

IKIN
INTEGRATED **KINETIC** NEUROLOGY

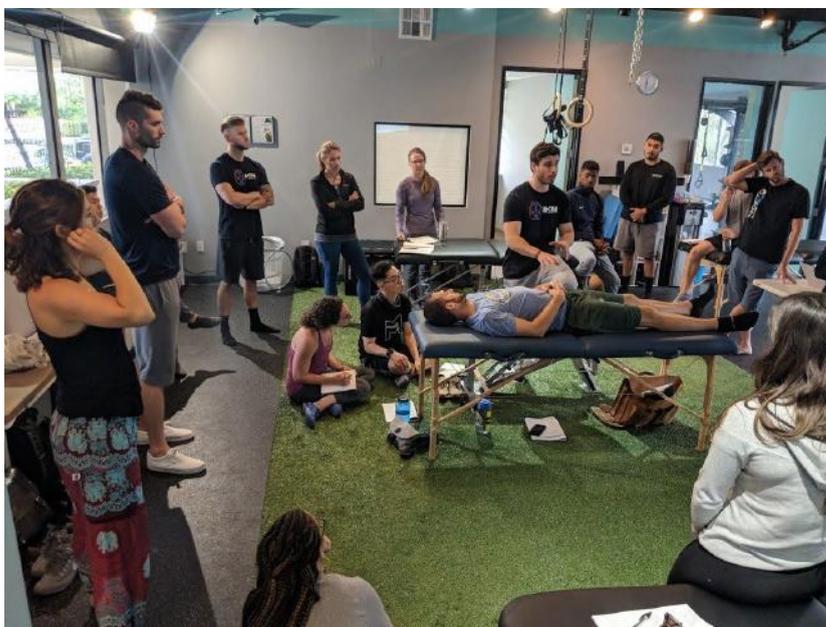
Discovery Guide



Integrating applied neuroscience into musculoskeletal rehabilitation is all about understanding the interaction between all the systems that help us generate and control movement. Humans are complex organisms, and the pain & movement difficulties we may experience are also very complex. At IKN, our goal is to teach you a step by step approach that you can use to address these movement sub-systems to facilitate robust movement. Robust movement is movement that can handle stress and perturbations. This should be our goal as movement practitioners, instead of searching for fancy techniques to temporarily alter pain and movement outputs. We need to prepare our clients for movement in the real-world, and that requires a simple yet robust approach that both you and your clients understand.

IKN's key points when merging applied neuroscience with musculoskeletal rehabilitation:

- 1. The clients experience and understanding is everything.**
- 2. Interaction between systems during real-world movement.**
- 3. The importance of "sensory load."**
- 4. Conscious vs subconscious movement.**
- 5. Midline vs limb control in rehabilitation.**
- 6. Graded exposure rehabilitation.**





1. The Clients Experience and Understanding is Everything

Your clients typically don't care about all the neuroscience behind your treatment, and what we have found is that if you go too deep into applied neurology, you will lose your client. That's why we have created a simple step by step approach that utilizes the most practical components of applied neurology and merged them with musculoskeletal rehab to allow for a unique and comprehensive rehab approach. You can find all the complicated neuroanatomy in books, but learning how to apply it to your clients with aches and pains requires a graded approach. Our clients typically just want to feel better, but what the research is telling us is that the more they are involved in the process and the more meaning they attribute to WHY they are doing what they're doing throughout rehab, is oftentimes more important than the rehab itself.

At our IKN seminars, we teach you how to get that buy-in immediately. If our clients can come to their own conclusion that they are more than just muscles and joints, then they will understand the importance of integrating a multi-layered approach throughout their rehab. On a very simple level, our movement requires quality communication between the nerves, muscles, and joints. Of course, we know it's more complex than this, but if we can allow them to feel how there's many layers that can influence their movement, we can build a solid therapeutic alliance with them, and give them the impression that we are leaving no stone unturned in our goal to get them back to doing what they love to do. Gone are the days where we have a sheet of basic exercises for our "back pain clients" and another sheet of exercises for our "knee pain clients." Our clients are not stupid, they can see when we're not trying our best to solve their issue. The key is having the tools to assess these multiple layers, and the ability to take them through a step by step approach to build robust movement qualities so that those aches and pain are not necessary for protection.

Having this understanding is key throughout the rehabilitation process. Where do we start? How do we progress from here? How can we make this exercise unique to this client based on what we found during the assessment? These are crucial principles to integrate, and allowing the client to become an active participant in their own rehab will facilitate much greater change than any fancy "party trick" technique ever will. After all, to facilitate long-term change, we want them to continue to reproduce what we did in the clinic at home and in their own day-to-day environment.



2. Interaction Between Systems During Real-World Movement

Basic neurology will tell you that the brain gives a command and the muscles carry out that command. This could not be further from the truth, and research into the complexity of human movement is pointing us down a different path. Real-world movement requires multiple systems to play a part to help us handle the stressors that we are inevitably going to encounter day-to-day.

How can our brain possibly control all of our movements in the real-world? We have all experienced those clients who are suffering with persistent pain, and we can see how they need to actively think about their movement before they actually move. This is by no means an efficient way to move, and it certainly doesn't allow us to build those robust movement qualities. How could we approach this? Do we need to get them to think differently in terms of over cueing them to



move the way we think they should move? Of course not. What we need to do is identify what's missing from their movement. During the assessment we may need to initially assess how well their muscles cooperate and distribute load/stress with movement so that certain areas are not doing too much. This depends on the area of their complaint. For example, with shoulder or neck pain, we don't want to just hyper focus on the area of pain, but understand what there's increased sensitivity in that area. We need to assess the directions of movement of the upper limb first.

Are the muscles of the upper-limb helping to dampen and share the stress over a greater surface, or is one area doing all the work (neck & shoulder)? Are the peripheral nerves able to accept load well? Is our spine & rib cage able to move well and adapt to allow for the upper-limb to coordinate movement well? If not, perhaps we may not feel comfortable reaching and moving our limbs outside of our base of support, and so we may end up with a lot of protective tension around the neck and shoulder.

We also know that the visual system and vestibular system heavily dictate the amount of tension held in the muscles around the neck and spine, so these areas could also be contributing to the issue. The main takeaway here is that there are many layers that we can assess, without just



rubbing, stretching, or strengthening where it hurts. There are lots of influences, but we need a step by step approach to perform a simple assessment to identify those limiting factors, and of course facilitate a rehab approach that integrates these layers in a seamless manner. This is just a small glimpse into our thought process.

3. The Importance of “Sensory Load”

The process of “loading” our clients to build tolerance throughout our peripheral tissues, so they can adapt and handle more stress, is well-known in rehabilitation. What we would like you to think about, is the importance of WHERE to deliver that load initially, instead of HOW. Think about how many exercises there are out there for a very general diagnosis of back pain- hundreds! Have we found that golden exercise yet? Absolutely not. What’s most important is understanding where the load needs to be delivered via manual therapy or exercise for the unique individual you’re working with, as opposed to the type of exercise load you use.

The reason that this is important, is because everything we do as movement practitioners, be it manual therapy or exercise, is delivered as RAW information to the brain. It’s not a case where your brain knows that you are using some fancy manual technique that you spent a lot of money to learn. All it receives is the raw feedback from the nerve signals sent from the tissues as a result of your pressure. That’s it. It’s mechanoreceptor feedback. So, what’s most important initially during the rehab process is WHERE that load comes from. Typically, there are peripheral tissues that are not delivering quality feedback as a result of current injury, past injury, or poor movement habits. If we can identify these areas first, and deliver quality feedback through graded “sensory load,” then we can help give the nervous system a better representation of what’s happening in the body. With a clearer representation, comes a reduction in the need to express pain or high levels of tone and tension.

Our peripheral tissues aren’t the only areas of the body that need to be able to tolerate load. Every time we are doing an exercise or expending energy, we are loading the body. We mentioned briefly



before about the importance of the visual and vestibular systems in terms of how much tension our muscles express, particularly around the spine. Depending on our client's current problem or past injuries, these are areas that we also need to assess for "load tolerance." At our seminars, we teach you simple ways to do this, and when it's necessary to integrate these systems throughout the rehab process.

4. Conscious vs Subconscious Movement

Current rehab strategies are very "conscious driven." We see many therapists trying to get their clients to move the way they (the therapist) thinks they should move. But is there really a right and wrong way to move? Certainly not. If we consider the dynamic nature of human movement and how complex real-world movement is, it really doesn't make much sense that the brain controls all movement. Many would have us think that the brain sends a signal to the muscle and the muscle does exactly what the brain asks of it, but this couldn't be further from the truth. This type of movement strategy is completely inefficient, and it's actually more of a strategy we may observe in those with persistent pain and poor movement habits. Have you ever asked someone with back pain to touch their toes? What you'll typically see is them stop for a second or two, and think about how they're going to go about this task before executing it. They will be very cautious with their movement. That's a conscious movement strategy, and one that doesn't open up a large capacity to handle other stressors with real-world movement. We need to facilitate movement that takes "just enough" energy expenditure.



What the research is telling us is that the Central Nervous System actually exploits a lot of subsystems below the brain level to help us move and adapt in the real-world. We have reflexes that communicate information from the eyes to the muscles of our spine. We have reflexes that connect our inner ear to the muscles around our spine that help us control complex movement. We



possess reflexes throughout particular parts of our body that help us prepare muscles so they can decelerate movement and transmit forces well, so that we don't get pain or irritation around tendons and other areas. We also have specialized muscle architecture and morphology that helps us dampen stress through our peripheral tissues to help us move with more robustness and save energy. Understanding these sub-systems of human movement, and harnessing them to facilitate rehabilitation for specific pain and movement-related issues can really help our clients create positive change. Why don't we exploit these subsystems enough during rehab? It seems like we are so concerned with having our own bias towards what's the right way to move, instead of identifying if the unique individual in front of us has these fundamental building blocks so that they can move without the need for pain or excessive tension. These ideas reflect our subconscious approach to human movement, and the rehab implications are endless. The more we can allow the CNS to take the backseat, and allow these lower subsystems to takeover with targeted rehab, the greater the chance we have at facilitating robust movement

5. Midline vs Limb Control in Rehabilitation

During neural development, we essentially grow and adapt from the center outwards. We must develop the movement coordination of our eyes first before we stabilize our head as children. We must be able to sit up and manage our midline before we interact with the environment through our hands and feet. Once we stand, the interaction between these movement sub-systems becomes even more important. During rehab for specific pain and movement-related issues, it's beneficial to consider this interaction between all the parts, but also the interaction on a more local level. At our seminars, we view rehab through the lens of the upper-limb, lower-limb, and the midline of the body. Each one has a different role during real-world movement, but they all influence each other. Each one has a unique "sensorimotor workspace," meaning the way each one handles stress and load on a daily basis is different. For example, the main role of our lower-limb during movement is to control our Head, Arms, and Trunk (HAT). The HAT segment makes up two-thirds of our body mass. As our lower-limb engages in mid-stance, a reflexive co-contraction in the muscles throughout my lower-limb occurs via the positive support reflex which helps to ensure



I don't fall forward and land on my face. However, what happens when I lose the ability to take advantage of this muscular co-contraction around my lower-limb? Perhaps I might express more



tone in my lumbar erectors to decelerate my forward movement? This is one of many examples whereby improving the interaction and coordination of load throughout the lower-limb, we can have a positive influence on spinal pain or excessive tone. Of course, there are many other things to consider, and

we would have a graded exposure approach in place to identify and harness these findings.

The muscular architecture and morphology of my limbs compared to my midline is an underappreciated concept in rehab. Longer muscles and more tendinous features reflect the limbs role to help dissipate and dampen stress/load before it reaches our midline. Understanding the “sensorimotor workspace” of the upper-limb and lower-limb can help us understand how poor movement habits and past injuries can influence the ability of these structures to dampen stress. Perhaps a past elbow or shoulder injury now becomes very important for a client suffering with unexplained neck pain, or a past knee or hip injury becomes critical for an individual struggling with on-going back pain? There are many simple strategies we can integrate into our rehab to leverage these ideas surrounding limb control to help those with pain and movement issues.

The control of our midline requires more of a bottom-up and top-down approach. How strong do we need our neck and spinal muscles to be during everyday movement? Research tells us that we require only 2% of our maximal voluntary contraction of the abdominal muscles during walking..so not very much. So, for us at IKN, it's not a case of needing “strong” spinal muscles, but quality coordination and proprioceptive feedback from the movement of the spine , rib cage and their associated muscles. As well as quality top-down communication through visual and vestibular reflexes. The eyes and inner ear communicate with the spine especially through changes in tone. Have you ever been working with someone with high levels of tone along their paraspinal muscles that doesn't shift with core stability drills? Well, you may need to assess the load tolerance of the spine & rib cage, as well as consider the influence of the eyes and the inner ear. It all comes back to



the assessment. We have many simple assessments we can use to identify poor load tolerance of these systems, and use our findings to facilitate a unique rehab plan for the unique individual in front of us.

6. Graded Exposure Rehabilitation

Once we identify the limiting factors that are preventing our clients from restoring pain-free and robust movement, we need to slowly expose them to load that they have previously perceived as threatening. This is an important concept for us, which is the understanding that a lot of our pain experiences are down to the perception of threat, not actual damage. We need to slowly make our system less conservative. Rehab is all about exposing our system to movements that it may have had a difficult time predicting the level of safety with. The goal is to establish proof of safety. To do this well, we need to identify where the client is not comfortable accepting load from, and that's what makes the assessment process so important. Each individual is unique, and the understanding of how every part interacts with each other is oftentimes more important than the local parts. We need quality feedback from multiple sub-systems, and the more layers we can integrate with treatment while being specific to the unique individual in front of us, the greater the change we can facilitate. We teach a systematic approach to progressively load those missing pieces throughout rehab, so we can restore robust movement qualities. Our nervous system will adapt when it's given the right input, and with a quality assessment and progressive loading approach, we can facilitate just that.

THANK YOU FOR READING!

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