The Physiology and Neurology of Precision Muscle Monitoring

By Adam H. Lehman, En.K.

Introduction – The Big Picture of Muscle Monitoring

There are 3 basic models we find in the plethora of Energy Kinesiology modalities:

1.The Energy Readout Model

2.The General Communication Model (Indicator Muscle)

3.The Protocol Model

The Energy Readout model is where it all began. Beginning with Applied Kinesiology and evolving into Touch for Health for the lay person community that spawned Energy Kinesiology, the Energy Readout Model says that, for each meridian and its related organ/gland, there is at least one muscle that can be used to assess the energy flow for that meridian. That muscle, therefore, acts as an "energy readout" for that meridian. When we use this method, the information is limited to the specific relationship involved.

In the General Communication Model, we learned that any muscle in the body can act as an ***indicator muscle***. This indicator muscle provides a means of communication more generally, accessing information in a neurological/electromagnetic manner, and has the ability to explore information outside of the muscle's specific meridian correlation. This more generalized approach offers a flexible, and even improvisational, method of communication with the person being monitored.

The Protocol Model uses an indicator muscle, but follows a specific path of action, usually based on understood principles of neurology and electromagnetic flow in the body. It is, therefore, less improvisational, and utilized in more specialized forms of Energy Kinesiology that target specific body function, such as brain integration, or sequential developmental processes such as early reflex development and neurological hierarchy.

Each model has its advantages and disadvantages. For the purposes of this discussion, I will focus more on the first 2 models, as they are much more common in the world of Energy Kinesiology. As well, the protocol model simply utilized principles from the other 2 models.

As the world of Energy Kinesiology developed, the use of the Indicator Muscle model became much more prevalent. The ability to "ask questions" of the body and get a response by using a single muscle seemed much easier than going through many muscles to assess energy flow. However, the importance of the Energy Readout model is not to be overlooked.

When you consider the premise that each meridian, and therefore its related organ or gland is directly represented by a particular muscle(s), then you can say that the muscle is a **direct neurological representation of the energy flow in that meridian**. So when a meridian is out of balance, that shows in its related muscle, as originally researched and developed by George Goodheart, D.C.

Now consider the role of an indicator muscle with one of its first uses – checking the alarm points of Chinese acupressure. By going through these points and using a single indicator muscle, the body has a way of indicating what meridian(s) one might find stress in without monitoring a lot of different muscles. This is a great "shortcut" to finding where stress exists, but consider that it is just that – a shortcut that acts as an alarm.

To use an analogy...when a fire begins in a house, what happens? An alarm goes off in the fire station. And then what happens? Do the firemen simply get the hoses out and begin spraying water around? Of course not! They have to go to the house where the fire is.

The Indicator Muscle model often forgets this part. We get the information about the alarm, and then we simply start to balance, ignoring the "house" – in other words, the muscle that is the direct neurological representation of the energy flow of the meridian – where the fire is.

In Applied Physiology (AP), these two models are integrated in a way that is not seen in other kinesiological modalities. Once it is known where the fire is (the alarm point), we then go to the muscle of that meridian (the house on fire) and monitor it to assess the actual stress found there. AP goes even further still by finding where in the range of motion a muscle's imbalance is showing, and adds that to the circuit. In this way, AP doesn't just go to the block the house is on, but rather to the specific house itself. Then we begin to balance! Now we're putting out the fire directly, having alerted and activated the body's neurology where the actual problem is. Why is this important?

Dr. Paul Nogier, a French neurologist considered to be the father of modern Auricular Therapy, did research on the results he achieved (or not) based on activation of a person's problem. He found that if he treated his patients based on what he was told about their problem, he got pretty good results – maybe up to 50% of the time. However, when he treated his patients with their problem *activated*, in other words, aggravating a pain or whatever it took to activate the neurology of the problem itself, his results jumped up to 95%. Pretty significant.

Considering that the muscle related to the meridian is the neurological representation of the imbalance found via the alarm point, then activating that muscle alerts the body as to where to direct the healing modality applied when the balancing is done.

Unfortunately, the prevalence of the Indicator Muscle Model has seemingly led to a deterioration of the use of the Energy Readout Model. In fact, the use of *precision* muscle monitoring as the tool of the Energy Readout Model is often neglected or considered a burden, despite it being the foundation of what Energy Kinesiology is about.

It is the author's opinion that integrating the two models will help achieve better results by activating more neurology around the actual imbalance(s) found using the indicator muscle.

With this in mind, the purpose of this paper is to provide further information about the importance of *precision* muscle monitoring, and *why* it's important. Please keep in mind that this is a complex topic, so what follows is a condensed overview to assist in understanding the core principles of muscle function.

The reader is encouraged to explore further if deeper understanding is desired. The bibliography provides some key places for continued study.

The Why We Do The Things We Do

Goodheart's original premise of each muscle in the body being related to a specific meridian (and therefore, also to that meridian's organ or gland) provides the basis for why it's important to monitor that muscle precisely. So let's delve deeper into that.

Every muscle in the body has a defined action and range of motion. Because the body has the capability of very complex movements, it is often beyond a single muscle's ability to carry out these movements. A muscle often needs assistance.

As well, muscles need opposition in order to carry out refined movement. With no opposition, our actions would be very abrupt and extreme, causing awkward and jerky movement. In most cases, the opposition comes from a group of muscles, not just a single muscle, again due to the complexity of movement in the body.

Due to the nature of these relationships, we have specific names to define the muscle we are focusing our attention on, and the other muscles in its sphere of action.

The muscle whose movement we are focusing on is called the ***agonist***, or prime mover. This muscle is our point of focus when monitoring.

Any muscle that assists the agonist in its movement is called a ***synergist***.

Any muscle that opposes the agonist in its movement is called an ***antagonist***.

Keep in mind that while a synergist is helping an agonist do a particular movement, it is outside of its own prime range of motion, so it doesn't have all its strength to apply to that movement. It simply assists by adding some peripheral strength.

As well, as mentioned above, the antagonists don't directly oppose a particular muscle's primary movement action. There is usually more than one antagonist, whose combined actions oppose the agonist's movement. The best example of an exception to note here is the biceps and triceps, which do directly oppose each other.

Muscles create movement by attaching to 2 different bones with at least one joint in between. Between these two attachment areas are tendons – fibrous and largely inflexible tissues that attach to the respective bones on either side – and the belly of the muscle made up of fibers that have the ability to contract and extend. When the fibers contract, they pull on the tendons, which pull on the bones and bring them closer to each other, creating movement. As these fibers are bundled together and all go in the same direction, then the movement is defined by that very direction. This movement, therefore, defines the muscle's action, and becomes the basis for figuring out what position to put the muscle in, and how to monitor it.

The Art of Kinesiology

Muscle monitoring originally developed as a means of assessing neurological function to determine where injury occurred. Knowing that the spinal segments each provide neurological enervation pathways to the muscles in a certain area of the body, then determining which muscles in that area are able to "hold" or not against pressure has the ability to identify at what spinal segment an injury occurred. In order to precisely determine this, it is important to isolate, as much as possible, a particular muscle's (the agonist) action and range of motion. As noted above, we use the muscle's anatomy to help figure this out.

Unfortunately, it can get a little more complicated. Some muscles have more than one attachment at each or both end, giving those muscles the ability to have more than one, or a more complex, action. As well, some synergists kick in close to the edges of another muscles prime movement and take over as the prime mover, potentially confusing where the range of motion begins and/or ends.

So the trick of monitoring a muscle precisely is knowing how to position it such that its action is as isolated as possible from its synergists, and how to monitor it in such a way (direction) that the specific action of the muscle is challenged.

And why is this important? Well, if the premise that we kinesiologists go by is that each muscle is related to a specific meridian, and we're monitoring that muscle in order to get the energy readout of its related meridian, then it's important to monitor that muscle in such a way as to negate the synergists as much as possible. This is because we don't want information bleeding in from the synergist(s), whose related meridian(s) is likely different than the one we're trying to get information about!

This is also why the quality of the muscle monitoring itself is also so important. If the pressure used is either abrupt or strong enough that it causes recruitment from the synergists, then the premise of the Energy Readout Model is defeated. This is why we learn to apply gradual pressure, only to the point of *feeling* the agonist muscle respond, so that we get the information we're looking for accurately.

The combination of isolating a muscle and gently monitoring it within its range of motion is the ***art*** of Energy Kinesiology.

The 7 States of Muscle Stress

In Touch for Health, as in the original Applied Kinesiology model, we deal with essentially two states of a muscle monitored in contraction – locked and unlocked. Richard Utt, the originator of Applied Physiology, identified *seven* states of muscle stress. Five of these states have been adopted in one form or another by other kinesiology modalities, and serve our purposes for this discussion as well. Let's look at the neurology of these states.

It has been shown that a properly functioning muscle in contraction has a frequency between 39 and 59 millivolts (mv). This range, therefore, indicates a muscle that is in homeostasis, or as we might say, in balance. However, when the frequency moves out of this range, one of two things happen – either the muscle becomes more rigid, or it weakens. This causes "erratic" behavior in the muscle. How does this erratic behavior express itself?

If the frequency drops to between 39mv and 0, then the muscle weakens, which shows as an unlocking muscle when monitoring it. Because a muscle in contraction is referred to as a facilitating muscle (think of a contracting muscle as "facilitating" movement), this under energy response is called ***"underfacilitated."*** (Please refer to the chart at the end of this section, on page 6, for a visual representation of the following discussion)

When the frequency of a contracted/facilitating muscle is over 59mv, then the muscle becomes more rigid. In Energy Kinesiology, this shows up as a muscle that will not respond to spindle cell manipulation. In other words, when contracted, if we pinch the belly of the muscle to send a signal that the muscle is too contracted and to unlock it (more on this later), that signal does not get responded to with the proper unlocking response. This locked muscle that won't unlock when we send the message to do so is called ***"overfacilitated."***

We now have identified 3 states of a muscle:

1. **Homeostasis** (a muscle working properly, between 39-59mv),

2. **Underfacilitated** (an unlocking muscle that won't lock when we tell it to, 0-39mv), and

3. **Overfacilitated** (a muscle that is locked, but won't unlock when we tell it to, over 59mv).

What is often overlooked is that a muscle's neurology goes beyond simply telling a muscle to contract (or not) to initiate movement. When in the role of an antagonist, a muscle must also work to resist the movement of its opposing muscles. In this way, a muscle acts as an inhibitor of movement. This is a crucial function. The neurology is more complicated than for facilitation, with signals coming from a number of different areas, ranging from spinal reflexes to deep brain centers, as well as the cerebellum and cortical motor areas. As a result, when we monitor a muscle only in contraction, we are neglecting responses from these other neurological areas that are an important part of a muscle's overall function and circuitry. Returning to our fire analogy, it would be like the firemen coming to the house and only checking the living room, spraying water around to put out fire, and then leaving without checking the kitchen and bedrooms. In Applied Physiology, based on the original research of Richard Utt, we monitor muscles in both contraction and extension, to make sure we are checking more thoroughly the neurology of the muscle in question – both its agonist and antagonist functions. Monitoring in contraction is *facilitatation monitoring,* challenging a muscles ability to hold its contracted state, and functioning in balance with its antagonist inhibitors. Monitoring in extension is *inhibition monitoring*. This is looking at a muscle's ability to play nice with its opposing contracting muscles.

While the muscle whose range of motion you're working with is not doing the "work" of holding (contracting to maintain its position, which is being accomplished by the opposing muscles), its function to maintain a balance through its role as an inhibitor is still part of the muscle circuit. By working with this muscle within its range of motion, and not necessarily within the range of motion of the facilitating (contracting) muscles, we are set up to understand the question we are asking. To further ensure that the information we are obtaining is relevant to the inhibition function of the muscle we are monitoring in extension, we use the spindle cells of that muscle (not the contracting muscles) to send the messages to unlock and lock again. What's important to note about the spindle cell message we send in this circumstance is that we reverse the direction of the spindle manipulation. In other words, to send the unlock message for inhibition monitoring, we *spread* the spindle cells, and then we pinch to send the lock message. This is directly opposite to what is done when monitoring the muscle in contraction/ facilitation monitoring.

Using the above model of electrical current in a muscle, and applying it to inhibition monitoring (monitoring in extension), we can state that a muscle between -39mv and -59mv is functioning normally...in homeostasis. Notice these are negative numbers, as opposed to the positive voltages generated in contraction.

However, if a muscle is between 0 and -39mv, and therefore unlocking when monitored in the opposite direction of its normal facilitation action, but still within its true range of motion, we say that it is ***overinhibited***. This monitoring of a muscle in the opposite direction of it facilitation action is checking its role as an inhibitor.

When a muscle is between -59mv and -100mv, thereby monitoring as locked when monitored in the opposite direction of its normal facilitation action, but still within its true range of motion, and will not unlock when its spindle cells are manipulated, then we say the muscle is ***underinhibited***.

We've now identified 2 more states of muscle stress, giving us a total of 5 (again, please see the chart below):

4. **Overinhibited** (an unlocking muscle that won't lock when we tell it to, between 0 and -39mv)

5. **Underinhibited** (a locking muscle that won't unlock when we tell it to, between -59 and -100mv)

We still have homeostasis, which represents a muscle in balance, between -39mv and -59mv when monitored in extension.

You may notice an interesting difference in the names of the muscle states between contraction and extension. The contracted state between 0 and 39mv is called *under*facilitated, while the extended state between 0 and -39mv is called *over*inhibited. Each is represented by an unlock when monitored, and won't lock when the appropriate spindle message is sent. It is usually easier to think of the under-energy as a result of its relationship to active function – a contracting muscle trying to stay contracted (and, in this case, failing). Keep in mind that opposing muscles are meant to be working in balance to each other. And because they are in opposition to each other, then consider that if one is *under* functioning, it may be because the opposition is *over* functioning. In this case, the inhibitor is winning the battle between the two, and not being in balance with each other, an underfacilitated muscle (or muscle group) is being opposed by an overinhibited antagonist.

Conversely, when a contracted muscle is *over*facilitated (greater than 59mv), then its inhibiting antagonist is not doing enough to keep it in balance. Therefore, it is *under*inhibiting (greater than -59mv). Regardless of which direction you're monitoring a muscle in, this is represented by a muscle monitor that is locked and won't unlock with spindle messaging.
I often refer to monitoring in extension as being in "opposite land." You monitor the muscle in the opposite direction, you apply spindle messaging in the opposite way than in contraction (spreading to send the message to unlock, pinching to send the message to lock), and the names of the stress states are opposite as well.

This is summed up in this manner:

Overfacilitated (OF) and underinhibited (UI) speak to muscles in either contraction or extension (respectively) that are locked and won't unlock with spindle messaging.

Underfacilitated (UF) and overinhibited (OI) speak to muscles in either contraction or extension (respectively) that are unlocked and won't lock with spindle messaging.

There are 2 other states, which are extreme states of underfacilitation/overinhibition (unlocking muscles that won't lock) and overfacilitation/underinhibition (locking muscles that won't unlock). The former is represented by muscles that are at 0mv, and therefore don't function at all. This state is called ***flaccid paralysis***, and results in people that need to be carried around and are otherwise unable to generate muscle function on their own. On the other side of the spectrum are muscles that are beyond the 100mv or -100mv extremes. This is called ***spastic paralysis***, often seen in scenarios such as cerebral palsy, and shows itself as limbs that are bent and can't be straightened because some muscles are extremely contracted and can't be straightened.

AGONIST		ANTAGONIST	
Spastic Paralysis	+101 mV or greater	Spastic Paralysis	-101 mV or greater
Overfacilitated	+60 mV to +100 mV	Underinhibited	-60 mV to +100 mV
Homeo-sta-stress	+39 mV to +59 mV	Homeo-sta-stress	-39 mV to +59 mV
Underfacilitated	+1 mV to +38 mV	Over Inhibited	-1 mV to +38 mV
No Facilitation	0 mV	No inhibition	0 mV

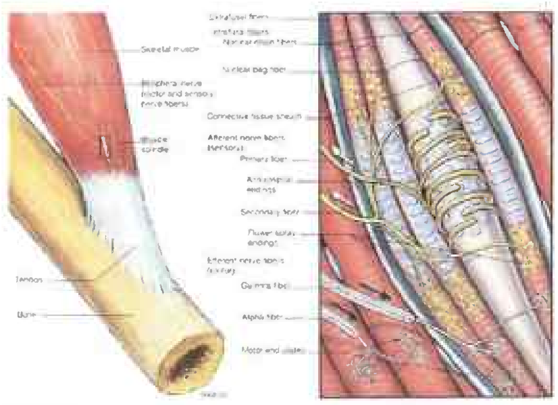
Muscle Proprioception – The Spindle Cells
Muscle spindle cells are specialized cells that are wrapped around groups of intrafusal (inner) fibers deep in the belly of every muscle. As proprioceptors, their function is to alert the brain to the state of the extrafusal (outer) muscle fibers that surround them – how contracted or extended they are – as well as to the speed that the fibers are changing. In this way, they provide important protective information – if a muscle is extending too quickly such that the fibers might tear or the joint become hyperextended, then this message gets quickly relayed neurologically and the fibers are told to contract again to stop the hyperextension. As well, the information of how contracted or extended the muscle is, even when not moving, is used to determine how much opposition is necessary from the antagonists to maintain a static position. In other words, there is an enormous amount of information being relayed from the spindle cells that is critical to posture and movement on an on-going basis – millions of neurological messages every second.

Muscles have several groups of fibers that combine to create movement and resistance. The outer fibers, known as *extrafusal* fibers, are the main workers – they are stimulated by alpha motor neurons, whose messages originate in the motor cortex and are further processed in the spinal cord before exiting to the muscle itself. The fibers are bundled into groups of various sizes, anywhere from 3 to several hundred, referred to as *motor units*. In this way, they are able to receive messages for a variety of levels of contraction and therefore, movement. If only a small amount of movement is needed, a small bundle of only 6 fibers might be stimulated. If more than that is necessary, maybe that bundle of 6 is supplemented with another bundle of 14. If a big movement is necessary, maybe a bundle of 20 is stimulated. And if the whole muscle must contract, then they all get stimulated. With larger muscles, these numbers would of course be greater.

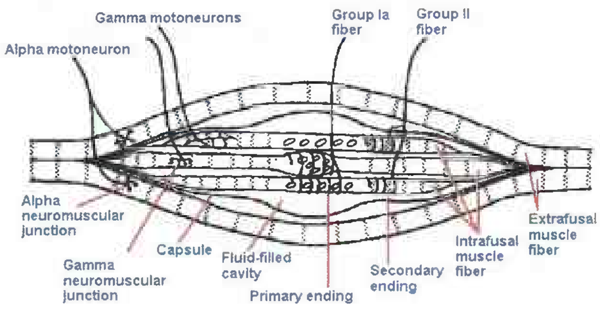
Anatomy of a Spindle

Within the outer layer of *extrafusal* fibers that are getting the alpha messages are other bundles of fibers, the *intrafusal* fibers, that have the spindle cells wrapped around them, and whose ends attach to the extrafusal fibers. In this way, as the extrafusal fibers extend or contract, they stretch or squeeze the outer portions of the intrafusal fibers.

Intrafusal bundles are smaller than extrafusal bundles, containing anywhere from 3 to 12 fibers per bundle. The intrafusal fibers are different from extrafusal fibers in that they have contractile regions at the ends and a non-contractile center receptor area (exactly the opposite of an extrafusal fiber, which contracts in the middle, but not at the ends where they eventually attach to bones as tendons). So when the extrafusal fibers extend and stretch the ends of the intrafusal fibers, this eventually stretches the central sensory region and stimulates it to send its message through the spindle cell neurology.



There are 2 types of intrafusal fibers – nuclear bag and nuclear chain. The nuclear bag fibers are both longer, and wider in diameter in the central sensory portion due to a larger amount of cell nuclei gathered there. There are anywhere from 1 to 3 nuclear bags in each spindle.



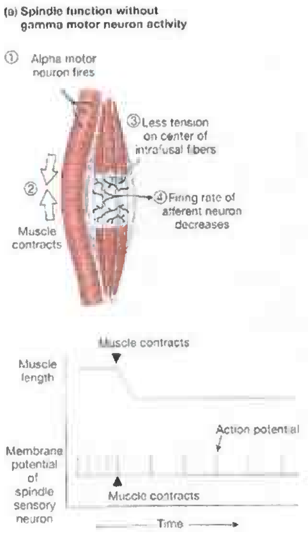
Nuclear chain fibers are half the length of a bag, and have nuclei lined up in a row (like a chain). There may be anywhere from 3 to 9 of these in each spindle.

The Neurology of a Spindle

The neurons that are connected to the spindle cells are not alpha motor neurons, but rather gamma motor neurons.

There are 2 types of gamma neurons – Ia and II.

Type Ia nerve fibers, also known as the primary ending or *annulospiral* ending, wraps a single sensory fiber around the central (sensory) portion of the spindle. These endings transmit messages as fast as any sensory nerve in the body, giving a hint at the importance of the messages they send.

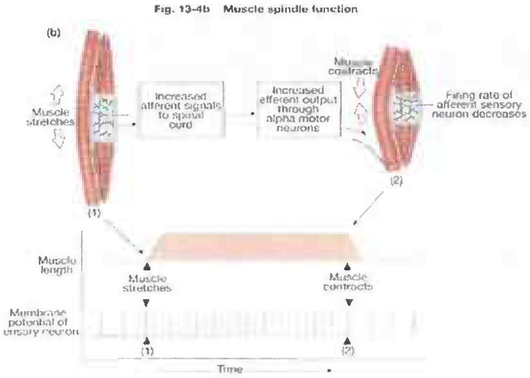


Type II nerve fibers are also known as secondary endings or *flower spray* endings. One or 2 of them are found to one side of the type Ia fiber, and encircling the intrafusal fibers.

The primary endings connect to both types of intrafusal fibers, but the secondary endings only attach to the nuclear chain fibers. This offers some clues about their respective functions.

One of these functions is the static response, and therefore isn't dependent on the speed of contraction or extension signals. Instead, it relays messages that have to do with the overall length of the muscle.

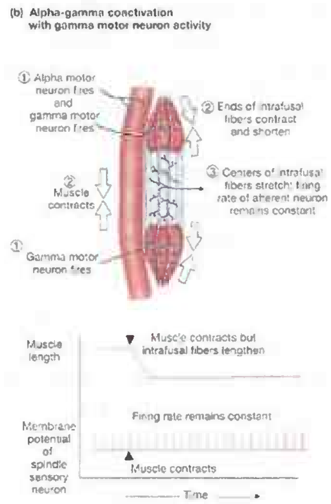
Fig. 13-4b Muscle spindle function



These messages are sent continuously so the body knows how contracted a muscle is at any time the spindle is stretched. Because these signals are sent by both primary and secondary endings, and because the nuclear chain fibers are the ones that both these nerves ennervate, it is thought to be the nuclear chain fibers that are most involved with the static response.

The dynamic response does both speed and state messages. However, it is only the primary endings that send these messages. Therefore, it is thought that the nuclear bag fibers are most involved in this dynamic response mechanism. When the length of the spindle changes suddenly, then the primary ending is powerfully stimulated (remember that these are also some of the fastest messages in the sensory system).

It doesn't matter how big the change is – it might be miniscule – but if it is fast, then the nuclear bag fibers will stimulate a message through the primary ending. This message is only sent as long as the stimulation is occurring, contrary to the ongoing message of the static response. There is a brief lag time as the central receptor area adjusts to its new length and the static response receptors reflect that change.

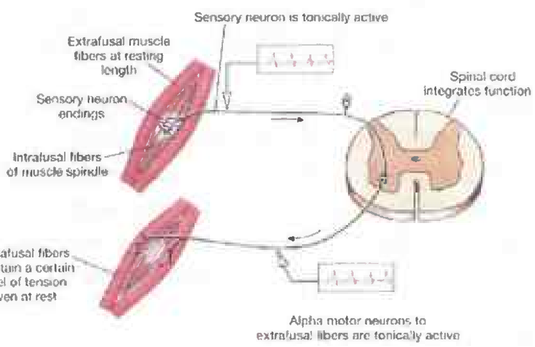


The Physiology of the Spindle Responses

If we put the above discussion into actual practice, we find 2 key functional effects: the static reflex and the dynamic reflex.

In each of these, the messages sent by the 2 responses go to the spinal cord, where interneurons send the messages to the brain (specifically the cerebellum, basal ganglia and cerebral cortex), and also respond to the messages themselves for quicker response. In each case, the response from the interneurons is to do the opposite action of the originating message. In other words, if the dynamic response is stimulated by muscle extension, then the interneuron's response is to powerfully oppose that response by quickly contracting the fibers. If a long term stretch is gradually applied such that the static response is invoked, then a slower contraction message is returned from the interneurons. Conversely, in either of these examples, if the originating message was one of too much contraction, then a "negative" response of inhibition (relaxing of the fibers) is returned from the interneurons.

Fig. 13-4a Muscle spindle function



Much is still not known about how this mechanism fully works, and all the functions it may be involved with. However, it can be postulated that this complex feedback system is involved in posture (including antigravity responses that allow us to maintain standing positions through on-going muscle contraction), the constant balance that must be maintained between agonists, antagonists, and synergists for any given movement, and the ability to make refined and smooth movements by all these mechanisms working together properly.

Putting It To Work

Given what we now know, it becomes easier to postulate what we are doing when we use muscle monitoring.

When we apply pressure to a muscle to gauge its response, we do so with gradual force to see how the muscle responds. This would be invoking the static stretch response and making sure it is functioning properly. It has nothing to do with the strength of the muscle, which is based on the extrafusal fiber's abilities. By applying our monitoring strength gradually, up to about 2 pounds of pressure, within a specific muscle's range of motion, we are isolating that muscle's action and making sure the static reflex/ response mechanism is functioning properly.

In order to further ensure that the response we are getting is accurate and complete, we then challenge the dynamic response by pinching and spreading the spindle cells *quickly* to see if the muscle responds or not.

If a muscle is not functioning properly due to its inability to hold against gradual pressure and/or determining that the dynamic spindle mechanism is malfunctioning, then we've learned something that is dependent on what model of Kinesiology we're working with:

In the energy readout model, we know there is stress in the muscle, and therefore, the flow of energy in its related meridian is not balanced (and based on whether the imbalance is OF/UI or UF/OI, we can tell certain things about the nature of the stress).

In the indicator muscle model, we can no longer rely on the indicator muscle to tell us what we want to know until we do something to bring it back into balance. This is an important concept that is often overlooked in models that use pause lock to hold stress in the neurology. In Applied Physiology we refer to this as *powers of stress*, and a procedure is applied to bring the muscle back into balance before continuing to look for the next piece of information.

Wrapping It Up

As we have now seen, to identify if a muscle is really functioning properly, it is important not only that it holds against a couple of pounds of pressure, but that it also will unlock when the appropriate message is sent to the brain. The most common way of sending this message is with the muscle spindle cells. Affecting the spindle cells provides us with three possible results to any muscle monitor:

1. A muscle that unlocks when told to, and locks again when told to (homeostasis); This can be checked with a muscle that is either locked *or unlocked* to begin with.

2. A locked muscle that does not unlock when told to (overfacilitated or underinhibited, depending on the direction of monitoring);

3. An unlocked muscle that doesn't lock when told to (underfacilitated or overinhibited, depending on the direction of monitoring).

When we begin monitoring a muscle by putting it into a contracted position and applying pressure to attempt to extend it (facilitation monitoring), this forces the muscle to contract more in order to maintain its position. Doing this *gradually* is critical – in this way, only the static gamma response is stimulated, and no "danger" message is sent to cause the muscle to unlock. If it holds, then we know it's not underfacilitated. But it doesn't mean the muscle is in balance!

Because the muscle is in a contracted state, then we must send a dynamic "danger" message to see if it will unlock. To do this we must "trick" the muscle to think it is being quickly over-contracted. By going into the belly of the muscle and giving it a *quick* pinch, this stimulates the gamma-Ia enervated nuclear bag spindle cells to fire, and through a spinal reflex as well as messages to the brain, the muscle's fibers are told to relax. Now, when the muscle is re-monitored, it should no longer be able to hold against the gradual pressure that was initially applied. However, if it still holds against that pressure, then something is wrong with the system, and we would know that the muscle is overfacilitated (OF).

Conversely, if we are monitoring a muscle in an extended state by trying to push the muscle towards contraction (inhibition monitoring), and it holds, then we have to send a different "danger" message. With a muscle in contraction, this meant pinching it further into contraction. With an extended muscle, to send the same danger message to get the muscle to unlock, we must force the fibers further into quick *extension*. Therefore, to send the unlock message for a muscle in extension, we *spread* the spindles. If it still holds against that pressure, then something is wrong with the system, and we would know that the muscle is underinhibited (UI) – the muscle in question, in extension, is not inhibiting enough to counter the contraction of its antagonists, hence, it is staying locked.

When the muscle is unlocked, we have to send the opposite message – after all, if a contracted muscle is already unlocked, sending the unlock message isn't going to tell us much! So for an unlocking muscle in contraction, we *spread* the spindle cells to send the message that it is too stretched and to activate the fibers to hold contraction. For an unlocking muscle in extension, we pinch the spindle cells to see if we can get the muscles to lock again.

In either case, if an unlocked muscle does not respond by locking again, then we have an imbalance. For a muscle in contraction that won't lock, this is underfacilitation (UF). For a muscle in extension, it is overinhibition (OI) – the muscle in question, in extension, is overriding the antagonist's ability to lock again, and is therefore, overinhibiting.

Remember that in each case, we are working with a muscle *circuit*. So even though we think we are sending messages about the muscle whose spindles we are pinching and spreading, these messages also affect the associated antagonists, and they must all work together to accomplish the desired result.

Conclusion

As a result of the above discussions, we see that the neurology of a muscle provides us with a lot of information that affects how we, as Energy Kinesiologists, do what we do. We've seen that the position we place a muscle in, and the pressure we use, are important to the accuracy of the information we obtain through the use of muscle monitoring. When we move outside of the boundaries of the actual neurology of the body, we can no longer be sure of what information we're getting. If Energy Kinesiology is to become well regarded in the mainstream of the healing arts, then awareness and consistent application of these principles is important.

We have also seen how muscle spindle cells actually work, an important part of muscle neurology that we often use. Now that we know how they function, it becomes important again to use them properly, in a neurological manner. If the spindle cells are not pinched or spread in the direction of the fibers, or if enough pressure to actually push into the belly of the muscle and activate the spindles is not used, then the message is not being sent. If these guidelines are not being followed, but muscle changes are being observed, then it is not the neurology that is causing that. Neither is it intent, as many often offer as a reason. Rather, it is more likely the expectation of the practitioner, instead of the actual neurology of the client, that is influencing the outcome, and thereby doing the client a dis-service. Again, if Energy Kinesiology is to become well respected, then the tools we profess to use must be used properly so that the results can be explained. Otherwise, one must wonder why we even use these mechanisms if we use them improperly while claiming they are the basis of what we do.

Energy Kinesiology is the use of muscle monitoring as the voice of the subconscious. As such, it provides us with an incredibly useful tool to assist others in their healing process by identifying blockages to healing and letting the body indicate what will work best for unblocking those blockages. By learning how this tool works, and the neurology behind it, we can benefit – and more importantly, *our clients can benefit!* – by honoring the principles of the neurology as a means of getting more accurate information and understanding what that information means.

Adam Lehman, En.K., has been in love with Energy Kinesiology and related healing arts for more than 2 decades. He is Director of the Institute of BioEnergetic Arts & Sciences in Sonoma, California, where he maintains his practice and teaches workshops. As well, Adam travels around the U.S. and internationally giving talks and teaching seminars. He is the Advanced Instructor and Instructor Trainer for Applied Physiology in the US and abroad.

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