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Using the deep tendon reflex for diagnostic Manual Muscle Testing purposes

Michael D Allen

Narrative: We now know that Chiropractic care is the most beneficial treatment for dyspraxia, successfully managing it with individuated therapy because it can stimulate the deep neurological structures of highest priority, the zygapophysial joint mechanoreceptors of the spine and spinal-related structures.

Eupraxia is normally coordinated muscular performance. It is the antithesis of dyspraxia. The former is characterised by functional reciprocity, normalised autonomic performance and cognitive awareness whereas the latter always progresses to intensifying pathology.

Problems with gross and fine motor skills like manual dexterity are the main symptoms of dysrecipria leading to deafferentation. Dyspraxia occurs when poorly synchronised motor skills interfere with daily and academic function and is observed on a continuum from mild to severe.

The dyspraxic presentation, particularly if not identified early, can lead to challenging behaviours such as frequent concentration disruptions and/or interference with interpersonal relationships, the avoidance of work, and attention-seeking behaviours. Rehabilitating these pathological expressions requires the sacrifice of dysrecipria and encouraging euplasctic behaviour.

Indexing Terms: Chiropractic; Applied Kinesiology; AK; dyspraxia; eupraxia; dysrecipria

Introduction

One highlight of my early career was to muscle test who was, at that time, the world's strongest man for his size, Franco Columbu. I met him as a student during a weekend seminar at a nearby Chiropractic College. This guy trained with bodybuilding's elite, like Arnold Schwarzenegger, Bill Pearl, Lou Ferrigno, Mike Katz, Frank Zane, and Robby Robinson. Columbu had muscles on top of his muscles. But when I functionally examined him, these same muscles were unable to meet the demands of manual muscle testing. How could this be?

> *... pain is a personal, private, emotional experience unrelated to the amount of tissue damage ...'*

One of the major principles in my peer reviewed research paper entitled, '*The mechanism of manual muscle testing as proposed by the ventral horn theory*' (bit.ly/3z4SwpA) is functional reciprocity. By definition, '*functional reciprocity*' is the phenomenon of coordinated interaction of homologously-related muscle groups around a joints.

Reciprocity is neurologically regulated in the ventral horn through various feedback mechanisms descending from more rostral neurologic centres yet arising from the environmental response of joint mechanoreceptors to gravitational perturbations. When working according to its original design, functional reciprocity allows for smooth and efficient movement and prevents excessive stress on the joint structures.

Application of the Deep Tendon Reflex

Functional reciprocity

Functional reciprocity can be easily examined on many skeletal muscles using the deep tendon reflex.

For example: When functionally examining the clavicular portion of the *pectoralis major*, it should normally maintain conditional facilitation. Tapping its insertion should reveal persistent functional facilitation for one test. Similarly, tapping the patellar tendon should facilitate that *rectus femoris* for one test. One can examine the reciprocity of these two muscles by tapping the patellar tendon and immediately testing the conditional response of the clavicular portion of the *pectoralis major* contralaterally. It should respond with a reciprocal and conditional facilitation. This is normal. The same conditional facilitation should be seen in the proximal *rectus femoris* when tapping the insertion of the clavicular portion of the *pectoralis major* contralaterally.

Further, stimulation of the patellar tendon should cause a conditional inhibition of the clavicular portion of the *pectoralis major* ipsilaterally. And vice versa, stimulating the insertion of the clavicular portion of the *pectoralis major* should cause conditional inhibition of the proximal *rectus femoris* ipsilaterally. Some might consider these various responses to be gait related. But while gait is an acceptable example of reciprocity, our example helps us explore the neurological display of the individual muscles upon demand.

These above primitive patterns are of an original nature, pre-programmed prior to birth. As a result, they provide the functional matrix upon which all human movement is founded. Therefore, any display other than that which is above is always pathological; i.e., it's '*other-than-human*'. This should lead the examiner to consider the probability of a phased breakdown of the cord's functional capacity secondary to a deafferentation somewhere between the sensory receptors, the dorsal cord interactions, the rostral neuraxis and the ventral horn.

Reciprocal inhibition

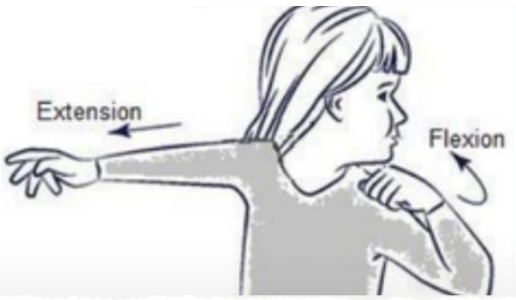
Reciprocal inhibition is a spinal cord phenomenon that inhibits a motoneuronal pool when the antagonist motoneuronal pool is activated. Because the interneuron is inhibitory, it prevents the opposing alpha motoneuron from firing, thereby reducing the contraction of the opposing muscle.

Without reciprocal inhibition, we find that both groups of muscles might contract simultaneously, working against each other. The dysregulation or simultaneous dysfunction of opposing muscles of the homologously-related joints creates the deafferentation that disrupts the function of more rostral neurological centres. It's the reciprocal motion that provides for intricate and precise movements that enable smooth walking, running, throwing, and catching, just to name a few.

Further, reciprocal inhibition provides essential modulation to promote normal human postural patterns, balance and stability, to prevent muscle fatigue, injury, and pain by optimising the use of energy and minimising the wear and tear of the joint tissues. The absence of reciprocal

inhibition allows pathological movement patterns that create the signs and symptoms of disease and its associated pain.

Fine motor control and reciprocal inhibition are indirectly related. The demand for fine precision is compromised by dysrecipria/dyspraxia. This is especially true for the precise ocular activities demanded of the extrinsic muscles of the eye, but that is the subject for another article.



We often find people with dysfunctional movement patterns. The figure shows a very common, yet pathological posture seen in clinical practice. It is not unusual for a person to display an increased tone of flexor muscles on the side toward head rotation and an increased tone in the extensor muscles on the side opposite head rotation. This is what I call '*dysrecipria*', an '*other-than-human*' movement pattern. Your brain instinctively knows there is something wrong, but it will not let you know it because this dysfunction is very often painless.

Dysrecipria/Dyspraxia

The basics of manual muscle testing cannot detect obvious functional reciprocity. The whole idea here is to introduce a neurological stimulus at specific locations and observe each homologue's unique response. That display will either be conditional inhibition or conditional facilitation, but it is the examiner's responsibility to understand which is normal and which is pathological.

As a result, I tell my patients that they may fool me with a weak muscle, but they cannot fool me with a strong one. The examiner must understand the normal response. One way is reciprocal according to the original design, and the other is dyspraxic. Literature suggests that when muscles are dysrecipric, the intervening joints lose their functional reciprocity creating an increased probability of joint breakdown and the experience of pain.

While it may be true that dysrecipria is a lifelong disorder that apparently does not affect one's intelligence, we clinically find that the decreased potentiation of normal reciprocal patterns impairs cognitive ability. The breakthroughs made by using diagnostic Manual Muscle Testing as functional neurology have helped us better understand that there is hope for dysrecipria. These pioneering applications of neurological examination have shown the potential of innovative therapies.

Problems with gross and fine motor skills like manual dexterity are the main symptoms of dysrecipria leading to deafferentation. Dyspraxia occurs when poorly synchronised motor skills interfere with daily and academic function and is observed on a continuum from mild to severe.

Dyspraxia can affect one's awareness of their own body position in space leading to clumsy and awkward movement, and/or the perception of objects around them. Both children and adults may have difficulty with activities such as hopping, jumping, running, and catching or kicking a

ball. They also have difficulties controlling and maintaining their posture, impacting their ability to complete learning activities and tasks.

While these patterns may not get worse over time, their challenges may become more apparent with increasing academic demands. Dyspraxic patients must work harder and/or differently than their peers to achieve the same goals. By sacrificing pathological patterns and reviving and rehabilitating the original ones, we can enhance proficiency with balance, sports, and learning, for example.

We now know that Chiropractic care is the most beneficial treatment for dyspraxia, successfully managing it with individuated therapy because it can stimulate the deep neurological structures of highest priority, the zygapophysial joint mechanoreceptors of the spine and spinal-related structures.

Pain

Before pain can be consciously recognised it is more correctly called '*nociception*'. It is among the slowest neurological signals in the entire human nervous system. Its signal travels at about half a meter per second and evokes an emotional sensitivity.

Nociception is neurologically blocked from conscious awareness by proprioceptive inputs, which are the fastest neurological signals. Proprioception keeps nociception under control by presynaptically inhibiting the progression of nociception in the dorsal horn of the spinal cord.

It is only after nociception has breached the protective barriers of the dorsal horn allowing the relay of second-order nociceptive signals through well-defined neuronal pathways and have traversed the thalamic centres to reach conscious awareness in the rostral neuraxis (including primarily the thalamus and cortex) can nociception be characterised as pain: a personal, private, emotional experience unrelated to the amount of tissue damage. While the dyspraxia of joint mechanoreceptors is not necessarily related to tissue damage, any pathological movement - i... deafferentation - could enable nociception to reach conscious levels resulting in the experience of pain. Left uncorrected over a long period deafferentation can lead to both organ and joint damage.

Eupraxia

The longer dyspraxia persists the more neurologically reinforced it becomes. Even though these patterns are pathological, they have a high probability of becoming '*the new normal*'. Beardall called it '*adaptation*' or the stress that creates the dependence on one tissue relative to another. Further, Beardall also found that rehabilitation of pathological patterns changes adaptation to '*resistance*' which leads to the independence of homologously-related muscles and normalises joint motion, thus '*eupraxia*'.

Functional neurology and eupraxia

Eupraxia is normally coordinated muscular performance. It is the antithesis of dyspraxia. The former is characterised by functional reciprocity, normalised autonomic performance and cognitive awareness whereas the latter always progresses to intensifying pathology.

Eupraxia can be encouraged by normalising cortical afferentation, which starts with the primary afferents, the peripheral receptors from joints and muscles. Normalising primitive reflex patterns like the deep tendon reflex and as discussed last month with the tonic neck reflexes, functional reciprocity enhances cortical awareness and frees joint motion.

Rehabilitation

The dyspraxic presentation, particularly if not identified early, can lead to challenging behaviours such as frequent concentration disruptions and/or interference with interpersonal

relationships, the avoidance of work, and attention-seeking behaviours. Rehabilitating these pathological expressions requires the sacrifice of dysrecipria and encouraging euplasctic behaviour. The resistance provided by sacrificing abnormal behaviour and encouraging euplasctic performance enhances cognitive abilities and inhibits the experience of pain.

Conclusion

If the world's strongest man for his size could do as well as he did in the presence of dyspraxia, imagine what he could have become with a foundation of eupraxia. Using the deep tendon reflex for examination and rehabilitation purposes can help the examiner better understand postural display and direct individuated exercise programs.

Michael D Allen
DC, NMD, DIBAK, DABCN, DCBCN, DAAIM, FACFN
Laguna Niguel, CA
neuronaut@cox.net

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About the Chiropractor

Dr Allen is a native Californian. 'My family comes from Glendora, California. It's was a small citrus-producing community at the last stop of the Pacific Electric Line that connected Glendora to Los Angeles. In the late 1950s Glendora grew into a large scale residential development at the east end of the San Gabriel Valley, at the foot of the San Gabriel Mountain range.

'Thanks to my mom's foresight my family has always had a bias toward natural healthcare. She had a long time classmate who followed in his father's footsteps and became a chiropractor. We saw that doctor for all our healthcare needs. Perhaps you can imagine the heckling we got from the medical community for such an unorthodox lifestyle decision.

'When I was a junior in high school I went to a place in Los Angeles called the Human Engineering Laboratory. They put me through four and a half days of every type of test you could ever imagine. At the end they told me I should either be an architect or a surgeon. I knew I did not want to sit at a drawing board all day, and because of my chiropractic upbringing I did not want to go to school to study medicine. I asked the Human Engineering folks about being a chiropractor. They said, '*With your ability to visualise structure, yes, be a chiropractor*'. It was one of the best decisions I have ever made!'

International recognition

Dr Allen is globally recognised both for his two books that deal with brain function, *What Your Brain Might Say if It Could Speak*, for the general public, and *Receptor Based Solutions®; Functional Neurology Every Doctor Should Know*, for doctors of all disciplines, and for having written dozens of professional papers. He has also taught thousands of

doctors in tens of countries on four different continents about the clinical techniques he uses to reverse the physiologic impact of failing brain function.

Dr Allen has over five decades of clinical experience as both a Doctor of Chiropractic (DC) and a Doctor of Naturopathic Medicine (NMD) with an expertise in using manual muscle testing. i.e., applied kinesiology (AK), as functional neurology to treat movement and vestibular disorders, learning disabilities, the brain-organ disconnect, and to deliver pain management.

Dr Allen has been a member of the International College of Applied Kinesiology (ICAK) since 1978, having served two terms each as the President and Vice President of its International Council that oversees 18 chapters worldwide, as well as having been the International Delegate for the United States Chapter of the ICAK, and two terms each as the Vice President and Secretary of the United States Chapter. He is also a member of the International Association of Functional Neurology and Rehabilitation (IAFNR), the Arizona Naturopathic Medical Association (AzNMA), and the German Medical Society for Applied Kinesiology (DAGAK, Hon.).