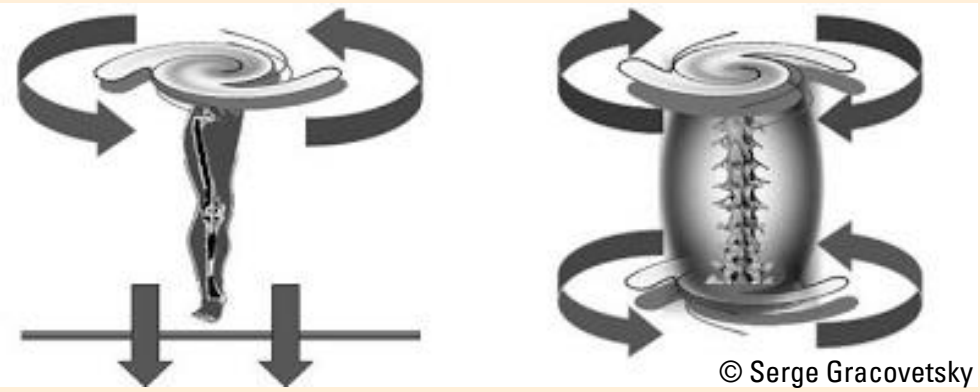
The Spinal Engine

An important cog in the E2 wheel



A theory was first posited in 1987 by Farfan and Gracovetsky that a lordotic posture allows the most efficient use of the body and optimum control. Subsequent experiments showed that the degree of lordosis is subconsciously adjusted during movement to minimise the expenditure of energy. Later, Gracovetsky also discovered that oscillations in lordosis serve another very important purpose, namely to power locomotion. This runs counter to the dominant view of the spine as passive 'passenger' with the legs as the engine. Moreover, a limbless volunteer has demonstrated that the legs are not even needed for locomotion. It is now clear that the legs evolved to improve - not replace - the spinal 'engine room' and serve to express forces generated by rotations in the spine.

As well as fully corroborating this theory, E2 methods readily demonstrate that in order to make use of the full potential of the spinal engine in locomotion, the nature of the interaction with gravity must be changed from the conventional 'push off' method of propulsion to a 'pull on'. Although a seemingly radical notion, this is the method that we all used as toddlers to walk, but subsequently unlearned.

In direct contrast to the explosive ‘push off’ method, the ‘pull on’ approach to propulsion makes use of implosion. It is made possible by generating and balancing equal and opposite forces based on an ingenious mechanism that converts downward pull on the weight bearing side of the body into axial torque and subsequently generates a powerful counter up-lift on the other side.

The reciprocal interaction outlined above is facilitated by largely substituting external displacement (i.e. vertical oscillation) for an internal displacement, made possible by generating unbroken chains of relaxation that create a phenomenal suction and a supranormal, powerful contraction of the diaphragm. The resulting pressure gradient enables a substantial internal energy transfer, creating a supranormal downward pull that can be readily converted into axial torque via reciprocal external-internal rotations in the hip, shoulders and spinal vertebrae. This mechanism also allows the powerful implosive forces of gravity to act in order to store and release the required energy internally.

The aforementioned powerful contraction of the diaphragm is instrumental in creating an increased lordosis of the spine. This in turn drives the counter-rotational swinging motions between the hip and shoulder that enable sufficient loading of the spring-like mechanisms of the lumbodorsal fascia. Overall these fascia can be described as operating like a bowstring, whose viscoelastic properties are made possible through the constituent materials collagen and elastin. This mechanism was ‘discovered’ by researchers from the University of Ulm in Germany, during the course of their excellent research into Zambian load-carrying women and represents another important cog in the E2 wheel.