



MICHAEL D. ALLEN, DC, NMD – FUNCTIONAL NEUROLOGIST

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.

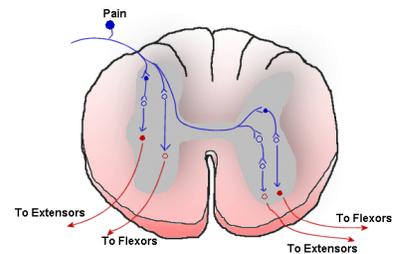
Dr. Allen has served the International College of Applied Kinesiology (ICAK) as the Vice-President and Secretary of the American Chapter, as President, Vice-President and Member-at-Large of the International Council, and as the Neurology Consultant to the International Board of Examiners, overseeing 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 the Crossed Extensor Reflex
The Importance of Reciprocity to Human Performance

The Crossed Extensor Reflex (CER; also known as the crossed cord reflex) is a protective response that apparently begins at about the 28th week of gestation and is functionally integrated one to two month after delivery. It is functionally significant in reciprocal muscle actions. Its dysfunction can interfere with activities like running and kicking, and other functional events.

Of the cord's 12 responses to a primary afferent, eight of them have to do with muscles. That means that more than half of the cord responses to incoming signals have to do with muscle function.



The CER response is like both the deep tendon reflex and flexor withdrawal response (FWR). Where the deep tendon reflex to the patellar tendon, for example, causes contraction of the rectus femoris, the CER inhibits the ipsilateral hamstring.

While both the CER and FWR are protective, the CER generates the reciprocal activity of the FWR. Where stroking the sole of one foot with a sharp object causes the physiological withdrawal of the foot from the stimulus, the reciprocal response causes physiological extension of the contralateral leg. That is, the stimulus causes a functional facilitation of the ipsilateral rectus femoris; it also causes a functional inhibition of the ipsilateral hamstrings and contralateral rectus femoris, with a simultaneous functional facilitation of the contralateral hamstrings.

The Crossed Extensor Reflex is a reciprocal response, generally considered protective. It is related to both the deep tendon and flexor withdrawal reflexes.

Case Study: Adam (23yo) was having some shooting pain down the back of his left leg that ended short of his gluteal fold on the same side. It happened whenever he stepped wrong on his left foot, often turning his ankle.

Findings: We performed the usual neurological examination. Stroking the sole of Adam's right foot with a sharp object caused the appropriate functional response both ipsilaterally and contralaterally. Conversely, stroking the sole of his left foot with a sharp object caused functional facilitation of his ipsilateral rectus femoris and hamstrings, with a concomitant functional facilitation of the hamstrings and functional inhibition of the rectus femoris, contralaterally.

Treatment: In this case, manipulation of the left talocalcaneal joint reset Adam's dysfunctional CER and his pain immediately ceased. A recheck of the CER showed its response to be as anticipated, bilaterally.

Discussion: It appears that while the left rectus femoris, and the right rectus femoris and hamstrings were responding as expected, the left hamstrings displayed an inappropriate facilitation. This could have led to the dysfunctional pulling of the hamstrings from the ischium leading to Adam's experience of pain.

A good example of the protective nature of the CER is when a person steps on a nail. Staying consistent with the above example, consider it was the person's left foot. The pain-filled left foot immediately pulls away from the noxious stimulus while the right leg takes the weight of the whole body.

Here is what happens: The nociception causes physiological facilitation of the ipsilateral proximal rectus femoris while that same side proximal hamstring gets physiologically inhibited. Simultaneously, the ipsilateral distal rectus femoris physiologically inhibits while the distal hamstring physiologically facilitates, causing the left lower extremity to flex at the hip and knee. Meanwhile, the right proximal hamstrings physiologically facilitates at the hip and physiologically inhibits at the knee while that same side rectus femoris physiologically facilitates at its distal aspect and physiologically inhibits at its proximal aspect thereby causing the right lower extremity to become like a compliant pillar to resist gravity.

Another example is touching a hot stove with the hand. The burned hand violently pulls back while the other hand extends to push away from the stimulus. On the affected side, the arm physiologically flexes at the shoulder and elbow while on the other side the reciprocal happens: there is physiological extension at the shoulder and elbow. Further, the protection also involves the lower extremities causing a step backward with the leg ipsilateral to the stimulus.

Summary: Adam's functional neurological response to the repetitive nociception revealed an excellent example of how a dysfunctional FWR generates a concomitant CER that may or may not be pathological. In this case, the FWR display contralateral to stroking the right foot was appropriate, the pathological response remaining within the left lower extremity when stroked ipsilaterally.

With each step, the subluxation reduced the primary afferents from the left ankle leading to an inability to inhibit the nociceptive reflexogenic afferents in the dorsal cord, leading to his perception of pain in the area of the ipsilateral proximal hamstring.

For more information about Dr. Allen's two books—*What Your Brain Might Say if It Could Speak* and *Receptor Based Solutions™; Functional Neurology Every Doctor Should Know*—go to www.receptorbasedsolutions.com.



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