiving feedback from our sensory receptors to allow adjustments to be made.

In the interest of simplicity, we will concentrate on the motor and sensory nerves that are employed to achieve or regulate movement.

Sensory receptors are located all over the body and are constantly sending feedback to the spinal cord and brain via the dorsal or posterior horn. When practicing movement, the receptors could be telling us if we are experiencing pain/pressure, if we are hot/cold, if our joints are experiencing dangerous force or if our muscles are being stretched too far or fast.

Motor nerves exit the anterior or front portion of the spinal cord and transmit commands from the CNS to various structures in order to participate movement.

As previously mentioned, if an immediate threat is detected e.g. a scold, the spinal cord can by-pass the brain to facilitate movement.

Movement and Movement patterns

In my role as a Strength and Conditioning Coach I often tell athletes that I prefer to see myself as a “Movement Specialist”. There is movement in all sports and it is efficiency of movement that ultimately wins medals! As a sports person your chief concern should be performing movement with the strictest of discipline anything less will dictate that you are performing in an inefficient way where the consequences could range from an individual poor performance to eventual injury. It is also important to remember that it takes around 500 repetitions for the body to learn a movement, if however this movement is learnt incorrectly, it takes around 5000 repetitions to unlearn the movement and learn it correctly.

To be ignorant of motion is to be ignorant of nature

Aristotle

Our Brains’ start to learn and store movement patterns from our earliest days. As we grow and require our body to perform more complicated movements, our Brain draws out a movement pattern that is similar to the required task and then sets about customizing it through repetition and Neural feedback. It is at the point that attention to detail is critical to avoid learning an incorrect or incomplete movement pattern.

An example of this might be learning the squat. We have been getting in and out of chairs from an early age so our body understands the Squat pattern well. However, when we perform the Back Squat, we have to resist an external force in the form of a Barbell. This in turn could potentially force our body into a compromised position by altering our centre of gravity. We therefore need to make small adjustments to the pattern to perform the task in hand.

Other factors also limit our ability to perform a movement efficiently, but the two I frequently come across are poor or reduced flexibility whether as a result of an injury or as a result of poor posture and “adaptive shortening”.

We have already seen how our body is continually taking feedback from our environment and the stresses that we place upon ourselves and it is therefore important that we “feed” our CNS with good quality movement in order to become efficient. The first thing that we can do for ourselves here is to ensure that we maintain a good posture and continually assess ourselves to ensure that we are achieving it. I often to ask my athletes to check their posture every time they send a text message to a friend. It does not matter what our trigger is as long as we do it frequently.

If we do a job that requires us to spend long hours sat at a desk or driving a car it becomes more important to give our bodies positive neural feedback in the form of stretching and or quality movement whenever the chance presents itself. Our body is always trying to attain a level of homeostasis and therefore it will only become efficient in the movements that you require it to do. The body will seek to adapt to the stresses that is being asked of it, nothing more, nothing less. It is therefore probable to assume that if you spend the bulk of your week in a seated position, your muscles will adapt to that position and ultimately shorten accordingly. This will obviously have implications should this same person then attempt to throw a javelin or perform a triple jump!



Fig 1: Good posture



Fig 2: Poor posture

In instances where people have a limited range of movement for whatever reason, the body will seek to compensate for a lack of range in one area by jeopardising the strength and integrity of another in order to achieve the required task. Left uncorrected, the likelihood of injury increases over time.

Posture and Core control should therefore be seen as one of the single most important factors of an athletes training. The Core transfers generated power from one area of the body to the other and therefore if you cannot control it, you cannot harness it. As

Vern Gambetta 2007 states:

“Rooted in the feet, powered by the core, reflected by the arms, manifested in the hands.”

To put it quite simply, if you cannot control your core, you are leaking power and your performance will suffer as a result. As a coach, I would never ask someone to perform complicated lifting exercises until they can stabilise and move their body efficiently. To do anything other would be to compromise the athlete’s future ability in the same way as “painting over rust.” All performance must be built on a foundation of efficient and strong movement.