

The 'Math' of Core Stability With Matt Walden

APM:

Well, this evening, what we're talking about is the math, of Core stability you're probably aware of a lengthy paper produced by Eyal Lederman celebrated osteopath and a very knowledgeable man, a doctor within physiotherapy in which he has spent a lot of time researching and disproving the idea that core stability training: Is there any benefit in dealing with back pain? Now, Matt Walden has come in this evening to talk to us about the math of core stability, so putting the other side of that particular coin to show us how perhaps, I don't know, maybe the evidence has changed. Maybe Eyal got it wrong or maybe there are other things that we can consider. I don't know yet, but we'll find out. Matt, as you might remember from our previous broadcast, is himself a very experienced osteopath. He's an associate editor of the Journal of body work and movement therapy. Works closely with Leon Chaitow. He's up to his ears in research. He really knows his stuff. Matt, it's a great pleasure to have you back in here, I hope I got that right,

MW:

Yeah that all sounded good.

APM:

Good. Okay so let's start then with the Myth, of core stability, which is of course is what we know lots about from Eyal's paper and the fact that he's promoted that idea on his website, which is CPDO.net, if you want to look up what Eyal is doing and in fact we will post a copy of his paper on the website after this broadcast, but as I understood it, when I attended one of his seminars, the idea was that a lot of core stability training as was marketed by personal trainers and exercise therapists back in I don't know when was it, the early nineties when it became back in fashion

- MW: Probably the late nineties.
- APM: it became fashionable. It was all about, well, you, you do exercises on a Swiss ball and that will train your core and that'll make your back better. But Eyal was saying, well, actually, that just makes you good at doing an exercise on the Swiss ball and it doesn't translate to standing up. There's probably more to the myth than that so perhaps you can enlighten us.
- MW: There is Absolutely Well, I think, um, with, with Eyals paper, which is a great paper and in fact it's one of the interesting things about the papers. It's the most downloaded paper from the general body work and moving therapies. So, you know, I think obviously the title captures the imagination, which is great. And it questions what we do, which is also great. But I felt when I read it that a lot of the critiques in there were based on generalizations in many cases. And so absolutely, you're right. That's um, uh, you know, some people will do, you know, one day course or a weekend course or something and maybe learn about Swiss balls or other balanced devices and assume that if people exercise on these, then it switches on their core somehow. Um, and uh, so I think Eyals paper was targeting those kinds of people that a little bit, little bits.
- APM: Didn't he argue that there was, um, an over emphasis on the idea of the transversus abdominis was the most important muscle in the abdomen. And that in fact, there isn't a core group of muscles. There's just a bunch of muscles that happened to be in this area.
- MW: That's right. Yeah. Yeah. So, so that was, that was part of a discussion and the reason that the transversus abdominis was focused on so much was that the research. It's really kind of led to the, the, the interest in that muscle in other core muscles. Like the multifidus is another example is, was from an Australian group from Queensland that showed that back pain patients tend to have a, a delay in the onset of their activation of these muscles, whereas asymptomatic patients don't. They actually have what's called a feed forward mechanism. So the intention to move, uh, results in the transversus abdominis firing about 30 milliseconds ahead of the other muscles that are actually are going to move you. And so the notion is that you're creating stability before you move.
- APM: I Remember Eyal saying yes, this may be true, but actually the timing is so minimal. You can't alter it, but also timing, may be the consequence of back pain, not the cause of back pain.

MW: Well, yeah, absolutely. And I think it's a little bit of a discussion at the VMO in the knee and how people talk about, you know, the VMO exercises, is a whole type of knee pain, but actually probably it's the pain in the knee that's inhibiting the VMO as opposed to the VMO being weak that's causing the pain. So I think it could be the same with the, the, um, transversus abdominis

APM: Well you've got an opinion about that, about whether it's pain that inhibits VMO or otherwise do share it with us because we'd be delighted to know.

MW: Yeah. Um, so, so yeah, you know, I think the reason obviously why I called it the math of core stability, is that to my mind all of it adds up, you know, a lot of the information

APM: You'd get a telling off for that you know? For that unit was that American, but it wouldn't sound quite right if you contrast it with the myth.

MW: Yes, yes, for sure. Um, so the, so, so this research showed that showed that these muscles weren't firing, so they were being inhibited by the pain. And one of the slides that I've got actually, I'll see if I can get this to appear. And it's showing the multifidus and the multifidus is, um, you know, obviously runs from deep in the lumbar spine right the way through to superficial is right in next to the spinage process there. And what they showed is that on the right hand side of the image. You can see a multifidus that is slightly shrunken down. Um, and uh, it's what they found was that on average within 24 hours of acute pain coming on in the low back,

APM: Can you orientate us as to what's going on in a particular image.

MW: OK. So, so basically you can see that this, this, um, muscle here is the multifidus. Yes. That, that muscle there is the multifidus it's actually on the patient's left side because we're looking from the base upwards. And this is the multifidus on their right side And so the, the multifidus on, on this sides, um, what this Australian group found was, was that within 24 hours, of the pain coming on, it will shrink down on average to about a 69 percent give or take three or four percent of the asymptomatic site and it would happen right at the segment where the pain was. And um, so what that indicates is you can't, you can't get atrophy that quickly. You can't get atrophy within 24 hours. So what they recognize, this is an inhibition. So it's a neural inhibition. So like Eyal says it's the pain that's inhibiting the muscle. And so then, um, you have to ask why is it inhibiting that muscle

and not other muscles. And so this then comes down to really the, the ratio of fast twitch fibers within muscle compared to slow twitch or it termed tonic verses phasic.

APM: Is that the same thing. Tonic and phasic that's the same as slow and fast twitch or fast and slow.

MW: It is loosely speaking is, yeah, yeah, it's, it's more or less synonymous. Um, and so again, you know, further down the line I've got a slide which shows how the multifidus can atrophy. So that's this one here. So we can see here is that you've got the multifidus on this patient on either side here and there's a little bit of atrophy here and this is now in chronic pain patients. So there is fatty infiltration into the multifidus.

APM: 00:07:13 So this left hand image is a patient with chronic pain,

MW: that's someone with chronic pain, but they've only got less than 10 percent of the muscle is infiltrated with fat. So that's actual genuine atrophy. And that occurs across a period of time. These are chronic pain patients. This middle image, this person is, is, um, actually has more than 50 percent of the muscle is, has had fatty infiltration. So that's, that's a severe grades of atrophy. And on the right hand side, that's less than 50 percent, but more than 10 percent. So that's a moderate grade.

APM: Why does that happen?

MW: So this seems to be what happens with disuse atrophy so, so you essentially, the muscle wasn't being used and why isn't it being used? Well, because the pain's inhibiting it in the first instance, but then it doesn't seem to switch back on afterwards. So this is the whole question of whether we go in and directly rehabilitate at the level where the pain is. So at the moment we're just talking about the multifidus, which is part of this kind of core group of muscles. Um, but, or do we just say we'll just do general exercise. And so

APM: I just sorry, the show isn't all about me. I know, but just thinking back many years ago I had um, a total menisectomy, on one of my knees and afterwards was sent to physio-therapy. Now this particular physio, terrorists, and I don't want to be rude to physiotherapists who are watching, but I mean she was a physio terrorist. Yeah. She told me that what I had to do was to clench my quads knowing no better. I clenched my quads and they had to peel me off the ceiling. And having done that, I then could not extend my knee at all, no matter how hard I tried it. And it has to do, as you say, it must be neural inhibition. My

brain just doesn't want to do it because of the pain and that's when she had to put the muscle stim machine on there to get the muscle firing again, if that helps in any way I can recognize that neural inhibition of the muscles as a result of the pain.

MW: quads are classically the inhibited muscle. Um, but so did this inhibition leads across time, uh, to, to fatty infiltration, which we can see here, um, but not if he rehabilitates the muscle, uh, specifically, uh, at the level. So one of the things they showed is that it's actually specifically yet at the level where the pain is, so you don't get inhibition or atrophy levels above and below it's actually at the level. So that's the multifidus. The transversus as well is involved in this. There's not so much research, or discussion, fatty infiltration into the, into the transversus.

APM: So it could be happening. We just don't know.

MW: It could be, I think, I think probably there'll be papers on that, uh, but so I suspect maybe not so much with the transversus, um, but so, you know, one of the things you alluded to was the notion that, um, do these exercises, uh, you know, where they'd be laying on the floor or using the Swiss ball or whatever.

APM: Do they have any kind of carry over to activities of daily living and to sports. And from a motor learning point of view.

MW: They don't particularly have a strong carryover. And so I think Eyal's absolutely right on that front and when you're talking about a motor learning and development of motor patterns in the motor Cortex, but what they do do is, is they, um, increase the neural drive to the tissues that have been inhibited because you're able to actually identify which the muscle, which muscles are inhibited or shut down by the pain. You can give a specific exercise, activates that muscle. And in doing that, what you're doing is you're increasing the, of course to activate the muscle, we have to get neural drive through the nerves that feed the muscles. And the law of facilitation states something along the lines of each time a impulse traverses a given set of neurons to the exclusion of others the resistance, that impulse will be smaller on future occasions. So, so the, the long and the short of it is, if you don't use it, you lose it as another way of saying it. But if you do use it, then it's easier to find.

APM: Is there an argument then that if I'm doing sit-ups crunches on the floor, or on a Swiss ball, activating my in inverted commas, core muscles, the rectus or transversus Abdominis,

because I'm lying on the floor, my body is less worried about the pain response and therefore is able to activate those neurons. And that in itself will help when I move to a different position.

MW:

Potentially so. So, um, one of the things obviously about laying on the floor, it's, that's first of all, there's no axial load and most spinal conditions were aggravated by axial load. Um, so, so that's, that's the first point. And the second point is that when you're laying on the floor, you have no stabilization requirements. So it's a bit of an irony that you do stabilization exercises on the floor, but the rationale for doing that is that because don't have to stabilize other joints, you can use all of your neural drive to activate the muscle. That is inhibited. So, and I always explain to patients, you know, if you imagine your nervous system can only generate, say a hundred units of electricity at any one time, but while we're sat up here, we're using a certain amount for our ankles and amount for our knees, amount for our hips, spine, neck, shoulders, et cetera. So that's all being filtered out to each of these different muscle groups if we were laying on the floor. If then I ask you to swell you're multifidus muscle or switch on your transverse abdominis using various queues, then you can put all of that drive into transversus abdominis. But to do that sitting up that's more challenging because you've got all these other demands on you. But what I was going to say about, um, the, you know, again, talking about the way Eyal was suggesting that there isn't a carryover, which from a motor program point of view has some truth. But the research that Hodges describes doesn't back that up because what he, when a saw him speak in London a few years back he was talking about research they had done where they were doing exactly this kind of thing, activating the transverse abdominis in prone on the floor. And um, then afterwards they would see if that improved activation of transversus in standing. So they would do a before and after and they found that sure enough transabdominis wasn't activating very well in standing do the prone transverse abdominis exercise get them to stand back up. And now it's firing better in standing. So it's this notion of facilitating the pathways

APM:

How are they measuring that activation, was that just?

MW:

so that's with emg studies and ultrasound,

APM:

what I meant really was what instruction were they giving to the patient were they measuring this as an activity of daily living or just putting them in position saying swell your muscle by,

MW: I honestly don't know the exact details of that study.

APM: Part of Eyal's argument was that actually what you need is a whole sequence of muscles firing in the right order to get your activities of daily living to work properly.

MW: That. Yes, that's right. Yeah. Yeah, absolutely. And so, you know, one of the issues for, for someone suffering with back pain is if the transverse abdominis has become inhibited, uh, and particularly the multifidus we know that doesn't switch back on. If it's not rehabilitated to switch back on, then well, that's implies is that down the line they may find compensatory strategies. And this is one of my big concerns about the approach that Eyal subscribes to, is that there's a lot of talk about adaptation and about compensation, but the compensation is still a compromise. And if we know that the transversus doesn't fire, we know that the multifidus isn't firing at a specific level and we know how to reactivate that, then why not go in and do it. So to me it seems illogical to create a counter argument just for the sake of it, when actually you can do something about it. Um, so I guess you could lead that into talk about the actual research has been done on core stability.

APM: Yeah I'd be interested to see that. And I'm sure you got lots and lots of challenging statistics and other things to show

MW: well it's like all areas, it's controversial, uh, you know, and you and you can pick the research that suits your framework or your idea. so there's plenty of research that supports the notion of core stability is very, very, um, uh, effective or beneficial for patients. But there's also research that questions as well. So, you know, what they recommend in research of course is to look at a meta-analysis and systematic reviews. And um, so there was a systematic review that was out last year, a Cochrane database systematic review, which essentially concluded that there was no great benefit to core stability exercise. That was the conclusion in short that it wasn't particularly, more effective than other clinical intervention classes.

APM: Can I drag you into that? I haven't looked at that study. And of course a cochrane review is gold standard, they shouldn't be biased in any way in, in their outcome. But when you have a study like that and you say core stability training, I'm under the impression that there's a, there's a whole swathe of different core stability trainings out there. How did they tie up what constituted core stability training?

MW: Well, you know, it's, it is very difficult to know what each of those studies looking at. So I think they had 34 studies

ultimately included from something like 900 studies that they evaluated. Um, and, and this is, this is the problem with systematic reviews is that of course they're trying to gather the best data and so you and the least biased data and if there is potential for bias and they'll knock down the score. So in this example, they were knocking, I think 25 percent off the scores. If someone that was doing the research might have been biased, like they might have been the original developers of the methodologies, et cetera.

APM: I suspect that that slide isn't going to show up terribly well on an iPad screens and so on, but you're happy for us to share this afterwards?

MW: Of course. Yeah. And so this is actually from that review and what it's showing is it's just comparing the different interventions. So you've got on the left-hand side, they've got motor control on the bottom left, and then you've got um, uh, other exercise. So, so you, um, comparing motor controllers with general exercise and you know, which one is more favored. So you can see that on that line, a vertical line, pretty much everything is favoring the motor control. And then it's the same with the other two. You can see that although there's one or two exceptions where they're either on the line are very slightly to the right to the line, they're all favoring motor control interventions. But the conclusion ultimately is that it's not that effective. Why is that? It's all to do with the statistics and whether or not, you know, there's a statistical significance in terms of the, the, you know, it compared to say manual therapy or it compared to a general exercise program

APM: wasn't one of Eyal's big conclusions from his paper that it wasn't the core stability training was useless. I think it was just that it wasn't any better than any other form of exercise because in every form of exercise you're, you are engaging the muscles which would be called by some, the, the core muscles.

MW: Well that's certainly that what some people have concluded, I'm not sure Eyal actually said that he might, he may have done. I can't recall that from his conclusion, but, but, but certainly that's the way a lot of people interpret it. But you know, another thing about this that relates to that point is that, you know, a lot of people will look at that Cochran review, they'll read the conclusion and they'll say, OK, so I don't need to learn about motor control. I do feel that this is part of the issue that we have, particularly in, in osteopathy, is the motor control hasn't really been part of a, an osteopathic movement. It was a physiotherapy movement and um, even in the early days I was teaching at one of the

major colleges and they were getting a PhD student to try and disprove motor control and I was thinking, well, why are we taking that stance? Why don't we see how we can apply osteopathic philosophy to motor control? Because the motor control field has been very, very muscular-skeletal in its orientation, which, which makes sense cause we talked about motor control, but at the same time there's all the visceral factors in the nutritional factors by chemical psychological, which as more holistic practitioners. You will expect us to have perhaps a better sense of how those integrated factors may affect motor control

APM: Motor control is a long way beyond simply core stability training though doesn't it?

MW: No, not really. Well, I mean, you, you, you could argue that I'll let you finish your point, but it was really, I think core stability, was recognized as, as a kind of flawed term quite early on. And then it started being used colloquially. The control was more of a technically accurate term is my understanding of how it came about. Did you have a difference?

APM: Well, no, I was just going to, I've been on a number of Eyal's courses and I'm sorry to keep dragging Eyal into this he isn't the only person on that side of the fence is he. A lot of his courses are about motor control, but they're all functional motor control. So you're teaching people to improve their walking. They will be standing and you'll be challenging they're walking by various methods to improve their motor control. But that's not core stability training as it is understood by most people.

MW: Well No. And, and so, you know, it comes back to the specificity that was found in the original research and has been repeated in many research studies, which is the notion that it's segmental. So the actual book that came out from the group from Queensland was called therapeutic exercise for segmental spinal stabilization, so it's segmental spinal stabilizer, specifically at the segment that the pain is that you lose stability or motor control. Um, and again, the same group showed that if you don't rehabilitate it, then that segment doesn't regain stability.

APM: So we were talking at an individual vertebral level or, and they measured that lack of stability how?

MW: Um, so, well they've measured it via a multifidus thickness in particular. So we're, again, this is where stability it is probably a somewhat misleading term, I think, you know, another, another sort of challenge that has arisen with this

whole field is, is that when you try to teach something, which actually ultimately is quite complex, if you get dig into the detail of it, there's also models in and um, methods for simplifying it. So, so for example, we talk about the inner unit and the outer unit is a great way of simplifying to help people understand that the in unit is the intrinsic musculature closer to the spine or deeper in the abdominal wall and the outer unit is the outer musculature that's more involved in moving. But unfortunately people, um, take that as a kind of clear delineation. But really it's shades of gray

APM:

As though they work separately. Which they don't.

MW:

Yes. Yeah. And so, and this is one of the things that Eyal's saying, there's no, there's no specific muscle is more important than any other. No, there absolutely, absolutely isn't. Is, is quite correct. But we do know transfer subdominant seems to be affected most and the multifidus, but most frequently by pain. Well why would that be? Well it's because they have a higher proportion of tonic fibers and the tonic fibers are tonic because they are fed by the tonic motor neurons. OK. So you've got tonic motor neurons and phasic motion and a least to the best of my knowledge is a paper by a guy called Kumar in 1992 I believe. And he was talking about tonic and phasic differentiation in infant development and how the way the child uses their body during infant development, so through all the crawling phases and so on, basically fires the neurons in a specific way, either more tonically if you're, if you're holding a given posture or more phasically, if you're moving. so phasic literally means to phase on and phase off phase on phase and tonic is the whole tone. And so if the way you find the motor neurons ultimately differentiates them into their adult function and the motor neurons themselves differentiate the fibers within the musculature into their different functions as well. This is why infant development is so important and why actually so many other rehabilitation exercises mimic infant development. And this is if we go back to what we were discussing about, um, whether a specific segment and so on and how people adapt for that will, again, loosely speaking, the Inner unit of that segment is shut down. So what you get is you get an outer unit compensation to that. And so you can stabilize perfectly well using your outer unit. So the outer unit in this case would be things like the erector spinae proper, not just the multifidus and the you know, the, the external oblique, internal oblique, rectus abdominis, et cetera. But the problem is that they are more phasic in nature because the more superficial you get in a muscle, the more phasic or in muscle groups, the more phasic they become

APM: because they're involved in more gross movement?

MW: because they're involved in more gross movement and they're involved in gross movement because they're further away from the axis of rotation of the joints. If you've got a joint here and you've got a muscle right close to it, the leverage of that muscle has, it's very poor you really can't move. It's mainly going to compress the joint, which is what the inner unit muscles do. They create compression and they control the fine motor control around the joint. The outer unit muscles are over the outside of those obviously. Um, and they tend to be longer strap muscles so they have greater leverage and they actually use those intrinsic musculature or muscles as like sesamoid bones, right? So if that must be inhibited

APM: To increase their leverage at the points of attachment

MW: So if that muscle is inhibited and, uh, you know, atrophied potentially, then you're losing leverage for the outer unit as well. But the other thing about the outer unit as well is the fast twitch, so they fatigue early so we can use our outer unit to sit up nice and straight and hold ourselves upright but unless conditioned the intrinsic musculature and the Tonic fibers to hold us there. We're going to struggle to hold that position for very long because of fatigue.

APM: It's a question which is often asked, um, is the balance of tonic and phasic muscles fast and slow twitch is that fixed? Can you alter it?

MW: Yeah, I mean they do say if you want to be an Olympic sprinter, you have to pick your parents wisely. And so say there's not, um, there's not a huge amount that you can do to, to shift it dramatically, but, but my understanding from the exercise literature is that the loosely speaking, you've got type ones, which are your tonic endurance postural fibers type two As which are faster twitch and type two Bs which are explosive. And I mean the Russians say it's 21 different fiber types. So that's, that's a real simplification. But I think it's quite useful. Breakdown of the key fiber types. Um, so the type two As that are in there in the middle. They are the most plastic, so they can shift more towards type one function so if you were to train up to do a marathon or something like that. Then you'll find a lot of your type two As will shift towards type one function, but if you give that up and start doing sprint training, then you'll find that shift towards type two Bs. but if you haven't got that many type two Bs in the first instance, then you never. You're never going to beat Usain Bolt. You know, he was born with more type two Bs than you or I.

APM: But there is an element of malleability in that central section.

MW: Yeah. If you like. Yeah. Yeah.

APM: We've got a question in actually, because you're talking about atrophy earlier on. How long term you're going to get atrophy in the multifidus or other muscles and Robin's sent in a question saying, well, is there a, is there a time after which you're not going to be able to rehabilitate that muscle to?

MW: I don't think so particularly. Uh, you know, I think um, obviously there's always the question of is contracting that muscle going to rekindle the joint or compress a painful structure, a disc that's bulging or something like that. And there's always that possibility. But because the body is always in that sort of state of healing and reabsorbing disc material and, and, um, uh, trying to reduce inflammation ultimately, then this is one of the key things I think as, as manual therapists be aware of is that just because the pain has gone does not mean that the spine is now a functioning optimally from a muscular control or motor control points of view. So I think, yeah, you I'm struggling with The exact phraseology of the question. So he was, he was

APM: Is there a point after which it's too late to rehabilitate an atrophy muscle.

MW: No, I don't think so because um, you know, while you're alive, you're adapting. And so there's something called the said principle, which is the specific adaptation to impose demands. And so if you create the demand upon the tissue, it will adapt to the specific demands put upon it. And uh, so that's, that's the principle of use training in the gym. And so if you can be specific about where you want that muscle to activate, then you're going to get a, to me as a clinician I will be much more comfortable to do that with my patient and to know that I've reactivated at the right level and rehabilitation at the level where they had the inhibition and the pain and then get them doing general exercise as opposed to just saying, well, let's just do a general exercise program because the research says it's OK to do that. Actually, there are contradictions in the research and what one of the. One of the challenges with these, these big, um, meta analysis is taking average across many hundreds and thousands in this case of patients. Um, and sometimes averages don't give you a full clinical picture, you know. And, and a great example of that actually because there's another meta analysis I was looking at, um, last time we were talking about neutral spine and um, so I was looking at

a meta-analysis of postural, um, papers. And essentially the conclusion of that paper was that posture is unimportant in back pain and chronic pain. And um, but when you look at it, what they were doing was they were comparing back pain with, They were looking at back pains as a generic term. And then looking at the spinal curves and seeing do people have more hyperlordosis or do they have more flat backs or, and they're finding all these kinds of um, uh, They're finding it, Basically there wasn't a correlation, but that's because back pain is heterogeneous, you know, so. So there's multiple different things that can go wrong in the back or can be irritated in the back and different movements. So ultimately the conclusion in that meta analysis was that spinal posture doesn't matter, but actually if you read the research papers that are involved, but then it was really showing that it does matter. So this is a really great example of where a meta analysis goes completely wrong and if you just read the conclusion or the abstract, then you get the sense that posture is not an issue and it's often quoted as a paper suggesting that posture isn't an issue.

APM: One might argue that actually you're cherry picking the papers that you want because you want to believe that posture is an issue because then neutral spine comes into play and you can treat your patients accordingly. I would like to think that's not what you're doing because,

MW: well, it, so, so you know, for example, one of the papers that they used in the meta analysis was looking at disc pain patients and found that they had flatter backs. Which is kind of what you'd expect because disc pain is likely or the discs are likely to be more loaded than a flatter back. Um, but then you find another one which is just general back pain paper and it's saying, well, there's slightly more lordosis in this group. So if you just to average out the two of those and say, you know, what's important here for patients with back pain, you say, well, once it's flat once it's hyperlordotic. So therefore we have to conclude that it has no relevance

APM: That sounds to me as though it was a very poorly structured, um, meta analysis. Because they are two different problems.

MW: Well, and this is the problem with meta-analyses and in fact, you know, one of, one of the studies I've got here is actually a critique of, of meta-analyses. There's a guy called Ioannidis who's from Stanford University. Um, and I mean not to deliberately sort of try to put down Meta analysis or systematic review, but he points out only three percent of all meta-analyses are actually worth the paper they're

written on is his view. He's a critic of research methods and research.

APM: And does he have a view on Cochrane analysis in particular because

MW: Not in that paper. But I mean that is a 2016 paper so It's not like it's an old review. And to be fair he is also talking about meta-analysis as a whole. So he's not just talking, I think in our field, probably they have more use. I think in pharmacology I think there's a lot more potential for bias because of the sponsorship for big farmer, et Cetera. And that's part of his point. Um, but, but nevertheless, I think we have to be careful about pointing to a meta-analysis and saying that meta analysis says, um, that it's no better or only slightly better or not statistically significantly better, which is essentially what this motor control one shows. Um, so, and then saying, so I'm not going to use it, you know,

APM: so making this um, just for just for a second, bringing this to the specifics when a patient walks into your clinic and says I've got back pain. What's your process and how do you identify what your approach is going to be with this particular patient that you would you be confident saying. There's a single segment of wasted multifidus, atrophied multifidus there or?

MW: Well, there's, there's various ways you can screen for that, uh, you know, which are, if you have the equipment you can use ultrasound to, to actually analyze for that.

APM: Most of us don't do we

MW: No, no, no. So there's other ways you can look out for these kinds of things. So one thing is looking for striations across the back. So striation is where you get a slight sheer in the spine at a segment and you get a little line appear sometimes, right the way across the back, sometimes just on one side. And what that is, is, is, um, the best way I've found to describe it is with a spondylolisthesis, which is a full slippage obviously of a vertebrae, one on top of the other, you get what's called a transverse loin crease. So that's a proper crease right the way across the back and sometimes across the stomach as well. where a Striation is like a micro version of that. And it only tends to occur when the person is under load so you can put a little torsion through their spine or little compression through their spine. I often will use a stick to, to, to assess different movement patterns to see how does their back respond to extension, how does it respond to flection rotation, slight bending. And quite often maybe just one of those

movement patterns that will, you'll see a striation appear. Oh okay so there's a little potentially is a little bit of instability there. Which is a term Uh, we've been told we have to be careful how we use that because that can create what we call a DIM a Danger In Me from the pain science sort of perspective. But you can turn that danger in me straight back into a, but I've got a solution for that. Here's the exercise. See if you can swirl this muscle. Oh you can swirl this muscle, fantastic. You can go away. You can manage this yourself.

APM: Interesting that you use that term to swell the muscle, rather than contract or exercise or any other term is that a specific method you will introduce to the patients rehab.

MW: That's a really good question because it actually addresses one of the points that Eyal critiques, which is the notion that how do you activate that muscle At these very subtle levels? Um, and so a lot of it's in the language that you use. And what, again, you always trying to find of course there's very specific ways you can do these things with research and tools like ultrasounds and then there's the real world. And so in the real world, you can palpate we know there's issues with palpation. You can look for striations like we just said, but also the language you use is very important because what you want to do is you want to give a feeling command rather than doing command. And the reason for that is if you give a feeling command. So for example, um, with transverse abdominis, rather than saying, I want you to draw your tummy button towards your spine, which is doing commands, if you say, I want you to imagine a silk thread between your belly button and your spine, and that someone is very, very lightly pulling on that creating tension through that. Now that's a feeling so can you imagine that. And what that does is it creates a very, very light activation of that muscle group. And what they've shown, you know, comparing different commands whilst using ultrasound is that those kinds of feeling commands So swelling is a good example, but also with a multifidus. In the last session we did a doll's hip manoeuvre in the neutral spine. And that's so there what you're doing, you're taking the patient's attention away from the spine, completely asking them to focus on their hip. And imagine again, that the hip is dislocated and they're drawing the hip into a socket. So then what happens is the spine starts to or I should say the multifidus starts to swell up. Um, you know, reflexively because of that movement pattern,

APM: presumably not just at the level which is atrophy or

MW: no, no, no, but what you've done is because you've identified the level where there's a striation you can mark that. So what I would do is I've assessed them using this stick tests or you know, different ranges of motion, you see where the striation is, so you I would either, you know, just sort of palpate and work out which level it is or just make a mark with a, with a marker pen and then I know exactly where to palpate for the multifidus and where to get them to palpate to ensure they're activating the multifidus at the right segment. So it's, you know, there's, it's pretty simple in some ways

APM: it sounds a lot more subtle than a lot of the core stability work that I've seen practiced by probably physical personal trainers and so on rather than physical therapists, which involves more vigorous sit-up work. So is there a role for that?

MW: well sit-ups, you know, are good for sitting up obviously. Um, but they, they, they will condition the abdominal wall obviously that they target the rectus abdominis primarily and the obliques to some degree. Um, but you know, one of the things with sit-ups is done off the floor. You're working in front of the mid-frontal plane, so mid-frontal plane here and you're working the rectus abdominis into a shortened position in front of the mid-frontal plane. Um, but actually in activities of daily living in, in sports, you use it mainly behind the mid-frontal plane to generate power to serve a tennis ball or throw or to kick or whatever it might be, or to reach behind you to open a cupboard using it behind the mid-frontal plane. And so, um, there's no, um, one of the things that Paul Chek talks about who I've obviously done a lot of my training with, um, there no such thing as a bad exercise, only a badly prescribed exercise. And so most people don't need to do a lot of sit-ups. In fact, most people's abdominal walls are too short and tight and pulling them forwards like this into this kind of rounded upper-cross posture. And so what we can do is we can certainly work their abdominal wall behind the mid-frontal plane to make them stronger back here and that allows them to sit more upright and to move around more upright, but still with a conditioned abdominal wall, but I wouldn't class that specifically as core stability.

APM: So there is a role for sit-ups over a Swiss ball or a Bosu ball then is there?

MW: I would say so yeah. You know, just like there's a role for a back extension exercises, uh, because it strengthens the back, you know. But is it specific to the needs of the individual? Uh, probably not in terms of it being specific for

what they're going to do. Um, I mean there are obviously examples of working with an MMA fighter, for example, than they often are pinned down on the floor. They need to be able to sit up against force which will throw their, their opponent off of them. Same with any kind of wrestling type work. So there are specific occasions where that could be useful in most cases, a situp of the floors is not particularly.

APM: I've always thought if you're an MMA fighter or judo player or whatever actually the best training you can get for your muscles is to go and do it. You'd have someone sitting on top of you and you try to get them off, which is what they do in a lot of the trainings.

MW: Yeah, I, yeah, I agree. But I think it's also um, training in a gym environment is what you can do is you can put loads on in a controlled way and uh, which can give you a kind of base of conditioning that then allow and also overload as well. So, um, as much as it's more functional to the fight and to the skill of the fight and the activation patterns with the fight to have someone to on top of you and try and sit up against them and throw them off. And you can actually develop a lot of strength. And one of the things that's talked about in strength conditioning a lot is, is actually activating the type two B fibres the explosive fibers and you can do that with a dumbbell across your chest, over a Swiss ball. So you want to make sure it's a good quality swiss ball and There's nothing on the floor that's going to pop it lika a bit of gravel or something, but you can, you can do that kind of training in, given the right environment and really teach the nervous system how to activate those type two b fibers, which then can translate to your sporting environments. So, um, and you're doing it in a relatively safe controlled way.

APM: I'm going to refer to some work I did with Eyal a few years back. But I've always struggled with on part of it because he argues that for it to be of any value, your exercise should be functional. But I've always thought that actually if you go to the gym and you make, you make your quadriceps big, you can then do functional training on a much stronger muscle. And won't that, that increased size and strength be more useful then, than rather than trying to make them big simply by doing the functional stuff. And I'm not saying that having big quads is necessarily a good thing, but just training the muscle in one way and then training functionally afterwards.

MW: Yeah. And this was, this is the point back to the hodes research, you know, what he showed, not only was that by activating, in this case, the transverse abdominis it on the floor, then activated, better standing up, but he also found

that a day later we're still activating better. So, so the point there is that, you know, it's not just, um, it's not just specific to, you know, you could argue that laying on your tummy and drawing your navel in is only good for laying in your tummy, and drawing, your navel in. But the reality is that's not true, you know, and hedges has shown that you activate the transverse abdominis better in standing not only at the time, but the next day. So this is this process of facilitation. So the more we can find a muscle, the easier it is for the nervous system to engage it. And so if there's a history of it being inhibited for some reason perhaps due to pain, then that's a great time to focus on facilitating

APM: do you want to put some illustrations to this? Do you want to show us perhaps a range of sequence of exercise that you might use with a particular patient?

MW: Yeah, of course. Of course.

APM: Right now we're going to get Beth to come and join us for this. I know she's really looking forward to this. And I should point out to the audience. Beth actually, she's not a practitioner and she doesn't have back pain. She's just very kindly volunteered to step in and be tonight's model. And so Beth, come and join us and come sit on the Swiss ball here. Let's pretend the Beth has come to you for Rehab.

MW: So, um, you know, one of the things that I would do is establish, you know, why you've come in to see me and, and for a lot of people it's because they're in pain. So, um, so then to start out with them, sat down might not be the best position because quite often when you're, when you're axially loading the spine, as we talked about earlier and that will aggravate the pain and we know the pain is what is switching off the muscles we want to switch back on again. So one of the first things we want to do is find a pain-free position so that you can help to activate those muscles. Now normally that's either laying down or in a 4-point position like crawling. So would you be willing to, uh, to get into that sort of four point position on the floor here and in that 4-point position, you've got a number of things going on. So first of all, the viscera trying to fall forwards towards the floor and so what they're doing is they're putting a load onto the transverse abdominis and the musculature of the abdominal wall, but also because the transverse abdominis is the deepest layer of the abdominal wall, you're getting intrareceptive stimulation to the transverse abdominis specifically. So it's quite a good position.

APM: Intrareceptive

MW: intrceptive. So a proprioception from the inside. So you can have extraseptive, so this is extraseptive stimulation I'm just touching this muscle and that will facilitate that muscle potentially because you're getting it's awareness from the outside but you're getting an awareness from the inside even though you consciously might not be aware of it, but there's something touching the deepest layer of the abdominal wall. OK, so then another thing we can do is create a neutral, a neutral spinal position. Because what we know in neutral is the transverse abdominis activates best in a neutral position.

APM: We looked at this before. This is a highly sophisticated stick

MW: Yes it is, a highly sophisticated stick called a neutralizer, and, and basically you can use any, any stick potentially for this exercise. A wooden dowel rod works quite well and you just rest it on there. You want three points of contact. So you want a contact here on the, on the sacrum. So you need to tilt your pelvis a little bit more there we go. So that's a neutral spine. Now in that position,

APM: three points, Sacrum, dorsal spine, occiput

MW: Yeah. Great. And so this is where the transverse abdominis is likely to activate just just reflexively on its own. But what we can then do is we can say, would you, can you imagine that there's this thread from your tummy button right the way through to your back and I'm just very, very likely drawing on that thread and pulling it towards your back. And of course you can watch in the clinic you can have the t-shirt up to watch to see what the abdominal wall is doing so it's just drawing in gently. And then you can hold that for say 10 seconds, relax, go back again. Adjust the spine so you can see that she's just lost the lordosis a little bit here and then go back again. And ultimately what you want is you want to condition that muscle to be able to work for about three to five minutes.

APM: Are you still comfortable there Beth?

MW: I'm gonna Take this off now you can come back to kneeling position. Um, so, so yeah, so the reason we want to hit three to five minutes of time under tension is that that will then mean that it is the tonic fibers that are being activated or being conditioned.

APM: It is actually quite a long time.

MW: it is. And this is one of the issues. So you go back to the Cochrane report, in fact, any research that I've seen done on

a motor control, and most of them don't hit that three to five minutes. Most of them do 10 reps of 10 seconds. So really what you're still doing there is you're training your type two a fibers.

APM: And you talked about doing 10 seconds. You've been doing this for three minutes.

MW: Yeah. So you could do 10 seconds contract, five seconds relaxed, 10 seconds contract. You can also use the breathing to facilitate it. So one of the things that we know because of the way the diaphragm works so you've got the abdominal wall here and the diaphragm there. And what happens of course is when you breathe in the abdomen wall opens out, and when you breathe back out again, the abdomen wall contracts and the diaphragm lifts back up. So we can use that as a cue. We can say, take a nice deep breath in this. And then as you breathe out, I want you to imagine this thread or cord or whatever it is, pulling the naval towards the spine. And so as they're breathing out, that happens. And that helps because you're already in that drawing in motion and then just hold that for 10 seconds and then we'll go again. You know, and so you can use the breath to facilitate.

APM: And then you're going to send this patient away to do this at home.

MW: Yes. Yeah.

APM: With a sophisticated.

MW: well maybe, I mean for this exercise alone, I would say that's a bit of a bit of an investment if, if that's the only thing they have to do. But the reason I developed that was, was that this is not where you leave it, you know, and this is one of Eyal's points is that, you know, how can something like this prepare you for upright activities of daily living or sports. And so the thing is you progress those, but a point on that front is that, you know, this is exactly how your body prepares for walking naturally. That's what infant development is, is being on all fours, crawling around, activating all these muscles in the way that nature has evolved us to, to, uh, to activate them. And that's preparing you it's work hardening the tissues in order that you can then stand up, right, with good core stability or motion control. OK. So, so one way, I mean there's hundreds of ways we could progress this, but we could use the Swiss ball again potentially and do a rollout forwards now this is not specific to anything in particular, um, but it will be an example of a more, ascended versions of core stability. So if

you put your forearms on the ball there and you just lift up a little bit from your, your feet there. What I want your start position to be is to be about 90 degrees at the arm and about 90 degrees in the hip. So you just flex forwards a little at the hip and that will be your start position. And then I would use this again potentially, now the thing with this is of course you can strap it to the waist like that. And what we can also do is use the string that I showed you before to strap that to the waist. And the string actually helps us to know whether or not sorry it's Beth? Is going rectus abdominis dominance, so is her rectus abdominis overcoming the transversus Abdominis, which shouldn't really happen at these low lows.

APM:

So how would that be manifested as well?

MW:

I'll let you rest for a moment. And the way that would manifest itself is that as Beth moves forwards, if the rectus abdominis overcomes the transverse abdominis, you, you'll see the abdominal wall push out. Now if you've got that cord around your waist, it will actually be uncomfortable so you draw back in and hold away from that discomfort. And so rectus abdominis dominance is quite normal when you're lifting heavy loads at a certain proportion of your maximum voluntary contractions. So around 60, 70 percent of your maximal voluntary contraction, you'd expect the rectus abdominis because it's a stronger muscle to overcome the transverse abdominis. And would start to push out. So you see this in weightlifting is the whole time anyone lifting a heavy load. But with lighter loads like this, you would expect the transverse abdominis to be able to hold the rectus abdominis in. So you see this a lot in pilates, for example, a lot of the techniques that they use, they are looking for that flat stomach, they don't want the stomach to push out and that will be because it's rectus abdominis dominance. Now when you get that dominance, what is indicative of his transversis either being deconditioned or inhibited, um, and therefore you start to develop a compensation pattern. And this is again, part of my concern with Eyal's approach is that he's saying well we can compensate. We can adapt. We, yeah, you can, but now you're using the wrong muscles to stabilize because you're using a phasic muscle to stabilize. And so yes, absolutely you can get away with that, absolutely the pain can go. But are you as functional as you could be? And I, I don't believe you are. I think you're not at the sort of you're not realizing your potential as a human being from a performance point of view.

APM:

So where were you going with this exercise with Beth then?

MW: So if we start back to where you were so about 90 degrees at the hip 90 degrees in the arms and then we'll get this neutral spine. So again the neutral spine, helps it keep each of the vertebral segments in neutral, helps us switch on the transverse abdominis and teaches hip-back dissociation, which may be useful for back pain patients if you want to just move out away slowly both at the hips and at the shoulders that's it. And she's going a little lordotic there So I want you to keep a little bit more tension there that's it can you go any further and keep that neutral spine good and then come back in. OK. So that's, that's essentially an abdominal exercise because you're in that slightly lean forward position. There's not quite as much axial load as if you're in upright. So that, that could be someone with say a disc injury. There is rehabilitating. That could be a good exercise because A there isn't, there's not quite axial load they're lent forwards, but, but also, um, if they're going to fatigue as we saw Beth, they likely to go into an ordotic position, which we, the disc bulges probably a safer position is going to then uh, going to a flex position.

APM: And can, I just say I wasn't meaning to sound dismissive of your highly sophisticated stick earlier on because it isn't, I mean it's not just a stick. Um, and we illustrated this when you came in last time, but this thing is set to by screwing it in or out to be the correct depth for the patients lordosis. So it does help to maintain the neutral spine position, the best spinal postion for tgem. So there is more to it than just a stick.

MW: And you know, and like I say, this is this part of the reason you might use something like that is for the reasons we've described to, to activate the core or the transversus in particular. But also because one of the things that's common with back pain is that you lose proprioception. So you're lose an awareness of what your back is doing so this is providing feedback to you to regain the awareness.

APM: Remember that pointy little screw gave me quite a lot of feedback. That's actually quite sharp.

MW: it is. But just to make the point again, you wouldn't want to use that throughout the rehabilitation. That's, that's a skill that you can dissociate your, your hip from your spine and it's good to train yourself to be strong in that neutral position as we discussed before. But then you want to take the patient beyond that and start to get them into, into other movement.

APM: So having done we've done all fours, four point stability on the floor, you progressed this onto a swiss ball presumably

Is there a more challenging exercises that you will take people through on a Swiss ball?

MW: There's hundreds of more challenging exercises you could go through so you could get the patient to kneel on the ball for example. It depends a lot on the patients. This is really important. So. So Beth, I would say, um, you know, have you used the ball like this before. And the question is, the answer is no. So, so um, I would know for Beth to ask her to kneel on the Swiss ball is probably way too much for her, but I don't know that because are you a gymnasts?

Beth: No

MW: so she might be a trapeze artist or a gymnast or tight rope walk and have tremendous kind of experience of balancing on things and kneeling on the ball would be No problem for you. But for most people that would be a big challenge and part of the rationale for using a ball is that or any kind of labile device that could be a bosu So it could be a wobble board, could be rocker shoes, those are all examples of There's all kinds of different things

APM: just in case people aren't aware. I mean a Bosu ball is basically a flat platform with a sort half swiss ball on top of it.

MW: Yeah, yeah, yeah. So the lability of the device makes the nervous system go into what Paul Chek calls a survival reflex. But essentially what it's doing is stimulating the tonic nervous system and Vladimir Janda talked about this a lot and really pioneered a lot of this, the wobble boards and rocker shoes. So by activating the tonic nervous system, what it does is the tonic nervous system feeds the tonic fibers. So if, um, if a muscle has a high proportion tonic fibers, like the transverse abdominis, then it will help to facilitate the activation of that muscle, but only if it's at the right level of challenge for the individuals. So if I were to ask you to sit on that, that would be so easy for you and that it wouldn't really have that effect. OK? It's not enough of a stimulus to the nervous system, but so if you want to sit up on here for a moment I'll just move it back a little bit, to get it back to where it was. So for you to sit on that, just, you know, with the feet normally apart and eyes open is pretty easy. But if I ask you to sit up straight, then it adds another component. Now you got to think about your spinal posture and that makes it slightly more challenging, but not particularly. I have thought, OK, so then try closing your left eye. And that is just another level of challenge. Now, both eyes. And that's another level of challenge. So the eyes are very, very proprioceptive. Now bring your feet together,

keep the contact with the stick. So this is getting even tougher for Beth. OK. And telling her is, it might not be. How does that feel? Was that pretty easy for you? Still not too bad. Pretty good. So let's try picking up a foot

Beth: Which one any?

MW: Which one feels best to you. OK. So she probably gone with the foot that she feels most comfortable with. So now I'm gonna ask you to switch and go to the other side, which may be more challenging.

Beth: Are my eyes still closed?

MW: Yes eyes still closed. So probably by now we're getting more activation in the tonic nervous system, but there's still may be too easy for her. So then I might get her to kneel on the ball or something like that

APM: Don't worry we won't.

MW: Which we won't get you to do right right now. So that would be an example of a simple progression because often when I've talked about Swiss balls to manual therapy groups in the past, they'll say there's no way I could do that with most of my clients because they're an elderly population or de-conditioned population and it's way too advanced for them. But I think what they don't recognize is that actually I normally ask the question a little bit rude with me, but I it will say well how do your Patients get into a clinic room and they say, well the walk in, you know, and so eighty percent of the gait cycle, 80-85% of the gait cycle is on one leg. You got one point of contact with the grounds. Here You've got three points of contact with the ground. So it's much easier than, than standing up or walking neurologically speaking. It's just, it's unfamiliar to most people you know. So. So it's that lack of familiarity that makes the nervous system go, what's going on here? Increase the drive to the tonic nervous system and that's how we activate. But this is where it's a little bit misconstrued where you might find personal trainers thinking just by getting the client to sit on the ball and doing cable wood-chop or cable push. This is somehow activating their core better than if they were to stand up. And, and that's just a misunderstanding.

APM: And you haven't mentioned the infamous plank exercise on the floor is that one that you feel is a useful exercise.

MW: Not particularly. I think again, it's like any exercise

APM: Again we're talking about for rehabilitation purposes,

MW:

it's very high intensity. So it kind of goes against the notion of the low intensity tonic activation. It's obviously isometric. So you know, that can be good because sometimes when people have pain conditions to move can be problematic for them. And so the fact is there's no movement or minimal movement can be good, but there's a lot of compression. And so this is kind of, this taps into the discussion where you're looking at the Hodges group versus the McGill group in Canada. And McGill is very much about bracing and about, you know, stabilizing. Um, and I, you know, to me it's a little bit of a silly argument and even Hodges when I've heard him speak, he says, you know, we've got no real beef with each other. It's really, we're talking about different ways of achieving something, um, and, and in some ways they're talking about completely different things. So one of the things that I know people that support the mcgill approach, which the plank is an exercise related to that approach, um, as our side bridges and those kinds of things. Um, the, the notion of the research that they often quote is that the transverse, and again, Eyal talks about it as well. The transverse abdominis doesn't offer much stability because it's, you know, it's a single muscle on its own and to think it provides all this stability, um, compared to if you activate the transversus, the internal oblique, the external oblique and the rectus abdominis and erector spinae altogether. Well that's what's happening. When you do a plank or a bridge, you're activating everything, so you're going to get much more stability. It's like saying, well, if I could just isolate my VMO is my knee more stable with the VMO activated or with the entire quadricep group activated? Well, it's quite clear it's going to be more stable with everything activated. It would be. It'd be crazy if it wasn't

APM:

But isn't the argument if this side is bulkier than that side. It'll drag the patellar of laterally.

MW:

Well, that's the one. That's the one with the knee That is one of the discussions. Um, but, uh, yeah. Again, I've got, I've got thoughts around that which perhaps, I don't know whether you want to go through that now.

APM:

Well not now, let's save that for later Well maybe if we run out of things to talk about, which is unlikely I suspect before we go on and progress Beth a bit further, we must be in the last half hour because the questions are now coming in. Jason. Jason, thanks for the question. Um, this is difficult Eyal is right Surely but so is Matt, there's so many studies indicating atrophy multifidus in patients with chronic low back pain. Therefore I swayed toward math. My only issue is how to isolate multifidus with core exercises without

triggering a response of the antagonist, opposing muscle group, the old adage: structure governs function. He's not asking a question there I suppose he's making an observation but you will have an opinion.

MW: So it sounds like the concern is, is related to

APM: isolating multifidus in retraining

MW: yeah, yeah. and not activating the antagonistic group was what he was saying as well. So the antagonistic group too, to the multifidus is kind of difficult to pin down because at the multifidus, you could argue particularly deep multifidus is so close to the axis of rotation of the spine. It doesn't have much of an effect on the spine at all other than compress it. So if there's a muscle that distracts the spine that can be an antagonist and maybe I'm being antagonistic, but the, um, the, the opposite potentially could be the deep fibers of psoas. So on the opposite side, the, psoas of course we all know as a hip flexor and um, but the deep fibers, actually go loop segment to segment, so the monosegmental, so they have a higher tonic preponderance and so they're more involved in compression and therefore stability. So they're kind of refined, control muscles.

APM: Maybe Jason if you've got a specific muscle group that you are concerned about which could be regarded as an antagonist and then let us know. Um, but what you're basically saying is that in trying to rehabilitate, multifidus you're not likely to cause any problems with antagonist groups because there aren't any real direct antagonistic.

MW: Yeah. I essentially, I am saying that what I found clinically is that quite frequently the erector spinae, will try and compensate. So you get an outer unit compensation, so you find hypertonicity for want of a better term tender points and trigger points because we have to be careful about talking about those these days. Um, but you do find these points that you press on and you know, essentially that there are tender points trigger points often right alongside where the multifidus is atrophied or inhibited. Um, OK, so, so you could see that almost as antagonistic to the multifidus activation. So what we do as osteopaths or manual therapist is we often will go in and release some of the tension in the erector spinae and that's the perfect window of opportunity to then activate the multifidus and that segment.

APM: If I can just do a couple more, Beth if you just bear with us for a second. We will get back to rehabilitating you in a minute. How would you adjust or modify? A good question,

how would you adjust or modify the neutral spine in a patient with a fixed deformity say an increased thoracic kyphosis with boney fusion in the DISH?

MW:

Well, you've always got to work with, with what you've got and um, and so this is why the neutral spine is one tool. It's one concept that can be useful, um, in terms of teaching new skills in terms of activating a specific muscle groups, et cetera. Um, but if the person can't achieve in neutral spine, then you would, you still want to activate those muscle groups. You still want to, you know, assess which ranges of motion are painful and pain-free Cetera. So you just go about your protocol the same way, but without the neutral spine component of it. And one of the things I would say though about the neutral spine is, is that there's a lot of people that have what appear to be relatively fixed Kyphosis and just if you can give them the tools to mobilize their own spine and to strengthen the muscles that would hold their spine up afterwards. So they actually can be working on that. A great point that Eyal makes actually not in his myth paper, but in some of his more recent papers is that you've got a hundred and 68 hours in the week and if you're visiting an osteopath once a week or twice a week for 30 minutes at a time, that's a tiny period of time to create adaptation. But if you give people things to go away with, which has always been the Chek approach and what I have subscribed to is give them an exercise program, give them a stretching program, give them a mobilization program that's very specific to their needs and then they have the tools. So not only can they get greater adaptive, um, uh, effects on the body, but they also are more empowered. So the point being that they're not dependent on the therapists, they have a set of tools of their own that they can use to help.

APM:

Isn't there a huge body of Meta analyses to say that there is no point in giving exercise protocols to patients because they just don't do them.

MW:

There is a, there is some, uh, what, we might have mentioned it last Sunday. There's a, there was a paper that came out which is called exercise caught in the efficacy trap, and the, the fact is the exercises incredibly effective for most things from depression to anxiety to diabetes to, you know, I mean the list goes on and on, to back pain, um, but it's not very efficacious because people won't do it. And so you're absolutely right on that front and that's why I think it's really useful if you can find different ways to motivate patients and one of the ways is to measure them, to actually take an objective measure and say, OK, this is got this much degrees, kyphosis, and if we give you these mobilizations in these exercises, then that should help to reduce, Kyphosis

and we can remember that when you come back. So they know, they've been clocked and they're going to be reassessed and it's a big motivator for them.

APM: Another question: your thoughts on and I don't know who said this. your thoughts on the pressure biofeedback units to help train the core if there indeed is such a thing as the core

MW: Yeah. Um, well they, they, again, they're useful tool. This is cheap, affordable a blood pressure cuff does just as good a job. So you don't need to buy a biofeedback units because essentially that is what is, is about blood pressure cuff. Um, and um,

APM: sorry, I, I had in my mind it was something completely different. Tell me what a biofeedback unit is then. Where does it go? What is it?

MW: It's like a slightly broader blood pressure cuff. It typically doesn't go as high as a blood pressure cuff. Typically it's about 1:20 millimeters of mercury.

APM: Used on the arm?

MW: No, you put it under the tummy.

APM: Now it makes sense.

MW: So the exercise that I was describing earlier, that Hodges did with the patient laying prone on the, on their tummy it, that's called a prone transversus abdominis exercise. And basically put the cuff under the tummy and you draw the umbilicus away from the cuff. And the idea is that you might have the cuff set on say a 40 millimeters of mercury and as they draw away you want to drop the needle down to 30 millimeters of mercury.

APM: So actually it's a useful positive reinforcement mechanism here and the patient seeing the result of their

MW: It provides a degree of objectivity as to what they're doing.

APM: Providing they're doing it the right way.

MW: Well then that's where you have to be coaching them and watching their technique and reassessing.

APM: We've had a question here about where does one buy the stick and how does one learn how to use the stick?

MW: Well that would be good to plug that.

APM: Well you know we're not here to plug anything. But you've shown us it, it's neutraliser.org is written on the side

MW: Yeah it is. And annoyingly that is actually down at the moment, but it's on my website is something that I developed myself because uh, I was taught to use dowel rods which are fantastic tools for that four point position. But as soon as you're trying to do anything out of that four point position, like for ball rolls or bent over rows or whatever it might be, stuff that's more functional, And they do what Dowels do, they fall off. Doesn't work and yeah, and also, you know, of course you can get the feedback from the pin and the string or the cord is a kind of separate concept that Paul Chek develops and I combined the concepts basially.

APM: So neutralizer.org is where to go.

MW: well actually it's mattwallden.com because this isn't, this isn't functional right at the moment, but it should be up and running soon.

APM: Again we just put the links up on the website. last question I've got at the moment I've got a whole bunch of more Just come in As I said that we're going to do this one question and we'll get back to you, Beth. OK. What are your thoughts on Professor Pavel Kolář's work in particular working on co-activation of the diaphragm and abdominal muscles. Pelvic floor, in other words, rather than drawing in, pushing out, creating intra abdominal pressure.

MW: This is another question I get asked a lot because it seems very contradictory to what the Australian group came up with. Australian group essentially were suggesting draw in and Pavel, I think you pronounce it collage because, because he's from. Yeah. Yeah. But anyway, anyway, his his group talk about contracting the diaphragm, which obviously creates interabdominal pressure, pushes the transversus abdominis out and then you get a reciprocal kind of pull back from the transverse abdominis. Um, so that, I think what he's got going on there in the way he explains it is an understanding of how it should work naturally when there's no pain. However, the Australian group found that when there's pain it doesn't switch on so you could push down on the transverse abdominis sorry on the diaphragm and they've shown it's inhibited. So. So I think that they kind of finding the same thing but in different ways. And so the notion of drawing in is that OK, so it may not be the way, uh, we developed from an infant development point of view,

which Pavel Kolář's is all about, um, but what it is doing is to say, OK, so this person's transverse abdominis is not firing. We can see that from the way they're standing or from our tests, whichever tests you're using. So what we can do is we're going to switch it on concentrically and then of course the diaphragm, you know, let's say you then go to pick up a weight well then the diaphragm is going to push down to create this interabdominal pressure exactly as Kolář describes and then you're going to get that eccentric loading off the transverse abdominis. So I think you can reconcile the two points of view and um, I've been on a couple of those dns courses which is his, his process and I really liked them but I still felt

APM: DNS?

MW: DNS is a it dynamic, neuromuscular stabilization something like that.

APM: And so maybe we can put a link up to Pavel Kolář's work as well. You'll have to help me with that to find that, in fact Daniele has asked if we can have a link to the Cochrane review as well. So yeah, Matthew Davis has sent in a question. Sorry no we said that we're going to get on to you now Beth, Matthew, you're going to have to wait. We're going to get Beth standing in a minute. I'm going to move to. We've done four points, we've done sitting on the ball, now you've got a patient who's good at all that stuff what do you do with them next Matt?

MW: OK. So, um, well I think it's probably important before we go to standing, uh, just, just to point out that this is not a specific rehabilitation. Protocol for Beth. Yeah, because I'm just showing examples of how you might move from, from different positions and that's what we would call ascending the exercise to take it up to a more functional.

APM: So we shouldn't use this as a prescriptive.

MW: So what I was going to show here was a bent over row. So if we were to stand up the bent over row is the reason I selected this is quite functional for a lot of people because we spend a lot of time bending over doing the washing up, cleaning our teeth, picking up kids, putting the chicken in the oven, whatever it might be. It's you spend time in this bent over position. Um, and so of course as you bend forwards it's your back muscles that are switching on to stop you from falling forwards. But in order for them to switch on, you have to have a co-contraction of the abdominal muscles. So if we want to make it talking about the core well the core will activate, but also because we're in this forward

flex position, you're going to be getting, again, this push up the viscera against the, uh, the abdominal wall. So if we go, what I want you to do it's called a hip hinge. So we'll just pop that on there. And I want you to hinge at your hips. Have these three points of contacts. That's good Now go as far forwards as you can until you start to feel a stretch in your hamstrings, you might feel your hamstrings, starting to tighten up somewhere around here. Yep. OK. So then you might give Beth a weight of some sorts she might have a dumbbell or a barbell or Kettlebell or whatever, cans of beans, whatever it might be. And then you would just row. So you imagine that your elbows are being pulled up towards the ceiling by puppet strings. And so if you like, you're rowing up like that, that will be it. And then back down. OK. So this would be an example of a position that's relatively functional. You can load her, you can set it up so that she is holding this position again for perhaps a minute's worth of work for the first set. Then same for the second set, third set, and you've got your three minutes of time under tension. But her core is going to be working. She's got the string around here to make sure she's not pushing out. That kind of thing you can relax again.

APM: Shall we release Beth back into the wild. So that's um, that's useful demonstration of core stability exercises within certain cases might work, but not necessarily every case.

MW: Yeah, I mean, so I think what is useful to illustrate there is that anything's a core, stability exercise because the core's pretty much involved in everything.

APM: well Eyal makes that point in saying all exercise is going to exercise what people call the core.

MW: Yes, yes, absolutely.

APM: And we better get back to Matthew Davis who the question, because to move on, he says, are you saying that there is a limited amount of neural drive (or CNS 'electricity') available to operate muscles simultaneously? If so, where might he look for references on that

MW: That's a good point. Um, I'm just trying to think. This is information I think Daryl Sale is a good person to look at. Um, I've got the reference in my chapter, I'm not sure if he specifically talks about. what he, what Daryl Sale talks about is the notion that, you know, if the nervous system is involved in activating the muscles, then the nervous system has to be as trainable as the muscles are. And so I'm just trying to think if that's where that the neural drive concept came from, but, but practically you can, you can, um,

experience this firsthand. And I experienced it firsthand when I was first doing the Chek training and I was doing these lumbar erector exercises, um, to, to, to try and increase my lumbar Lordosis a little bit And to, to lift my posture up a little bit because I've measured myself and found myself a little bit protracted and gravity was taking me in the direction it tends to take you. So I was doing the exercises and could do them all, you know, got to the point to the three to five minutes worth of time under tension loading that. Um, and so then I thought, OK, now I've got to make it more functional. Like we've just been talking about. So now I have to go to a bent over row. So I went straight into a bent over row position. And um, what I found was that, should I stand up is so I can demonstrate it. So, um, yeah. So what I found was that in this bent over row position, and I will start with a neutral spine and you know, be looking across in the mirror to make sure it's keeping the neutral spine so I was kind of looking across like this. And after maybe two repetitions or three repetitions, I see my spine starting to round out and I just couldn't hold it in neutral. I was thinking. That's weird. I can hold it for three minutes, you know, extended on the floor, but with standing upright can't do it. And of course as an osteopath. I spent a lot of my time over a treatment table, probably not with a completely neutral spine but with a rounded back, you know, this kind of thing. So I spoke to um, one of my instructors about this and I was saying look, no matter what I do, even though I've conditioned my lumbar rectus, I can't seem to hold this neutral spine. And she said to me, well you need to kneel down. So OK, well how's that going to help? She said, well now you don't have to stabilize your ankles, your knees, so you've got more neural drive for your lumbar rectus. So then like I got down on the floor and did the same thing, a kneeling bent over row. So this neutral spine and I'm bent over row like this and suddenly it's, no hassle at all it's totally easier I could do the full set just like I expected because I'd taken out the stabilization requirements for my knees and my ankles. So I have more neural drive. So that's just a practical example of how that works and maybe there's other explanations for that, but, um, I don't think so. I think that made a lot easier.

APM:

Well I hope that answers Matthews question. Somebody Anonymous has sent in a question to ask whether the atrophied multifidus correlates to any functional deficits. Now I don't know if that means functional deficit which isn't compensated for it by other muscles or.

MW:

Sure, sure. Well, I mean, first of all, there's this notion of segmental instability, which we've talked about and striations. And so when you get getting a segmental

instability, what it means is you're going to get a degree of shear at that joint and that would happen each time you take a step or each time you jump or twist or whatever. So the spine is incredibly robust, the ligaments extremely strong, et Cetera, et cetera. So you probably have no ill effects for awhile, but across the period of time, that additional motion at that segment, what it does, any kind of motion like that creates piezo electric charge. And so the Piezo electric charge is where the mechanical forces, are being turned into electrical forces. And it's that electrical force that piezo electricity stimulates fibroblasts to lay down more fibrous tissue or ligamentous tissue. So this is what starts to create stenosis potentially within the spine of course because you're getting, laying down of a connective tissue within the spinal canal. It also stimulates osteoblasts to lay down, bony tissue, so you start to see osteophytic development around the facet joints, et cetera. Um, so yeah, so cross period of time that atrophy there and the segmental instability,

APM:

Is that something we would expect to see when there is evidence that this does happen as a result to multifidus atrophy

MW:

the, uh, I, I can't say with 100 percent certainty that it has been proven that this is the case, but my understanding of segmental instability of what I've read around it is that this is the process that actually causes these changes that we see in the spine is a additional movement beyond the normal physiological movement. And that creates these charges which creates the laying down of tissues. And then suddenly in your xray, you see, oh, there's osteophytes in the spine, um, or in this knee it will be the same thing. So you know, we talked about core stability we're not, just talking about the core of the body here we're talking about the core around the knee and the core on the shoulder and the core around every joint has deeper muscles which are more core-like and tonic or have a higher proportion of tonic, nerves and muscle fibers and then you have the extrinsic musculature which is more phasic. And so, you know, the principles apply no matter where you talking about. Yeah.

APM:

Lengthy question here from another anonymous, um, member the audience. Could you describe the three points of contact again with the rotatory muscles being of the deeper layer, intrinsic back muscles and working with the multifidus and Semispinalis, do you see any need to isolate or distinguish between these structures or is multifidus always the primary culprit?

MW: Yeah, that's a good question. I think the multifidus is the muscle that's been most studied because it's relatively easy to study. It's quite a big muscle, so it's palpable. Um, it's easy to insert the needle into and know that you're in that muscle. Rotatory is a very small, difficult to identify muscle. Um, but the notion is, and actually have a slide on this, I'm not sure if I can get to it when you have a quick look, but the, the um, the deeper a muscle is the more spindle cells it has the illustration that I had of the multifidus you can see that I've got a bunch of s's in deep on the multifidus there on the left-hand side of the screen. And so, so I'll just, yeah, so just stay here on the screen here. And so what this is showing is the deeper fibres in the muscle have a higher level of spindle cells the spindle cells are designed to provide information about what is going on in, in that segment. And it's exactly the same for rotatores. Exactly the same for intertransversarii and interspinalis. So all of this deep intrinsic muscles, a very high level of spindle cells compared to the outer muscles in fact. But there's, there's some figures which we can, we can potentially provide to afterwards.

APM: And as I said we'll will put it up afterwards anyway and hopefully amplify on that.

MW: So, but in, in general, I think it's about six times the level of spindle cells in those intrinsic muscles compare to the extrinsic muscles like iliocostalis lumborum for example. Yeah.

APM: Um, another question from Daniel, asking you about the bent over row. Would you use this if a patient is complaining of pain on bending, for example, brushing their teeth? And if so, how would you make the movement less painful? Are there any cues or positional tweaks that help?

MW: Obviously you always want to avoid pain, um, because you know, the patient doesn't like that, so it's not very good for compliance. Um, but also pain will inhibit these tonic motor neurons and therefore the tonic fibers. So it's kind of counterproductive, but a lot of people will get pain because they brush their teeth with a flexed spine for example. So you imagine someone with a posterior disc bulge, they flex the spine to, to, to put the toothbrush, toothpaste on, or to lean over the sink and that puts pressure on the front of the disc, which may increase the bulge pressing against, say a pain sensitive structure. So if you'd teach them than to flex by hip hinging to brush her teeth, by hip hinging, that may mean that they get no pain, and if that's the case, then that's a great thing to teach them. But if it's the other way around and they're better flexing and but the hip hinge

makes them feel worse, then you wouldn't give that to them. So it's always case specific and based on what aggravates the pain.

APM: And a question from Daniele. Again, sit ups? crunches. Surely sit-ups will work only in stabilization of the abdominals. Wouldn't they? Crunches are more specifically to abdominals.

MW: sit ups work what sorry?

APM: Sit ups will work only and stabilization of the abdominals won't they crunches equals more specifically to abdominals. I'm not quite sure. I suppose actually if we talk about that we need to talk about what exactly Do you mean by a sit-up or crunch are because they are a different exercises and there are different types of sit-up as well, which are involve lots more rotation than others which perhaps involves TA more than rectus

MW: Well, yeah. I mean, I don't think rotation particularly facilitates the transverse abdominis because it's more the obliques that induce the rotation through, through the trunk, but always if you're doing a crunch or a sit-up or any kind of a crunch over a Swiss ball, whatever it, you always want to look to see if the patient is going to rectus abdominis dominant because they probably shouldn't unless they've got a huge dumbbell or Kettlebell on their shoulder and they're crunching with a big load. Um, and it's surprising how strong those muscles are because they're very phasic. If you think of someone serving a tennis ball or a lot of the power's coming from the rectus abdominis for that because they're leaning right the way back and then recoiling through the abdominal wall. Um, and so, you know, I can quite comfortably crunch, even if I haven't been training with maybe 30 kilograms on the shoulder and doing a cross crunch like that. And, and that's, I'm not saying that to say that that's what I'm trying to convey is not that hard for someone who's semi fit to crunch with quite a big load on their chest.

APM: Last question. If I may. I don't know who sent this in, but it says, my understanding was that the process of laying down of osteophytes, following instability due to discal changes was also largely a normal part of the aging process. Does this mean that it's rather due to injury or if it just happens faster after injury but likely occurs to some degree anyway?

MW: Well, so, uh, yeah, it is of course a normal part of the aging process, but I think that that doesn't necessarily explain how they get there. Is it just it because you're old? Um, I think

the reality is that, you know, if it's because you're older, why, why is it appeared here and not there or at this level or not at that level, you know, so the my understanding is that, um, you know, most people have disc injuries where they're symptomatic or not, and as soon as you have a disc injury, you lose disc height. OK. And as soon as you lose disc height, you got that Panjabi, his model of stability. So you've got the the nervous system, the passive system in the active system, and so as soon as you lose disc height, you've, you've compromised the disc itself. So if you lost some of the passive system is it has been affected, but the ligamentous structures between the segments have also lost tensions. So now you've lost really the effectiveness of the passive subsystem, which means you're going to get more sheer at that level, no matter how effective your muscles are. Often that correlates with pain, which can then inhibit the muscles, but, but you're going to get segmental instability it's that instability is my understanding that creates the piece of electric charges which leads laying down of osteophytes ligaments tissue

APM:

Thank you Matt I mentioned that you're up to your ears in research and I'm really glad that there is someone who is up to their ears in research so it makes it so easy for the rest of us. Thanks very much for that. It's been a great run through core stability here.