Allen Chiropractic
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Clinical Secrets

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Dr Michael D. Allen is a healthcare leader as both a Doctor of Naturopathic Medicine (NMD) and Doctor of Chiropractic (DC), with certified specialties in functional neurology and applied kinesiology.

Internationally recognized and with 37 years of clinical experience, Dr. Allen has frequently lectured on four different continents. He has authored several books and professional papers dealing with uniquely human movement patterns and their autonomic concomitants, pain management, and learning issues.

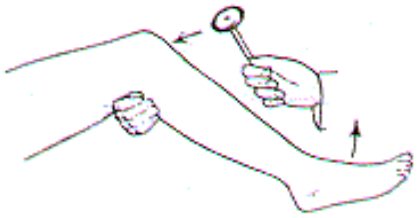
Dr. Allen has served the International College of Applied Kinesiology (ICAK) as the Vice-President and Secretary of the American Chapter, as President, Vice-President and Member-at-Large of the International Council, and as the Neurology Consultant to the International Board of Examiners, overseeing 18 chapters worldwide.

He is the President of the brain-based healthcare facility known as Allen Chiropractic, PC, and Founder of its educational division called, HealthBuilderS©, both being in Orange County, California.

Receptor Based Solutions™ for Your DTRs

Functional Display of the Deep Tendon Reflex

Striking a tendon has an almost instant display. A quick stretch to the patellar tendon, for example, should register with an involuntary jerk of the knee; the foot kicks. This "knee jerk" deep tendon reflex (DTR) test is a common part of even the most basic neurological exam. It assesses the functional integrity of the central and peripheral pathways.



In the human nervous system, that knee jerk reflex happens in an arc that goes from the patellar tendon to the spinal cord, then back to the muscle—the quadriceps.

The DTRs can be upgraded, as during repetitive activities like practicing a movement, or when linked with autonomic responses related to conditioning. And they can be functionally altered by the same the same mechanisms.

Fundamental: Tapping the patellar tendon should cause the foot to kick one time and extinguish after that. Coupled with the kick is an increased blood supply to the muscle because it is doing work. This demonstrates a coordinated segmental response between the DTR and the autonomic system.

Deep tendon reflexes should not only demonstrate the characteristic muscle response but also be accompanied by an autonomic concomitant. Sometimes the two are not concurrent and that's troubling.

Case Study: Matthew (20yo) was having right knee pain, so we examined it with manual muscle testing. Tapping the left patellar tendon caused functional facilitation of that rectus femoris. Tapping the right patellar tendon caused a functional inhibition of that muscle.

Discussion: The left rectus femoris demonstrated the classic kick response, but it appeared that the right rectus femoris could not meet the demands of manual muscle testing. In theory, the right reflex arc could not update fast enough, and the anticipated functional facilitation response expired somewhere between the input, the cord and the effector—e.g., the muscle.

While there are many possible explanations for this dysfunction, the gist comes down to timing. Just because the reflex arc is drawn a certain way in a book does not mean that it will work like that every time. There must be some allowance for functional interference and its correction.

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Treatment: In this case, we adjusted Matthew's right foot and his right rectus femoris was immediately able to meet the demands of manual muscle testing.

Summary: This erroneous DTR display is important because it suggests that there was some functional mismatch in Matthew's nervous system, perhaps related to that cord segment. That confusion could have been anywhere from his brain to his foot, but in this case it was the foot.

Mechanism

Striking the patellar tendon with a reflex hammer—the quadriceps tendon of insertion—gives a quick stretch to the quadriceps tendon. This stimulates stretch sensory receptors (i.e., the muscle spindles) that trigger an afferent impulse in a sensory nerve fiber of the femoral nerve leading to the lumbar spinal cord. There, the sensory neuron synapses directly—monosynaptically—with a motor neuron that conducts an efferent impulse to the quadriceps femoris muscle, triggering contraction. This contraction, when coordinated with the relaxation of the antagonistic flexor hamstring muscle causes the leg to kick. It has been thought that this type of reflex helps maintain the upright posture.

The patellar reflex is a clinical and classic example of the monosynaptic reflex arc. There is no interneuron in the pathway leading to extension of the quadriceps muscle. Instead the bipolar sensory neuron synapses directly on a motor neuron in the spinal cord. However, there *is* an inhibitory interneuron used to relax the antagonistic hamstring muscle.

Purpose

The patellar tendon reflex tests the function of the femoral nerve and spinal cord segments L2-L4.

The absence or decrease of this reflex is known as Westphal's sign (the clinical correlate of the absence or decrease of patellar reflex or knee jerk). Patellar reflex or knee jerk is a kind of deep or stretch reflex where an application of a stimulus to the patellar tendon such as strike by a solid object or hammer caused the leg to extend due to such stimulus causes the quadriceps femoris muscle to stretch.

Associated Conditions

Westphal's sign is a characteristic finding in tabes dorsalis, a type of neuro-syphilis. It has other clinical significance used in determining neurodisorders or diseases such as receptor damage, peripheral nerve disease, involving the dorsal (sensory) columns of the spinal cord and cerebellar lesions, lesions present within the motor cortex of the brain or the pyramidal tracts, which it combined with muscular spasms, or complete interruption of sensory and/or motor impulse transmission in the femoral nerve.

Clinical Significance

The absence of knee jerk is not unusual in the clinical setting with no indications of other hard pathological signs. In this case, consider that the central integrative state of the system has changed from neutral where the facilitatory and inhibitory stimuli are balanced, to one of conditional inhibition. In essence, the segmental functions of the cord have been driven away from that which is normal.