Academy of PHYSICAL MEDICINE

Transcript

The Neutral Spine Principle
With Matt Wallden

APM- Good evening and welcome again to the Academy of Physical Medicine. You're in for a treat tonight, another 90 minutes of CPD, learning with others, of course, if you're a UK osteopath or chiropractor, great CPD if you're anyone else. We're actually in London again this evening. We're back in one of our favorite studios. We're at the Fish Tank Studio in South London, and it's fantastic for everything we want to do except occasionally you will hear the rumble of trains. Now we put up with that because it's such a good studio, but try to keep that out of your mind as we go through this evening, because it's gonna be great CPD, great CPD because I'm joined by Matt Wallden. Now, Matt's been on our list of people to hoick into our studio for a long time, not least because Leon Chaitow, probably one of the most famous osteopaths in the world, is constantly remarking on how good he is at his various subjects of expertise. He's been a lecturer at various colleges in the UK. He's appeared at conventions in Australia, New Zealand, and is in demand to be going back there next year. He runs various discussions and meetings of his own, and I'm really pleased that he's here in our studio this evening. Mattie, Matt.

MW- Yes, thank you very much.

- Thank you very much for coming and joining us. We're gonna talk about the neutral spine principle this evening, which is probably gonna take us down all sorts of avenues, but we've got you in for another four or five broadcasts after this, haven't we?

- That's right, yes, yes.

- We're gonna try not to trespass on the territory of the other broadcasts too much.

- That's the idea, yeah.

- Tell us, what's the neutral spine principle? I've billed this as being a bit controversial, because there are people out there who say, well, actually, posture is not so relevant to treating back pain these days.

- That's right, that's right.

- Where does neutral spine fit in?

- Well, to take a definition or an attempt at a definition of a neutral spine is that it's really, well, it's like trying to define posture or optimal posture. The notion is that the spine is neither in flexion nor extension, side-bending, rotation, et cetera, it's neutral, and so many of the sort of authors and thinkers around this have suggested that there's a kind of neutral range. There's not a singular point that is considered neutral. But I first came across this concept when I was entering more into rehabilitation-type work, and creative-exercise-based work, and of course it does very much correlate with the osteopathic training and the notion of a good posture, but being able to exercise with good posture and to train the muscles to, I guess, preferentially move towards that good posture is part of the goal of a corrective exercise program.

- You make that statement as though we know that is what we should be trying to achieve, and I think that the critics would say, well, actually, why are we trying to do that, 'cause the anatomical textbooks tell us what is the correct anatomical posture, which is of course not unique to osteopathic training. Massage therapists, Pilates practitioners, chiropractors, and all the others I'm sure, follow that ideal, but surely, I mean, there are various different body types, there is no identical spinal pattern which is correct or neutral for everybody.

- Yes, yes. So there's a lot of truth in what you're just saying. One of those concepts that I talk about in the chapter that I wrote which covers this is the notion that from a biomechanical point of view, the main stressors on the body are gravity, which obviously, is pulling us toward the center of the earth, and in the planar resistance of the earth, and that doesn't change the world over, and so what you could argue for there, certainly, with a degree of face validity, is the notion of biomechanical universality. So that's a more conceptual approach to answering your question, but to sort of illustrate the point, if you were to look at nutritional requirements for example, for a human being, the nutritional availability varies the world over, so depending on whether you're an Alaskan Inuit or someone from deep in the Amazon, where there's very low protein, then your physiology will have evolved to basically function well on different diets, so there's biochemical individuality, which is a notion that's discussed quite a lot in nutritional circles, but from a biomechanical sense, the primary stressors are gravity and the planar surface of the earth, which obviously, doesn't vary no matter where you are on the planet. So I think that that doesn't prove anything, but it gives a little bit of face validity to the notion that we should have similarities in what would be considered optimal in the spine from person to person.

- I guess, from sheer physics principles, you would say, well, if there is a force acting directly downwards on you, then there is an optimal stacking pattern for the blocks above it, isn't there?

- Well, that's the notion, and so, there's a lot of discussion actually about how the spine specifically transfers load through it, and so there's an image here which I'll just bring up, and the image is essentially illustrating that if the spine is a lot flatter, then more load will be going through the anterior elements of the spine in particular, the discs and the vertebral body.

- So on this diagram, the gray part on the top image there is showing the highest area of pressure, which is on the body of the vertebra.

- Correct, correct, and on the discs, of course.

- And the discs, yes.

- And then with a more lordotic posture, we have the reverse, so now the facets are taking more of the load, and less load on the disc and the vertebral body, and the idea of a neutral spine is that it shares the load neatly between that tripod mechanism of the spine. So this, again, seems to make some sense, but is also controversial, and so, when you look at Bogduk's book for example, Clinical Anatomy of the Lumbar Spine and Sacrum, he talks about how research varies a lot from group to group, and some groups say that as much as 25% of the load should go through each facet, and 50% through the disc and the vertebral body.

- Is that possible to measure? Can they do this under laboratory conditions?

- Yes, they've done this under laboratory conditions, measuring the pressures going through those components.

- How on earth do they do that?

- I don't know. I don't know. But I do remember thinking this seems, it might be in cadavers, but they certainly have done it in vivo as well, so there must be techniques that they use.

- It might be possible I suppose with a functional MRI. You might get pressure-sensitive responses on those, those particular areas.

- It's certainly a thought, isn't it?

- Expensive.

- I'm not sure. Yes, yeah. But so that's kind of one extreme is that essentially 50% is going through the facets and 50% through the disc. Panjabi and White said that it was about 8% and 8% through each facet, and then about 84% through the disc and the vertebral body. And then Bogduk himself said that well actually it's 100% going through the disc and the facets take no load whatsoever, which is kind of interesting, because you think, okay, well, if the facets don't take any load, then, A, what are they there for? But, B, if you read a little deeper, what he's saying is that in the neutral spinal position, the facets take, should take no load. So depending on who you want to believe, and Bogduk's, at the time of writing, his was the most current research, so you have to say, well, maybe that's the correct approach, but either way, what it means is that if you are more flexed when you've got 100% going through the disc, well, it's not gonna increase the percentage. What it is gonna do is it's gonna change the weightbearing relationship, so now more of the load's gonna be anterior on the disc, okay, and also of course, 'cause he's talking about a neutral spine, if someone's not in a neutral spine, if they're in a hyperlordotic position or posture, then of course, then they will be loading through the facets and so if the facets aren't designed to take load as he is suggesting in his research, or certainly not weightbearing load, then suddenly people with a lordotic posture or hyperlordotic posture, are now taking load through a structure which isn't designed for that. So I think either way, the notion of a neutral spine, no matter what the actual balance is between the different components, makes some sense in terms of sharing the loads between those different structures. And of course, we're just talking here about static loading, but as soon as you start to walk, of course, the facets with each step are approximating and then opening up, and approximating and opening out, and so that, if you're extended, means more loading through the facets, and if you're flexed or straight, flat in the spine, there's gonna be less loading through the facets and more loading through the discs. Of course, it gets a lot more complex with--

-Excuse me. Many people are fond of pointing out, or suggesting that we weren't designed to walk upright. We were designed to walk on all fours. Now, I'm always very skeptical about that claim, because the way the body's evolved, would suggest to me that we are designed to walk upright now, but if you took our spine and put it into a horizontal position, then this loading would change dramatically, surely.

- Yes, yes, it would do, yeah. I mean, the--

- So does that disprove this idea that we're meant to be horizontal and actually our spine is designed to stand upright in its neutral position?

- Well, yeah. I think it certainly appears to involve many incredible mechanisms to be able to cope with bipedal life, and so not just gates, which talking about evolution, Gracovetsky's approach to gates, talking about the spinal engine. He takes a whole evolutionary stance looking at how the spine has changed throughout different species across millions and millions of years.

- You're gonna have to let me have these references in writing afterwards, because even if I can stick 'em up on the website so people can look 'em up as well.

- I think probably most of them will be in the article, which I can give you to have that.

- 'Cause I didn't actually mention, and we discussed it before we went on air, but you're an associate editor of the Journal of Bodywork and Movement Therapy, of which Leon Chaitow is the leader, is he not, and you write an article every six months, and the chapter you referred to earlier on, was that in the journal or was that?

- That's actually a separate thing, and that is available on my website. Unfortunately, the book is now out of print. There's a 2008 book called Naturopathic Physical Medicine. Again, it's a Leon Chaitow book, and I wrote a chapter on rehabilitation in that.

- And your website is MatthewWallden.com, again we'll put a link to that on the website.

- It's MattWallden.com.

- Matt Wallden, sorry. I'm sorry, yeah.

- Yeah, so I think Gracovetsky talks about the importance of lordosis in gates, and if we didn't have lordosis, we wouldn't be able to effectively move forwards from an efficiency point of view. And so his evolutionary approach, I think would certainly question anyone that was saying that we haven't evolved to stand upright. So that's one mechanism, is the gate mechanism, the spinal engine itself, but there's also many other mechanisms in terms of lifting, postures, and the way the transverse abdominis for example will activate at certain degrees of flexion to stabilize the spine and decompress the discs. And you look at that and think that's an incredible kind of mechanism to have evolved in what seems like a short space of time, and we say it's a couple of million years since our ancestors stood upright, maybe four million, but I guess, it's difficult for us to fully get our head round what a couple of million years really is, and these mechanisms I think suggest significant adaptation to bipedalism.

- So the debate about whether posture is actually important in back pain, there's obviously more to posture than the spinal position. There's forward shoulder position and so on. Where do you stand on this? Do you think that those aspects are important, or are you prone to forcing patients into a posture which is clearly not natural to them?

- Well, hopefully, I'm not prone to forcing them into those positions that they're uncomfortable with. Absolutely, the spine is obviously just one component of the posture, and in terms of posture itself as being relevant, I think one of the challenges that we have with research at the moment is, and push for evidence-based research, is that there's a lot of strong epidemiological research which suggests that posture does not play a role in back pain. But the challenge with epidemiological research is that it can't pick up on nuances associated with multiple factors contributing to a given outcome, and so when someone has poor posture, I would suggest that that's one factor that's a stressor on their system, combined with perhaps poor motor control, combined perhaps with poor breathing patterns, combined with poor nutrition, you know, and when the list gets high enough, then the back pain manifests, so I think if we just were to work with posture alone and not look at all the other factors that contribute to back pain, then I think, yes, you'd find that posture doesn't seem to be causative in back pain, which is what indeed the epidemiological studies show. But the problem with them, as I say, is that they can't deal with the complexity of all of the multiple factors and how they will interact with each other.

- Yeah.

- Yeah.

- So who is looking at that now? How is that being addressed in research circles?

- Well, there's certainly cause to abandon epidemiological research, or to at least recognize its limits, and to look at things like complexity theory, which has been utilized in lots of different fields outside of posture, and indeed health, for things like meteorological studies and so on. So I think that could be one direction to go, and I think that's really what a holistic practitioner attempts to do with their practice is to recognize the complexity of the individual and that the whole is greater than the sum of the parts. And then identify which are likely to be the key factors for that individual to return to optimal health and function, and so there's obviously an element of skill in that and guesswork, but I guess that's where experience and of course a good knowledge base facilitate that process.

- How receptive do you find patients to you describing this complex process by which they have either arrived in their painful state or are gonna get better from it?

- Well I think a lot of patients are very keen to find a solution that makes sense to them, and so I think that's, in some ways, that makes it easier to explain a good rationale for why they may be in pain. In terms of making adjustments, I think people struggle a little bit. I think that's one of the challenges with taking a more active approach to rehabilitating someone as opposed to more of a passive treating the patient approach. So the treatment is great and it does things that the patient can't do themselves actively, and there's that connection, and the touch and everything else, and the reassurance that comes with that. But to then give them tools to get themselves better and to give them exercises and to give them maybe nutritional approaches or other lifestyle advice, that's all great in theory, but then in practice we find, in fact, there's a really interesting paper on this showing that exercise itself is the most potent form of medicine across the spectrum, from back pain to depression to cancer to diabetes to heart disease, it's as effective or nearly as

effective, and in many cases, more effective than the leading pharmaceuticals.

- There's gotta be a whole lot of people in our audience who won't be in the least bit surprised about that, I imagine.

- Yes, but the problem is compliance.

- Or will be delighted to hear it.

- Yes, yes.

- And so then, so it's the most, I have to get this right now. I think it's the most effective, but it's the least, or it is not very efficacious. I think that's the right way around. Which essentially means that the research shows that it's highly effective, but then is not, has poor efficacy because people don't actually engage in it even though they know that it will benefit them, and without any side effects as well.

- Absolutely, well, unless you sprain your ankle whatever, while you're doing it.

- That's true, that's true.

- But how do you address that then in your own practice? 'Cause this is clearly something which is very close to your heart.

- Yes, yeah, absolutely, so but really, it has to be dealt with on a case-by-case basis, and so one of the questionnaires I use for patients before they come to see me identifies where their motivations are, what they like to do from a hobby

perspective, whether they like to exercise, and what their perception of their pain is. So we're kind of looking to see what their mindset is before they come in, and then from there, you can obviously take a number of different strategies to encourage engagement, but quite often, it's just a case of simply, simply, bit by bit, give them the key exercise or the key stretch that will help them, or the key bit of lifestyle advice. And then I think that's--

- How much do you think it matters what the exercise is? Is it just exercise which is actually the thing they need to do?

- Well, again, there's a lot of research out there which is suggesting that, yeah, absolutely, exercise alone is as effective quite often as many of the more technical exercises that have been prescribed over the last maybe 10, 15 years to rehabilitate back pain. But I have some comments to make on that as well, because what you find, and I think this fits really beautifully with our osteopathic background and understanding is that the multifidus, that's a muscle that's been talked about a lot in back pain because it seems to be fairly consistently inhibited when there's low back pain, and it seems to be fairly consistently inhibited on the side that the pain is present and at the segment that the pain is present, and so, essentially, people have used corrective exercise to attempt to rehabilitate the multifidus, and what they found, as you just said, is that it seems to be no more effective than just asking them to go and play a game of tennis or go take up walking or something. But part of the issue with that is that the multifidus muscle itself, you can target it very specifically, but it can be inhibited by a number of different things, pain being one of them.

- Yes.

- Also, when you get atrophy of a muscle, then unless you create a hypertrophy stimulus on it, which is actually quite profound strength-conditioning stimulus, you're not really likely to change the shape of the muscle that much. So a lot of the exercises that have been prescribed are prescribed on a treatment table or on the floor, and a lot of rehabilitation exercises don't go beyond the treatment table and into a gym environment or a sporting environment, et cetera, and I think that's where, when I did the CHEK training, I saw the CHEK training really provided a bridge from my osteopathic background across into the kind of sports conditioning and strength conditioning worlds.

- Can we come back to the CHEK training, in a minute, which is C-H-E-K.

- That's right, yeah.

- We can go into what those initials stand for in a bit, but two things occur to me there. You talked about people doing exercises lying down, and perhaps that might include Pilates, 'cause a lot of Pilates is lying down or is on all fours. How well does exercise in that position translate to a walking position?

- That's a really interesting point, because in my early days of learning more about corrective exercise and rehabilitation, there was quite a strong push towards those exercises being ineffective because they're laying down, and so when you look at how the motor cortex organizes itself, it organizes itself through motor patterns, and so the notion was that just to activate a given muscle laying down, is not necessarily gonna translate when you're now walking or running or hitting a baseball bat, whatever it might be. That was, and that's still true, that's not that that has changed, but there has been research by a guy called Paul Hodges who showed that just by doing actually a transverse abdominis activation technique laying down, that even 24 hours afterwards, there was better transverse abdominal activation standing than there was before that technique. So that again, that ties in with a kind of osteopathic principle and just neurophysiology, which is the law of facilitation, and the notion that each time a neural impulse traverses a given set of neurons to the exclusion of others, the resistance to that impulse will be smaller.

- And I'm assuming that this principle is actually one held by our chiropractic colleagues as well. Is that--

- Yeah, of course. No, no, no, yes, yes. It's neurological, absolutely, yeah, yeah.

- It's just the fact that most of us tend to come from osteopathic backgrounds. The other thing I was going to talk about was the business you mentioned about multifidus. There's an issue here of cause and effect, isn't there? Is it the

multifidus that's the problem, or is it simply inhibited because of the pain and therefore any exercise that gets rid of the pain will then rehabilitate the multifidus?

- Yeah, so there's a couple of points there. First of all, there has been research which suggests that there tends to be symmetry until such point as the pain comes on, and then within 24 hours, the cross sectional area decreases at the segment involved by an average of about 31%, so you get quite a significant decrease in cross sectional area.

- So the pain comes first and then the decrease, then the atrophy.

- Yes, that's it, that's it. But see, this is the point, it's not atrophy, because you can't atrophy that quickly, 'cause it's 24 hours later. So atrophy, even to start happening, takes about two to three weeks, so what it must be is it must be neural inhibition, so the cross section, like if you touch your bicep, it gets wider, so when you inhibit that, then the cross sectional area will decrease and that's what's showing on the ultrasound there, and it's very specific to the segment as well. So, you asked me another point there.

- Oh, the point was whether it was the, I suppose where I was going with this is that, as you mentioned earlier on, for a long time, rehabilitation of patients with back pain was let's target this multifidus muscle as though it's the multifidus's fault.

- Yes, yes.

- What you're saying here is it's not multifidus's fault, and actually anything that gets rid of the back pain will rehabilitate the multifidus because it can now function normally.

- Ah, okay, so, and that's the point that we have to be careful of, because research by Judy Hides, which was published way back in 1996--

- You have a phenomenal memory for these things.

- Oh,well, I talk about it a fair bit. So it's easier to remember. But, thank you. She basically published research which showed that multifidus recovery was not automatic even one year after the pain had gone, and so this I think is a very important point, because I think a lot of us as manual therapists tend to work in a way where the patient comes to see us because they're in pain, and therefore the objective is to get the patient out of pain, and once that happens, then the job's done. My message that I'm trying to convey more recently is that, really, to try to find a goal that's bigger than the patient's pain. That's also a more positive goal than getting out of pain, which you could argue is positive in some ways, but really, you're trying to get rid of a negative. So it's actually much better to, both psychologically and physiologically, to focus on something that is a bigger goal, a bigger dream perhaps, and to create that program, which may be a year's worth of rehabilitation. And so the initial goal is to get the patient out of pain of course, but beyond that, we want to get that multifidus faring better, because now that's gonna improve the stability of the spine, and the functioning of the spine. Once we've done that--

- Would you do that by targeting multifidus? Would you do that by doing functional exercise which will involve multifidus naturally?

- It's very difficult to activate a muscle like multifidus in conjunction with multiple other muscles when it's inhibited, and so therefore, the notion of isolation but then moving to integration is the process that I use and that I would recommend. So you isolate the multifidus, or whichever muscle it might be, initially, to get the neural drive through to it, so this is this facilitation that we talked about, and then when you get the neural drive through, it's gonna activate better, and once we've got that going, then the next thing, we want to start loading it in relevant movement patterns, which may initially be very low key things. So again, floor-based exercises, but just targeting that muscle a little more.

- What sort of things do you use?

- Exercises?

- Yeah.

- Okay, so I would use an exercise called an alternating superman is one of them, yeah, so just go to opposite arms and legs, and in the early research on multifidus, that was one of the exercises which were shown to activate the multifidus the most effectively, because it's an extensor and rotator of the spine. So the alternating superman does exactly that, it extends and rotates the spine, so it tends to wake that up. Actually, prior to that, I would use a technique to swell the multifidus, which is much more isolated and can be literally at the segment, and there's a number of different ways you can teach that. I guess a little tricky to explain verbally, but essentially, one of the tricks is that you can use what's called a doll's head maneuver, which is where the patient's laying on their sides, and they imagine that their hip is out of its socket, and they're gonna just draw the hip into its socket. And at the same time, you can be palpating their multifidus at the level you've identified as the problem. And as they draw that hip upwards and inwards, of course, the pelvis starts to move slightly, and so essentially you're getting an extension rotation through the pelvis but it's very, very subtle, and that's normally enough to switch on the multifidus at that level. You can palpate it so you know it's on. Once you're confident that they're doing it right, you can then get them to palpate it, and so then what that does is it gives them an extrinsic awareness or an exteroceptive awareness of the activation of the muscle. Once they've achieved that, then the next thing is to ascend or make the exercises more advanced and to build an interoceptive awareness of when that muscle is switched on so they don't have to keep palpating.

- Yeah, okay.

- Yeah.

- But compliance is still gonna be an issue when you send them away from the treatment, isn't it?

- It is, it is, potentially, yeah. Obviously it depends a lot on the patient and on their goals, but one of the nice things that helps to motivate is of course, pain is a very strong motivator, but also if you can take measurements and use different testing procedures, so you know where their spine is at, where the stability is at, et cetera, then they've been clocked at the beginning of the assessment or the beginning of the program, and so you can say in three weeks time, or have a long weekend to reassess this, and then we can see how you're doing and we can progress the exercise, so there's a little bit of a carrot, but there's also a potential stick, which is to say that if you haven't done it, I'm gonna know because we're gonna retest you. And most people respond really well to that actually. It seems to be very effective.

- Yeah, little like showing up and not done their homework.

- That's it, that's it, yeah.

- Okay, let's go back to where you, you mentioned the CHEK Institute, what's this all about?

- Okay, so the CHEK Institute, I was first made aware of the CHEK Institute when I first graduated actually, I graduated in '97 and I went to New Zealand to work there for a year. I thought it was best to get as far away from home as possible in my first year out. And I saw this guy presenting, this guy Paul Chek, and it looked quite interesting what he had to say.

- He's an American, I believe.

- He's an American, yeah, yeah. And at the time he was consulting with some big sports teams, so you kind of have an air that maybe, he had some credibility from that perspective, but I listened to what he had to say and it was fascinating information. So then I came back to the UK and did a master's degree. My objectives had always been to get into professional sports. I really wanted to work with a professional football team, and so my master's thesis was on hamstring strain in professional footballers, and I thought, oh, that guy Paul

Chek knew a thing or two about sports injuries, so I wrote to the CHEK Institute.

- What's his background?

- In terms of official qualifications, he's a neuromuscular therapist, so that's I would say in British terminology, that's like a fairly advanced sports massage therapist. The applied anatomy that they go into is quite incredible actually I have to say. It was very impressive, their ability to work with all kinds of different muscles you didn't even know you had. But so that's his official background, but he was in the Army, US Army boxing team, and was their trainer, and so he had quite a training background, and he combined that with his therapy background, and he actually worked under an osteopath in the US Army boxing team who's the medical doctor for the team, so I think that gave him quite a holistic overview. And then he really developed his own ideas, and really just studied a lot of osteopathic philosophy and textbooks, a lot of physiotherapy, a lot of chiropractic. And when I saw him speak, I was just incredibly impressed that he was referencing everyone that I was aware of, and others that I wasn't aware of, and so I ended up going into his training system from there, 2001. And I was saying earlier, it's like bridging the gap, I would say, between a good strength conditioning coach and a manual therapist, let's say. So it's kind of clinical exercise rehabilitation, it's very holistic, so it really fitted with my philosophy.

- What do you think now given that you've been through osteopathic training, you have a master's in sports rehabilitation, hamstring, wrote a thesis on hamstring injuries, so what did Paul CHEK's teaching add to that?

- Well, I think it added a lot of structure to the way I work with patients in terms of understanding how to write a very effective corrective exercise program. He's very good with tools and questionnaires and assessments. And one of those sort of catch phrases, if you're not assessing, you're guessing. And so the idea is that you assess, you do your intervention, and then of course you reassess, and so there's lots of measurements and this kind of thing. But in terms of what it added, I would say that I think as an osteopath, I had a lot of anatomical awareness of different muscle groups and how they may be relating into certain pain conditions, but it was a kind of best guess approach as to how to exercise them and which acute exercise variables I should use. So acute exercise variables or reps, sets, loads, tempos, rest periods--

- Well, reps, sets--

- Sets.

- Tempos, loads.

- Loads, tempos, yeah. Rest periods, periodization, which is essentially time tabling it out. I think most therapists in most courses that I've been on where they're teaching exercise therapy or some description, you normally will ask, well, how many repetitions do we do and there's a bit of a shrug of the shoulders and 10 is the normal response. And I think if we lived in the imperial times, then it would be 12, but because we're in decimalized times, then it's 10. So I think there's no real strong rationale for why--

- It's gonna be three sets as well.

- Quite often three sets.

- Even in modern history it was always three sets.

- That's it, that's it. But there's a science behind all of that, so we know for example the eight-to-12-rep range, if that's the maximum you can lift for eight to 12 reps, then that's gonna have an optimal hypertrophy response. If it's one to six, that's more power. If it's 12 to 20, it's more strength endurance. If you go beyond 20, it's more endurance. So there's lots of things, so that's just reps, but then there's a science behind sets, and there's a science behind rest periods, and the tempo as well can influence different aspects of the exercise, so, it really kinda took exercise to a different level for me.

- How long did it take you to develop an adequate level of knowledge about all this in terms of exercise prescription for patients?

- Well, I would say that within the first year or so of doing the CHEK training--

- Which is all online, is it?

- It's a mixture of online and then courses, five-day courses, typically, yeah. Yeah, I would say within the first year, I felt fairly confident, I mean it was quite a lot of, I think, you have to kind of change your minds set about how you're working with the patients and also to be able to write a program can take a very long time in the early days because you're strategizing and trying to work out which is the correct sequence here and what's the right acute exercise variables, et cetera. So that can take a while but, I think, within a year or so of doing it, it was fluent.

- Does that conflict with what you said earlier on, when actually just exercise is good. Regardless of it being so complicated.

- Yeah, yeah it does and it doesn't, from a general overview then, yes, general exercise is, of course, is great. But I think if you can get specific with the exercises, particularly with the example I gave you, the multifidus, there are muscles and other situations where being able to target a specific muscle can be beneficial or maybe even be vital for full recovery. Then I think it's really important to be able to understand which muscles are involved in different issues.

- I was dreading this, when you talked about it, but we've had a question come in which says, "Could you show us the exercise for multifidus."

- Oh,

- Now, I'm happy to be the model for this, if you want to draw this through. But I think we're going to need some clever camera work on this one.

- Well the alternate of superman,

- Facing this way?

- you'd actually do on the floor, but if you imagine you are on the floor,

- I can be on the floor, that's fine.

- Okay, so the alternate of superman would be prone.

- On the belly?

- On your belly, yep.

- Oh good, this is going to be great for my shirt.

- That's it, that's it, then what you do is you lift, left arm and right leg into the air from there, that's it. And If you turn your thumbs up towards to ceiling then that will just activate your external rotators of the shoulder, which is typically a little bit better for the shoulder health. And then you can rest that back down and then you switch sides. So, essentially what you're getting is, you're getting an extension and a rotation through that lumbar spine region. And so that will activate the multifidus in a non-specific way. So that's the alternating

superman. But it's a little bit non-specific. The dolcut maneuver, is perhaps better for multifidus specifically.

- Right, dolcut maneuver, I'm gonna lie on my side. You want that on my side?

- Yeah, so probably lay down

- Let's go this way.

- That's it, okay, and so the way I would do this with a patient is I would just say, you want your hips to go about 45 degrees something like that.

- Something like that.

- But you can adjust the hip position, so obviously, the more vertical they are or more in alignment with the body, the more your get a hitch through the hip, the more flex they are, the more you're gonna get rotation through the spine. So, assuming you've identified your level, where there's multifidus issue, then you can palpate that level. You ask the patient to imagine that this hip is out of socket and that they are going to draw it up into the socket very, very slowly. Just using the muscles in the hip there. So if you just relax, don't actually pick the knee up, just drag the thigh up the other thigh, just relax back there. Good and so I can feel that just switching on there, just go really, really slowly, really lightly, good, and then relax, good. And if it's done well, quite often, do you need to get your neck?

- No, no, no, I'm fine.

- If it's done well then quite often it's quite difficult to actually palpate the swelling of the multifidus, which is then the first muscle you come to, just after you move off of the spinous process. So it just sits in that laminar groove there. If they do it

well then you won't really feel it swelling much, but when they relax you feel your fingers dip back in, so that's an indication that, of course, it was working.

- I can get up now?

- You can get up.

- So, I want to ask a question. When you said alternating superman, I assumed it was going to be this alternating superman.

- Okay so that's another way to do it and that's, we just have a different name for that one. We call it a horse dance horizontal. I think in physio world it tends to be called a four point kneeling exercise and, yes, obviously you're using alternate arm and leg again for the same reason.

- Well I don't know which of our viewers it was that asked us to demonstrate that exercise but I hope you feel you got your money's worth from me lying on the floor in my lovely clean green shirt. Desperately trying to protect to protect my microphone. Do you do a lot with Pilates?

- I'm familiar with it, yep.

- Because we had a question from another anonymous viewer. Pilates using a reformer how does that compare with mat Pilates reformer Magill, you use his exercises.

- I'm not familiar enough with Pilates to say that I'm an expert or a reformer. I know what they are and my comment would be on a reformer is that, of course, it's a fixed movement pattern and so there's certainly benefits to it but it's on a track and therefore, there's less stabilization requirement on something that is moving in a predictable way then if you were to use something like a Swiss Ball or a Bosu or a Wobble.

- Bosu?

- Bosu is like a half Swiss Ball. And those things move in three dimensions and therefore have a little bit more of a functional carryover potentially. But that doesn't mean that reformer's bad, it just means that it's recognizing the limitations of what that offers. Compared to using the floor, of course, one of the other things we have to be aware of is whenever we use any kind of moving device or balance device like the things I just mentioned you start to activate a different reflex profile, so you're actually activating a tilting reflex profile as opposed to a righting reflex profile. So, the tilting reflex is the one that we use when the train goes off or the bus accelerates and something is moving underneath you. But a righting reflex is what we use just to move across the floor. So most of our life we're using a righting reflex, predominantly, but when we hit ice or slippy mud or if we ride a horse or a surfboard or a cheap train, that's when we use a tilting reflex. So there's a limitation to all of those things as to how much carryover they actually have to activities of daily living, but what they do do, is they do stimulate the tonic motor neurons which means that although the tonic nervous system, which means that the motor neurons get stimulated and then the tonic musculatures activates better and so Vladimir Yonder talked about this a lot and he developed what he called Rocket Shoes which were basically based on the notion of Wobble Boards, he was one of the pioneers of Wobble Boards as well. But the idea of stimulating the tonic aspect as opposed to the more phasic larger mobilizer muscles, so that is one trick that you can certainly use. The reformer would do that, other balance devices would do that to some degree, but then you have to ask how relevant is that and how are we going to make that more relevant or ascend the exercise is the term that we tend to use, or progress the exercise to be more functional for that person in their sport or their activities of daily living.

- Are you a fan of Swiss Balls?

- Yep, I think they're great tools for a number of things. They're great for stretching, for mobilizations, they're great for switching on the nervous system a little bit in terms of the tonic motions we just discussed. They create some stimulus, some fun, some balance challenges and so, I think they can be very beneficial for a lot of reasons. But just like any other tool, they have their limitations and it's knowing when to use them and for optimal efficiency.

- Yeah we had a broadcast with an ergonomics expert once, and we talked about people using Swiss Balls all day at their desk. And her opinion was that, as you know, a Swiss Ball if you use it all day at your desk, you're going to start adopting some very bad patterns cause your bodies not, you'll get tired and therefore you can't keep that up. So you're talking about using it for doing specific exercises, for a shorter period of time.

- Yes, yeah yeah.

- To switch things on or stretch them.

- That's right, I do use a Swiss Ball as a chair from time to time, but just like your presenter said, in a half an hours about enough for me and then I'll need something that's more stable. And the danger for using a Swiss Ball for a seat is that, of course, is essentially fatiguing your stabilizer system so then if you get up out of your seat and twist to pick up your briefcase or something at the end of the day and you've fatigued the stabilizer system, then you're leaving yourself quite exposed.

- First, quite useful to bear in mind because, I think, I don't know how much impedance that's based on but I assume it's based on a lot of experience. There is a tendency in some walks of life where people say, oh it's great, go and get on a Swiss Ball and stay on it for all day. You want to put it into perspective, yes you can use but watch out for the dangers that occur if you over use it.

- Yes, yes.

- I think that's very helpful.

- Yeah, yeah.

- Somebody possibly the same person who asked about the exercise asked what you were looking for when you were palpating a dysfunctional multifidus?

- Well first of all you can palpate atrophy potentially and it feel as a dip in the spine so you can literally palpate along if you've got the spinous processes moving along the spine. Running down the spine here and you've got the multifidus above, you can just literally palpate along the spinous processes or I should say just off the spinous processes and you'll find that there's a large amount of meat at one segment and you move along and there's a dip and there's a large amount of meat at the next segment. And so that's quite palpable in some cases, but there are other ways to assess for it, is just in movement analysis, so you could watch someone walk or you could watch someone twist, you watch them twist under a load which often will bring that out, or doing a chin up is another time that often you'll see this phenomenon occurring, it's what's called a striation. It's literally a line that goes across the back, sometimes right across both sides, other times it's just on the one side. And the striations essentially are kind of, micro shear that's occurring through the spine and so the skin literally gets a little crease at that segment and if you recall your orthopedics and spondylolisthesis, then a spondylolisthesis will often present with a transverse lung crease. So transverse lung crease being a false slip, so now you have this crease going right the way across the back, well when there's segmental instability what you see is you see a striation appear under loads when that segment is stressed. It's like a micro version of a transverse lung crease. So when you identify that you know that that's the level that you want to go in and assess and you can palpate at the level and that's how you can retrain.

- Sunny has asked, do have any tips for those patients that just have no body connection or awareness and struggle to switch on muscles. Lot's of cues, I assume, she says.

- Yes, so if someones got poor kinesthetic awareness, then as you say, cuing is key and there are a number of different cues you can use, and some people respond better to different cues, so with the deep intrinsic muscles of the spine and of the core, which obviously we'll talk about more on the actual time that we go through that.

- Cause we're doing a book and it's called, the Math of Core Stability.

- The Math of Core Stability.

- Which is to put opposite side to the myth of course, stability

- That's right Which is a famous paper of our Lederman's

- Yes, so I'm looking forward to that. I forgot where I was going with that, so

- Well, we're talking about cues for

- Cues, yes, so the multifidus, the transverse abdominis, the pelvic floor, they all will co-contract together. So one of the things with the Dolcut maneuver is that you feel the multifidus swelling up, you actually see the transversus switch on, because you see the abdominal wall draw in. Even though the patient's not focusing on their back or their abdominal wall, they just focus on their hip. But as the multifidus switches on the transverses will to. Sometimes by asking someone to draw in their naval towards their spine, which isn't a great cue, but it's one cue that's used for the trans abdominis, that will switch on the multifidus sometimes, giving them a pelvic floor cue, like imagining that their stopping the flow of urine, for guys you can ask them to imagine their drawing their testicles up, for girls contracting the vagina or for either sex, contracting the anal sphincter. It's amazing actually, for some people, the first two don't work at all but the last one does and for other people it's the middle one and you know, so on and so forth. It's finding the right cue for people often is the a key thing, but sometimes you can actually wake up people's nervous systems by balance challenging them. So one of the tricks that we use in the CHEK system is to get people to let's say, kneel on the Swiss Ball, if that's challenging to them. For some people that would be way to easy, it doesn't bother them at all. But for most people to kneel on the Swiss Ball is quite scary. Even for some people to sit on the Swiss Ball is scary. So you've got to find the right level of balance challenge that it frightens them, but it's safe. Because what that does is it increases the neural drive to the tonic system because the body feels under threat so it tries to stabilize

and then if you immediately take them from there and then do, let's say the Dolcut Maneuver, then often they'll activate straightaway.

- Excuse me.

- Yep.

- Another question here. The molty,

- Yes.

- Dot, dot, dot.

- Yeah, yeah.

- We do it all the time with yoga, will you address quadratus lumborum, that's Selema. Thank you Selema.

- Will I address quadratus lumborum, yeah. Okay, so quadratus lumborum obviously is quite a big muscle and the oblique fibers of quadratus lumborum are more, will be turned outer unit or phasic. And then more involved in side to side flexion, the lateral flexion that we think of the quadratus as being involved in. The medial fibers literally leap from segment to segment and they behave just like the multifidus but in the lateral aspect. So depending on what your interest in is there's different ways to work with that muscle. I'm just trying to think. If there's something specifically that their angling toward because one of the things I'm most interested in with the quadratus lumborum is the balance form side to side, of course, and so I tend to measure the range of motion in the quadratus lumborum. Just in simple side flexion tests and quite frequently what you find is that there is a difference. It's a little bit like leg

length discrepancy, you'll most commonly find a difference but whether or not it's a significant difference is what you're interested in.

- So when you say a slight bending test you're just looking at the range of side bending.

- Yes.

- That's right.

- Yeah, yeah.

- And so, there may be other things that influence that, like obliques of course could influence that, pain can influence it, but generally speaking, the limiting factor there is likely to be quadratus lumborum, so your looking for that symmetry. And when you find a big asymmetry, perhaps two, three, four centimeters from side to side, then I would create a stretch program where their perhaps doing if their tight on the left, you might give them a left, right, left stretch protocol, so your stretching both sides but you're fixing more on the left. And then we might give them the right, left, right exercise protocol so your working both sides but you're biasing it more to the right hand side.

- What do you mean by that? You say left, right, left stretch protocol means in actual physical terms? What are you going to tell the patient?

- So it would be, let's say that they, a good stretch for the quadratus lumborum would be to lay over a Swiss Ball or a curved surface, again a Bosu would work, and to essentially hold the stretch for maybe five or 10 seconds, you can do a little contraction and then relax back down again, five or 10 seconds, so we might go left side times three, switch to the right side times three and then back to the left side times three.

- And you're doing both your exercises there, cause you're doing the contraction on one side, since you're doing the contraction twice on the opposite side aren't you.

- Well I was just using the contract relax method as an example of how you might stretch. I wouldn't say that's an exercise per se in terms of conditioning the muscle. But then you could use a similar exercise again over a curved surface like that to basically, like a side crunch. But there's lots of different ways to work it. Someone mentioned Magill earlier and Magill uses slight bridges is one potential way to do that. And there's other, there's obviously many exercises.

- Do you work with an elderly population as well, cause I know the things you've described, I mean asking an 80 year lady to do a pull-ups so that you can look at the multifidus is perhaps a little impractical. And some of these exercises could be a bit challenging for the elderly, I mean, do you have modifications that you use for that.

- Yeah, absolutely, one of the stories I like to tell, is of a lady who came in to me who's 79 and was really upset because she was going to miss her ski season for the first time in 50 something years. She had low back pain which looked like a disc bulge and I was trying to work out how could this be a disc bulge in a 79 year old. And after working through all the rationale, I recognized that is must be stenosis and because we know that the both the spinal canal and the intervertebral foramen will increase their volume with flexion, I gave her some exercises for her glutes were which would flatten out her lumbar spine and create a relative flexion in her lumbar spine, which will open out the intervertebral foramen and the spinal canal to some degree and so it just for her of course, she wasn't going to go to a gym and she wasn't going to buy exercise equipment so I just gave her floor based exercises. But I gave the right exercise variables again, so the right reps, the right sets, the right loads, right tempos et cetera and she didn't hear back from her for a while, but about three months later, I got a lovely card through the post saying that she just had her most recent ski season and that her pain had gone and she was fantastic. So it's a nice example of someone who's , A relatively old and B had no equipment but just followed the right exercise for the right variables and it made the world of difference to her.

- Danielle, Dani has asked us, well asked you, whether you think any seat or seated positions carries its adverse effects or so Dani thinks that seating positions carry

adverse effects. The answer is surely to take regular breaks from that posture resetting the through proprioreceptors and stabilizing mechanisms.

- Absolutely, yes, yeah, so the neutral spine concept is a hypothetical optimal position. And I think that's really important, that it's hypothetical because of course posture is dynamic and it's not static so, in that way sitting should be done and should not be static. And it's quite interesting to me that the field of ergonomics has gone heavily into the notion of angles and lumbar supports and getting everything at exactly the right angle so that there's minimal stress, because if you're taking your physiological approach then what you see is that within the space of about three minutes pretty much any connective tissue in the body starts to undergo creep depending on how much stress it's under. Cause creep is both time dependent and load dependent so, if there's very low load then the creep may take a few minutes longer but if there's relatively high load, like if you're leaning forward over your computer, that's quite a lot of load through the thoracic spine for example, so the creep is going to happen quicker. Now creep obviously being stretching through the connective tissues, is what actually stimulates the mechanoreceptors within the connective tissues to fire. These are protective mechanisms as soon as you start seeing any type of creep the mechanoreceptors are like, whoa, this is traumatizing, the ligamental system we need to switch the muscles on to either take the load off or to move positions so there's a different stress going through a different part of the connective tissue. So the point is once you understand the newer physiology of the human body, then ergonomics in its kind of classical sense doesn't make any sense because they're trying to find the perfect angle just like you know you could say, well, the neutral spine is trying to find the perfect spinal position. But the point is is this, it's a continuum, so I'm not against ergonomics, I just think that to be in a perfect posture is not realistic for more,

- It's interesting you say that because the ergonomics speaker that we had in, must have been well over a year ago, two years ago now, she made the point that's alright, they make, she just spoke the ergonomics expert for HermanMiller who makes some very expensive office chairs and they're very comfortable office chairs. But she said it's not about having a comfortable chair, you sit in the same position, the whole point is that you can move in the chair, because you've got to keep moving.

- Yes.

- Even if you curl up on the chair with your knees to one side or you slouch in the chair or you fall in the chair or make the chair go wobbly, it's changing your stressors that makes the position comfortable.

- Yes, yes.

- And as you say, there are nice little diagrams that say well put your keyboard here and your screen here which probably helps as an overall postural pattern, but in between that you've still got to get up. Do you give people, is there a time limit that you would say people should be sat in a chair before they should get up and walk?

- Well it's interesting

- We would say 20 minutes

- When I worked in New Zealand, because the healthcare system there, which used to be called The ACC system was essentially an accident and compensation system, I think was what the ACC stood for, so if you were working injured, or injured in a working environment then essentially the government would not only cover your rehabilitation but they would cover your, up to 80% of your lost salary. So it was an incredible system from that perspective, but there's a lot of malingering that occurred.

- Yeah I would imagine.

- And the government were extremely hot on providing ergonomics advice. So what they said is that every three minutes, you should have a micro pause and what they meant by that was this, if you're typing away, and some companies took this out deadly seriously, they'd have an alarm go every three minutes, bleep and you would have to stop, take your hand off, maybe a quick stretch and then back to it. You might just adjust you're posture a little bit it and then

back to it, that's a micro pause, about 10 seconds. Every 15 minutes you had get out of your seat, so every 15 minutes there'd be a bleep, you had to stand up, maybe go for a little stroll, grab a glass of water, whatever it was, get back.

- It's quite disruptive.

- It seems to be very disruptive. And then every 45 minutes they said, you had to take a proper break.

- Imagine it be the water has arrived.

- Amazing, amazing.

- Every 45 minutes.

- Every 45 minutes

- you had to get up.

- Every 45 minutes. That was their recommendations. But what I'm talking about is studies on creep and connective tissues show that it occurs again, depending on the times depending on the loads involved. Typically it will occur within about a few minutes, within about three minutes in the seated position, so that means that you should be moving about every three minutes. Now of course, again not that feasible. But to be shifting in your seat or leaning forward or leaning backwards or whatever it is, the body should be doing that naturally, that's how the body should work and this is why I would favor in an ideal environment, I would favor multiple work stations. So floor based work stations, desk space work stations and standing work stations, so you've got

the options to move between the three. That way you'd change the stresses on the body consistently and continuously throughout the day.

- Well we did have, in fact there's a video on out website, about using one of those moving desks.

- Yes, yeah.

- There's always all sorts of ways of doing that, aren't there, people sell locks that you put on desks that will lift your computer, the HermanMiller desk there was a button on the desk, everything on the desk would rise up to whatever height you wanted. Very expensive, but of course, a very nice way of getting it. In fact, Alex the lady who owns the studio that we're in at the moment, she's actually fitted her laptop to the front of her treadmill.

- Oh right,

- She can get up from her desk and use the same machines, it's the same, it's plain, just do some walking while she's on the computer. Which I guess must be quite good posture really. We must go on with some of these questions. This is an interesting one. I don't know who's asked this question, but is a neutral, you talked about the neutral spine, is a neutral spine model not a little outdated and to one dimensional, the tense gritty model offers a more realistic and adaptable explantation of spinal function.

- Well, unfortunately I'm not familiar with the tense gritty models so I don't, That's tricky for me to

- Well you'd be if you'd sent that question in. Could you tell us what you mean by the tense gritty model? That would be very helpful.

- I think a neutral spine philosophy if you

- I know what this is, this is a spelling error, by the people sending the question in, they mean tensegrity.

- Oh, tensegrity

- tensegrity modal That makes more sense.

- That would be it. Of course, yeah, yeah.

- You got to work the auto correct on the program, it turned into tension gritty which I'm sure it isn't, tensegrity.

- What tensegrity still has to work with physical properties and physical properties of connective tissue which we've just discussed, are that they undergo creep of course, over period of time so a neutral spine, and it's a really important point that they're making because what my understanding of the neutral spine is that in the 90's it was used a lot in back pain schools and what it did was it created this kind of theory of movement into flexion, in particular, because they were teaching the notion of hip hinging and not moving the spine. So you can see from that perspective is outdated, we know that that's not a good strategy, but what we also know is that it minimizes stress through the spine and it teaches good technique for things like lifting and teaches hip back disassociation, teaches arm back dissociation which people with low back pain often have very poor awareness, they've normally lost proprioception so it's a part of the process of retraining proprioception for them

- This is the modern concept of neutral spine, not the original.

- Yes exactly, exactly and so I think a really good analogy for the neutral spine is the notion of playing tennis, so if you imagine, if a neutral spine is standing, right in the middle of the court, than that's where you want to be to a successful tennis player and your opponent is gravity. So gravity is unremitting and without an opponent, we don't have a need for a neutral spine, just like without an opponent in tennis you don't have a need to stand in the middle of the court, you can stand anywhere. But when there's gravity opposing you and you want to stand in the middle of the court, that doesn't mean that you can't move forwards to the drop shot or back to the lob, but if you stand to near to the front of the court that's like being in flexion the whole time, you're going to keep getting lobbed and eventually you're going to lose the match. Because your opponent is going to suss you out. Similarly, if you stand to far to the back of the court that's like extension, and so you're going to be loading at the back and they're going to to keep hitting the drop shots and eventually you're going to lose the match. The same with leaning off to one side or leaning off to the other side, et cetera, so I think there's an analogy, the neutral spine is the position that you want to return to as a default so from a neurological point of view, the brain will migrate the body to the position where it's strongest. So if you are strongest in the neutral spinal position, then what that means is that, you can certainly move into flexion, or you should be able to move into flexion but your body will want to bring you back to neutral. Now if you are strongest in a flexed position, because that's where you spend most of your time and you're de-conditioned let's say, then when you move into flexion the body, first of all won't move back to neutral spine but what it also means is that you can't go into much more flexion, so you see starting from a flexed position. Let's say you're carrying a table or sofa through a door and it just catches on the door. Well, because you're already in flexion, you've got no range to move into, so that's when you injure a disc or a ligament in the back. If you're carrying and your strongest in neutral and then you catch the sofa on the door as you go through let's say, then you've got capacity to move into flexion and so one of the interesting things about the neutral spine position is that it's actually contrary to how it may have been discussed, partly by me, but partly in the literature, is it's actually the least stable position for the spine so what it means is that you have the most number of options to move into, which means that from a performance point of view it's got to be the optimal position, which is like the tennis court analogy I just gave you.

- Some more questions for you. This question is, I don't know if he's taken a mickey out, he's actually mistyped his name on an email he sent so he's actually phonetically spelled out his name for me, Danielly it's lovely to hear your voice through the medium of text. He says, I see, it was because his name had been misprinted on a previous question and I, right, so Danielly, just wondering about engaging multifidus using PNF, proprioceptive neuromuscular facilitation, I imagine that if it would come in with stretch component,

another thing wondering thing wondering about what the E. Lederman concept of his missive core stability, that doesn't go anywhere, he considers danger in trying to work in isolation the likes of quadratus lumborum as the so called core muscles are not anatomically isolated, they invest considerably in and through other similarly working muscles. Now we are covering the myth and the math of core stability in our later broadcast with Matt but it may be you want to touch on that and what about the PNF concept that Danielly is talking about.

- So from a PNF point of view, I think it's difficult to know exactly what he's alluding to there because PNF in its original conception, I think was a lot of, crossed extensive pattern type movements, a little bit like the alternating superman that we looked at, but then of course, it's used as a stretch modality in physiotherapy and it tends to be a contract relax technique much like MET, the major difference that I understand is that PNF tends to be 100% and therefore the notion is that you're targeting all of the different muscle fiber types where as with MET you're tend to be going at about 10% contractions so your targeting more, just the tonic muscle fibers. So, I'm not quite sure, I'm guessing he's meaning using cross extensive patterns and I think of course, that's how the multifidus is utilized in gate and in many other functional movement patterns and so I think it makes sense but again it's an integrated version of activating the multifidus. So if we know that multifidus doesn't react a bit spontaneously even when the pain's gone, I want to for thoroughness and some peace of mind, I will want to know that the multifidus is activating at that segment. And then I would create the integration and that really, to some extent, answers the other part of the question which is about Lederman's approach in saying that we don't abuse a muscle in isolation. That's true, it's very rare to use a muscle in isolation at least, but if we want to activate a specific muscle, you only have a certain amount of neural drive you can muster at any one time and when a muscle is inhibited a lot of the time you need 100% focus on that single muscle just to get it to fire up. So that's the notion of isolation. Isolation, as I mentioned earlier then creates facilitation of the neural drives to that muscle which means that it activates better in integration but you would never stop a isolation, or I certainly would never stop it, isolation, I would then integrate back into functional movement patterns, which is exactly what Lederman's talking about.

- Right.

- Yeah.

- And we'll go into that more depth on that in a minute.

- Yeah, yeah, yeah.

- Hope that helps Danielly, if you want to come back with some more than please do. Somebody said that that was a really good analogy about the tennis court that you brought up earlier on, I don't know who said that but they like it.

- Obviously.

- Monica, has mentioned that IKEA does standing desks and sit to standing desks, I don't know anything about those, the HermanMiller ones are very expensive, and very lovely and electrically controlled but it's nice to know that IKEA is doing something, and I suppose the challenge is actually, putting them together when they come out of the box. Chap called Ian has asked if there's any research about creep and ergonomics.

- Oh, there's huge amounts of research about creep and ergonomics of course, I don't think it's covered a lot in the ergonomics literature, I've looked into it. I presented a concept called ergolution which is ergonomic, what does it stand for it's evolutionary solutions to ergonomic challenges and so the idea really is to look at the body from an evolutionary perspective and so things like creep are part of what we've inherited as a biological organism and why is it there, well it's there to encourage us to move regularly. One of the big issues I actually think with ergonomics and with this phenomenon of creep is that computer screens are hypnogogic and so they take us into hypnogogic trance and so we just get drawn into what's on the screen, we'll tap and tap and tap away, and ignore our bodies. Then we might realize that our back's really sore. So I think that's a bit of an issue as far as ergonomics is concerned is that, where the body would normally be responsive to discomfort, in whichever tissues are undergoing creep when you're drawn into a screen, whether that be an entertainment screen or whether it be actually that you're engaged in writing a document and you've got to get it done and

there's a deadline that's where I think you can start to get issues because your body isn't responding to the messages that it's receiving.

- I suppose at some extent that is particularly evident when you get, I'm not going to say young people, but anybody, engrossed in a computer game and they lose all awareness of pretty much everything around them including time, because they are so focused on what's going on. So I don't know if that answers Ian's question about research into creep and ergonomics.

- Well if you want a specific research, I list a number of, there is some research I've presented in the paper on the neutral spine principle which obviously we'll make available to everybody. So there's one or two references there, the same in my chapter as well that mentions, but there's plenty out there, yeah.

- I'm going to come back to using this neutral spine principle in a minute but there's a couple of questions which have been sitting on my list for some time. Chap called Craig asks, how do you determine the right number of reps? Going back to your exercise description as you know.

- Sure, You have to determine first of all, what your objective is. So if your objective is just to activate the muscle like we were showing with the dulcut maneuver then really it's not so much about reps as it is about the time under tension. So the actual duration that you're working for. What we want to achieve with any kind of postural conditioning, is a minimum of three to five minutes of time under tension. So what that means, is that you can break that down however you want to, now it could be that if someone's relatively well- conditioned, you held that for what, maybe 10, 15 seconds each time something like that. Was that uncomfortable to you?

- Possibly a little uncomfortable as I was trying to keep my microphone off the floor, so I was

- But that's generally quite a good duration to start with for people. So let's say it's going to be a 10 second hold, well then we know that we want to hit three to five minutes at a time under tension, so straight away we know we've got to do at least 18 repetitions of that,

- That's a lot.

- to get to three minutes. Okay, so that's reps but then we also can break that down into sets. So sets would be, so if we know 18 is the number that's minimum, then we can break that down into three sets of six repetitions of 10 second holds, so now we've got three minutes of work in total. But this is where the rest period comes in, is that you can't have to long a rest between those sets, because if you do, you won't get the training effect that you're after, because you're not stressing the type one fibers. So this is a slightly long winded way of saying that you know that it's quite variable. But that would be an example with a postural exercise, you want to hit three to five minutes of time under tension. But for a hypertrophy exercise, so if we were trying to actually hypertrophy your multifidus there, then we would want to probably be looking at loads you can only pick up 8 to 12 times before you're completely fatigued so we're talking quite heavy loads. We might do something like a bent over row where you've got a load in your arm and your rowing in that bent over position. Or you might need to do a dead lift, which is picking up a load from the ground, and standing up with it.

- Which I've had to, in my personal experience with that, is that it's a damn good back exercise.

- It's an excellent back exercise.

- For back pain.

- That's it yeah. You know given, the right person doing it. You know, there are obviously are contraindications to these exercises, but generally with good technique.

- But that's also key isn't it? Because I don't know whether you would ever consider having a sheet of paper and saying alright, go find yourself a weight and do dead lifts on the basis of this piece of paper. I suspect that many people who aren't

used to the gym, really need a coach or personal trainer or somebody with them while they're doing those exercises. A, to make it happen, but also to make sure it happens right.

- Sure, sure, absolutely, in the first instance, technique is always going to be taught, it's just like anything, I think it's going to be, you can be taught well by a good book or a good paper or a good instructions, but it's always going to be better to have a good coach and so, yes, to have someone observing you and talking you through how to work through each step is important.

- One quick question before we go into looking at how you actually apply your neutral spine technique. Do you think working multifidus also mobilizes the SI's and lumbar spine could that have as much effect on recovery? This question came in ages ago, when we were talking about

- Sure.

- Multifidus.

- I wouldn't particularly say that it works the sacroiliac joints, in my view, of course, it depends on how you're activating it and how you're utilizing the exercise. But you know, the multifidus, I'm just trying to think, so the question was about sacroiliac joints?

- Yes, SI's and

- The multifidus if you look at the anatomy, you've got the sacrum here and you've got the iliac crest going round and there's actually a gap between the two and the multifidus actually fills in that gap and what it does is pushes the, when it swells, it pushes the iliac crest into a slight posterior tilt. So it sits here and it swells out when it engages and it pushes the

- The structures on the top of the ilium, as well, doesn't it.

- It's not, are you talking about the quadratus lumborum or you talking about,

- No, no it's for the multifidus, there's an attachment at the top I think.

- It may well be that there's an attachment, I'm not sure, what I know is that at it's at its thickest at the lumbar sacral junction and essentially there are no paraspinals beyond the lumbar sacral junction other than the multifidus. So the multifidus is all the meat you're gonna get below the lumbar sacral junction and what it does, is that when it swells out it pushes back on the PSIS which creates a subtle posterior tilt which actually stretches the posterior sacral iliac ligaments which creates tension in them, which then stabilizes sacral iliac joint, as does posterior rotation of the phenomena.

- So that's a good thing, that swelling and posteriorization of the ileum.

- It's all a good thing but the problem is if you have pain, then the multifidus gets inhibited and then it atrophies and then it won't recover even when the pain's gone unless you exercise it effectively. So this is why it's so important to know how to do this stuff.

- Okay, so how do you apply your neutral spine principles, actually treating a patient?

- Okay so, first of all it's putting it in at the right times and in the right, I suppose in the right context. It's always context specific.

- Well one of the questions is, how do you suggest a Hyper lordotic posture is improved, for example, do you want to take that as a specific in the setting.

- Yeah, yeah, yeah absolutely . Well a hyperlordic posture, typically you will find as a kind of textbook case, you will typically find that the hip flexors are a little tight, the lumbar rectus are a little tight and you'll find the lower abdominals are a little weak or inhibited and the glutes and hamstrings are a little week or inhibited. So it's what is classically known as a lower crossed syndrome in muscle imbalance textbooks and so I would give stretches to the lumbar rectus, stretches to perhaps perhaps rec-fem, psoas, I normally measure them to see if their tight of course, and sometimes it can be the lower tibial band that's tight and it's creating an anterior tilt on the pelvis and sometimes it's the abductors as well. So there's a number of muscles that can pull the pelvis anterior and creates the lordosis. But then the ones that counteract that would be glutes, hamstrings and lower abdominals. So, I would prescribe corrective exercises for those muscles and build them into a program.

- When does the stick come into it?

- Well it's

- Nobody knows what the sticks are founded in.

- Well it actually, could have come in when we were talking about dead lifts and you asked about how do you train someone to do a dead lift and what if they're doing it wrong? Well this is where I developed this idea of a neutral spine kind of by a feed back tool because one of the things that I was trying to do when I was doing the CHEK training was to use a dowel rod, so a wooden dowel rod, six foot long and you put that on someone's back when they're perhaps in the four point position, like you were in earlier and it's a great tool, a dowel rod, because it's circular so what that means is if you pick up your arms higher than you pick up your leg, let's say, then it will roll off your back, so you know you've not got good symmetry. But the idea of the dowel rod is that it should touch on the back of the head and it should touch in the mid thoracic and it should touch on the sacrum.

- Right.

- So I knew that that was great for this four point exercise but there's a whole raft of other exercises where you want a neutral spine at least you want to train that initially and dead lift would be one of those. But you can't have a six foot dowel rod held onto your back while you're trying to dead lift and in fact, I've tried this, I tried various ways of strapping a dowel rod to my back and tucking it down the back of my shorts it was hitting against the ceiling, all kinds of different things and in the end I realized that I don't actually need anything that six feet long, I just need it the length of the spine. And so then I basically made these out of wood initially, and what I also was aware of is that actually we're talking about neutral spine, one of the ways to gauge if you spine is in the neutral position is that the, either the femur eminence or the first MCP is the right depth, anthropometrically for your lumbar spine. So if you're laying on the ground flat against the floor you should be able to fit your hand just under your low back and that will be a neutral spinal position and that will give you just the right amount of lordosis, technically, according to Shirley Soloman and the physiotherapists. So then what you can do is you can sort of screen through a proper metal screw in these prototype versions and you screw it through to the depth of the femur eminence or the first MCP.

- So that's gotta be the depth, if we're gonna use this on me that's got to be the depth of my femur eminence of MCP.

- Yes, that's right.

- That's not far off

- Pretty much

- Spot on.

- Pretty much. That would be a neutral spine.

- What do we do with it now?

- So then what I did was, well it obviously needs to be attached to the spine, so I was using a bit of string initially, but I managed to develop a cord which holds it in place a little better than a piece of string.

- Why you take a piece of string?

- It's a high tech piece of string. But it's part of the idea with this, is that one of the things that's very common when you have pain or inhibition of the deep intrinsic muscles of the spine, is that you get what's called rectus abdominis dominance so the rectus abdominis six pack muscle becomes dominant over the transversus abdominis muscle and so what you get is the abdominal pushes out to early and really the transversus abdominis should hold the rectus abdominis in. So if you have the string around your waist then what it means is that you can feel if you've got rectus abdominis dominant and pushing out. It kind of serves a dual function, gives you information, as to whether you're going rectus abdominis dominant and it holds this in place and that sits on your back. Should I teach you to do a dead lift?

- You want me facing this way to start with?

- Yes, yes. So basically that would sit on there, like that and so we'd be looking for the three points of contact, the sacrum, thoracic spine and the occiput. So that probably feels a bit foreign to you.

- Yeah.

- Initially. Yeah.

- A little bit.

- But to get that to stay in place and normally you'd do this against the skin, you'd put this around the waist and just tie that up there.

- I'm not taking my shirt off today.

- You don't have to take your shirt off today.

- To cold and my microphone's stuck to it.

- There you go. Tighten that up a little bit and then, you'd just tuck that in there. And what that does is it allows you to free your hands, of course it needs to be tightened right up to hold that in place, so, I'll just tighten that up there like that.

- Okay

- That frees the hands and then what that means is that, you can potentially, if you try bending forward so your hitching from your hip, so now you flexed a little bit, so just try coming back up there.

- Yeah, I was just trying to flex to see how much that little pointy thing hurts. And it does.

- It does hurt a bit doesn't it and that's the idea is that when something is pointy like that it creates the noxious stimulus which you then want to move away from.

- So you want me to bend without this moving from this three points of contact, which is actually quite hard.

- So if you do that again, if you bend forward there

- Let me do this sideways so the camera can see it best. So if turn this and if I'm bending forwards like this

- Yeah and that's about as far as you can get, can you keep your chin tucked a little bit and move that back, there you go, so that's about as far as you can get with a neutral spinal position. So if I was teaching to do a bent over row or something like that I'd want you to be

- In neutral

- Just to there and then that's where you would row from.

- And so with my dead lifts I'm going to be still trying to keep a neutral spine.

- Yes, that's it.

- I'm getting clunked on the back of the head.

- But you would probably take a wider stance and that would allow you to get a little deeper as well. So that would be one way, and the idea there then you don't need me with you. So, of course, the first time you go through it, probably it would be helpful for me to be present, but once we've talked you through that, you

can then use this so you don't need, it's kind of a personal trainer you can take with you if you like.

- I'll let you remove it and just set it down.

- Yeah, yeah, yeah

- Don't want to break it.

- And of course you can use that in lots of different exercises as well.

- And the positioning of that white pointy bit there.

- Well the way you set it up is that of course, there's multiple holes going through and so you would set it up so that this is opposite your umbilicus. So the umbilicus is at L3, so obviously that's the apex of the lumbar curve, so you want that in the apex of your lumbar curve.

- Right, but you could do that just by moving the stick up and down, so why have the whole

- But that should really nestle between the buttocks so the triangular part of the bottom is literally to nestle there to give it a little bit of stability. And then you adjust that to the height.

- Now do you give these to many of your patients?

- Yes, I think especially when people, particularly when people maybe aggravated or their back condition may be aggravated by going to flexion then this is a great tool for that, so often disc pain patients are aggravated by going to flexion in the early stages, when they've got posterior disc bulges.

- So we spent about two minutes learning how to use that there, it strikes me that it would take a bit longer to get the hand of using that properly and safely and effectively with patients.

- Yes. Is that one of the things that you do on your discussions, your meetings, your courses that you run.

- Yes, yes it's part of it, so certainly when I'm training other personal trainers or manual therapists then we would go through how to use a dowel rod initially and then I'd just explain that this is a slightly more versatile version of a dowel rod and show how that can work. But with patients, yeah I would take the time to go through it with them. In many cases they may only have one or two exercises they need to do, so I might just lend one to them, but sometimes they want to take one away with them and use it to work through a whole sort of, process of rehabilitation.

- And is that a website of yours I can see printed on the side, nuetralizer.org.

- It is, yes, yes.

- Well, okay, put a link up there that way I making it so it's a fascinating concept, I think. I've got a whole lot of questions though, I'm going to start at the most recent one, I think, which is any thoughts on the Alexander technique?

- Well I think it's great, from what I've heard of it, and you know, I've not studied it formally but I've met with some Alexander teachers and had lots of discussions with them and I think it's always fascinating to hear their points of view and I think

it's very congruent with my understanding of the body, of course, there's always a few differences in philosophy but I think it's a great approach.

- If you're interested in seeing one of the Alexander technique we have got an earlier broadcast on the subject, which actually was really well received by the live audience and I think it's a fascinating insight into what is taught. Because I was very skeptical until we had the broadcast and at heart there's more to this than I imagined.

- Yes. I think it's like a lot of these things, it's like what do you think of Pilates, well I think, if you took what Pilates said, when he said it, then he was ahead of the curve in many ways and if you had him here now today, because of the research and the way the field's moved on, he'd probably have a lot of other great things to say, but if you isolate and try to identify exactly what it was he said back in the 50's then you'd look at it and go, well actually he's a little off the mark here and little bit off the mark there. And it's probably similar to Alexander and many of these sort of gurus, you know.

- Okay

- Yeah.

- Now I've been picked on for my technique by my dentist, by Monica now, she says, shouldn't my head be touching the stick while I'm doing my

- Absolutely, it should.

- Yeah, thanks Monica. My first time, you know, I'm a novice at this.

- So sometimes people can't get their head back to the stick because their thoracic spine is a little bit tight, so sometimes you need to stretch out the thoracis spine or mobilize the thoracic spine before you use this.

- Question here, which is again, this is something which does occur to me because when I was kind of alluding to when we talked about the variety of spinal curvatures at the beginning of this discussion. I don't know who asked the question, but she asks should everyone be able to put their hand in their lumbar lordosis? Cause surely some people are just flatter there than others and her sister is practically kyphotic she says.

- Yeah, I mean, I guess this is where it's back to the earlier discussion of the loading through the spine and so just theoretically, and we can't say for sure, but theoretically, the flatter the spine is the more likely you are to load the disc and the vertebral body and therefore the more likely you are to get a disc injury. Now there's multiple other factors that will contribute to that. And what I mean by that is compared to someone who shares the load between the disc and the facet joints, more so or who has a more neutral alignment.

- Does that meant that there are patients who you can't achieve, what you would perceive to be, the perfect neutral spine position because they just don't go that far.

- Well, no one of the interesting things of doing all of the measurements that we do is with any patient I would do spinal inclinometry so you just use inclinometers to measure the angles on the lumbar sacral junction, thoraco ilium junction and CT junction and so that way, you can calculate the gross curves and when you apply corrective exercise and corrective stretches in tandem, sometimes with a bit of treatment, you consistently see the curves improve and move towards an optimal spinal position. So I've never seen anyone who doesn't respond, it's only if they don't comply that they don't respond you know. So then it goes on to that discussion about compliance.

- Well, there's two more questions I'm going to cover, so any more that come in now I'm not going to ask as we won't have time, gone so quickly.

- Yes, yes.

- And I'm never going to hear the end of this from Danielly, Danielly, I have got the hang of pronouncing your name, honestly, I promise and I apologize for having gotten it wrong earlier on. He's forgotten much of what he knew about Fryette's laws and spinal motion and he must make a point of recapping, what he's getting at, that it's not a simple case of flexion extension AKA flexion and retroflexion of the musculature action components by neural input also become engaged so I think that refers back to what he was saying earlier on. So it's an observation rather than a question from Danielly which I think you've been talking and basically agreeing with that throughout the discussion.

- Yeah, I think so.

- I've got one from Jason. Jason asks, is there any research on how long, or how many treatments and which sort of treatment modalities are best for altering chronic tissue changes that may have been present for many years. Many treatment modalities claim to get good results, but in practice he found them very varied at best.

- I'm sure there is research, I mean there's a lot of research in recent years on things like myofascial release and myofascial techniques, which I think could be valuable for more chronic issues. But I think, my view has become and to some extant always was, that there's only a limited amount, you can do passively with your hands. I think certainly there's a great array of tools that we have as manual therapists but they are primarily passive and if you want to make a change to the patient then they have to become actively involved and so just as a very simple example if someone is kyphotic and you mobilize them into extension, well the muscles that hold them in extension are long so their just going to go back to the position where their muscles are in the optimal length tension relationship for them. And muscles actually lay down sarcomeres when they're held in a length and position for a long period of time. What happens is the muscles literally does get longer it lays down more and more tissue, just like a woman's stomach during pregnancy lays down sarcomeres and expands. So that thoracic spine unless you then create a stimulus to shorten the muscle and to make it stronger in as shortened length tension relationship, they're just gonna go straight the way back to where they were before. And so that principle applies to any part of the spine or any part of

the body. Certainly we can facilitate things passively but really the patient has to be actively engaged and ideally to do exercises with the right kind of acute exercise variables that we've discussed earlier in the evening.

- Well time's flown by this evening, and when we booked you for this we thought we were, kind of going out on a bit of a limb, because we thought, if you were a crap speaker we're going to be really, really sad that we've got you for another four or five broadcasts but it turns out that I'm really looking forward to the next ones and I know everyone else is because it's been a really fascinating discussion. It's been great. Great to have you. Thank you very much for inviting me.

- Looking forward to seeing you.