

## Fascia – The Latest Research – Ref 306

Steven Bruce 15:48

Good evening, and welcome to the second of this week's broadcast. This is another one of those perennially fascinating subjects, we're going to be looking at fascia. And like many aspects of health and medicine, our understanding of fascia has evolved over the years. And even now more is emerging about this amazing connective tissue to help us make sense of it or not just to make sense of it, but also to make use of it in our work. I have Gary Carter in the studio with me. Gary is a real expert in this field. He learned and studied and taught about fascial slings with Tom Meyers. He's worked with Gunther von Hagen, he of the body world's fame on a project to display the world's first plastinated fascial human. And he's of course up to date with all the latest evidence and research in this area. Gary, very warm welcome to you. Thank you for making the trip. Thank you for inviting me, it's

Gary Carter 16:39  
great to be here.

Steven Bruce 16:40

Let's, let's start off here, man, I said a little bit about you there. And there's two very famous names there, Tom is going to one Hagens I suspect everybody watching knows about both of those, what's your room route into fresher?

Gary Carter 16:51

Well, from a background of athletics and sport and bodybuilding, funnily enough, which is a strange way to come into it. In fact, before that, I was a graphic designer, okay, and as well as working with 3d graphics as well. So modelmaking, before the days of computers makes me sound quite old. And I was always able to see the body in 3d. So when it came to the bodybuilding world, and I was trained by very interesting people, that taught me to get a sense of the body and movement that particular way, but I could see how the body was connecting up when they were moving, especially the guys that are going into competition. So say if they were training their biceps, for example, I could see exactly how their calves were responding to that. And also because these people were in good condition, the bodies were well defined, you could see the movement transfer from one place to the other. And that always fascinated me. So I left that world got involved in becoming a personal trainer, I did some natural bodybuilding competitions, which is non steroid based. And somehow the

visual or the anatomy just made sense to me. And it was a subject that I was always interested in. And my father just brought down to Brighton a book that he bought me when I was about 10 which is a pop up anatomy but she was fascinated by still have that book and learn

Steven Bruce 18:14

something already I didn't realise they were competitions were steroids were allowed.

Gary Carter 18:19

But they're the world of bodybuilding, I'm gonna show you the world of bodybuilding, there's, there's a huge, I mean, it's a level playing field to a degree which we had certain cyclists talk about. But it was a world that I never really wanted to get involved in. And the guy that trained me, he just looked at me and said, Listen, you're never going to become a top professional bodybuilder. So don't kid yourself. And don't do that to yourself. And I was more interested in the longevity of the body. And how we, my interest is can we keep changing it and it can keep adapting all the way through my life, not to the point that I can only do that up until I'm about 30 or 40. And that fascinated me. So this sort of constant changing element of the body is that something that we have control over? Anyway, through that I then trained to become a personal trainer, but use the bodybuilding techniques to help people improve their structure, their form and how they moved. But I also want it to be more hands on as well. So I also come from a background of martial arts and really in theory, came up in that so I was interested in the energetics of it. So I studied shiatsu as my manual therapy to start with, but I was always feeling something under my hands that I couldn't describe. Even when I went back to my original shiatsu teachers and describe it to them. They said well, we're not too sure what that is you're feeling until I met someone that you know called John Stark. Yes. And

Steven Bruce 19:39

John Stone was one of my tutors when I was at college for the benefit of anybody watching, right and

Gary Carter 19:43

John had studied his yoga practices with a woman Vanda scaravelli who had a huge influence on my work. And he, as a teacher at that time, coming from his osteopathic and cranial osteopathic work, was talking about fascia, and this was probably for me in the late 90s. Until the late 80s, early 90s. And I just thought, oh, that's I'm not heard that word before. I've heard of connective tissue but and what's this fascist stuff. And our understanding of it from that perspective of bodywork and movement was more of a fluid base. So what I did was then studied in cranial sacral therapy. And that made a lot of sense to me and what I realised what I was feeling under my hands, was that rhythm when I was giving my shiatsu agreements through that world, and the various works that I was doing, I ended up teaching a lot of anatomy to various yoga schools and so on. But I came, we came across Tom Meyers. And Tom, at that time, was running some lectures in London, and he was over from the States. And this was mid to late 90s. And we brought him down to Brighton to do a two hour lecture on this idea that he had, which was becoming the Anatomy Trains, but it was before the book came out. And he was showing these particular connections through the back of the body, which we now know is called the superficial back line. And my colleague who I mentioned to you before Peter Blackaby is another osteopath and yoga teacher. We used to literally almost staple diet in the bands to the back of our clothing, to get a feel for movement through the entire back of the body. But we didn't assign any anatomy to it. We just knew that it was feel there. So when Tom came along and described that, we thought, well, he's actually put the anatomy into something that we're feeling.

Steven Bruce 21:27

So you were saying before we came on air there actually, for many people over the years anatomy is all about getting to the muscle and the bone and the ligaments and yeah, and in most prepared anatomy, special dissection special specimens, the you know, the fascia has all disappeared. Yeah. And I don't know what stage maybe Tom Meyers was the sort of the the leader in this field, when people started to really take pressure seriously as part of the dynamics of the body.

Gary Carter 21:55

Well, there's there's an image that we have is a slide that if that could come up right now, it'd be fantastic to see it. Because the image that we see on the far side of the screen closest to you is from a book from the 1850s. And what we see our fashion compartments in that here, we've got a dissection that we had done on our Plastination projects. But I'll leave that one for the moment. But what we see there is, is this beautiful illustration of all the fascial compartments of the thigh, and the book has compartments of the low leg, and then it's got longitudinal cuts as well. So it's got all of the channels of every single muscular structure. We know that Andrew Taylor still in the 1800s was also talking about fascia. And now just recently understood that there was another individual which I've completely forgotten the name, but he's talking about the interstitial tissues. I the interstitium, which has now been named again, by a man called Neil T's. He's a liver pathologist and written a paper a few years ago on this. And this was all happening around about the 1800s. But somewhere along the line after that, all of a sudden, these images started to disappear from the books and we started to see the kind of anatomy that we are used to seeing in anatomy books that I grew up with, yes, which is muscles, tendons, ligaments, origin, insertions, bones, and so on. I understand why that's happened so that we're trying to simplify something. But from and we were talking about this earlier from Andrew Taylor stills, initial understandings and his proposals about what fascia could be suggesting that it could be neurological, suggesting that it could be a mediator for fluid flow, suggesting that disease begins and ends within the fascia. A lot of what he was suggesting, has since been proven to be correct. And I think it's probably because they didn't have the equipment to study it. And Andrew Taylor still had said something along the lines of there will be more future study in the mind's eye of fascia. So he knew that at some point, we would understand it but outside of his lifetime, yeah. And we're finding that now so then there's been this renaissance in that tissue and that's been going on, really since the time of Ida Rolf, so the 1950s and into the 60s with her work of Rolfing. And how the origins of osteopathy have continued as well.

Steven Bruce 24:17

One of the things we were taught when I went through training and I've pretty much been disproved since then, is this idea that we can stretch fascia. Is that still something that you find is common amongst various practitioners? Not just osteopaths, chiropractors,

Gary Carter 24:32

yeah, there is sort of, there's conversations now around strain and stretch, when then having to look into physics when we do that. So I was also, as an aside as a hobby. I used to build race cars with a friend of mine whom used to race cars and a lot of physics came into that and we're looking at stretch and strain. If some sort of material is under a lot of stretch, it can start to lose integrity. So structural integrity of an object or the human is something that compromises its stability. So strain is something that we start to feel when people think they're stretching their hamstrings. So there's a level of strain. And those tissues are resisting, and they're resisting for a reason not to be taken too far. However, we do know in terms of extreme martial arts and ballet, for instance, there's going to

be a lot of force to the system to get as much range out of the body as possible. And if I'm working with someone that needs to do that, we will look at the whole system to find that the range works in a balanced way, rather than just one region of the body, because then integrity is gone. But in terms of stretching it, I know this is in cadaver labs. So there's a big element missing the living body. But I as manual therapists and structure integration practitioner as well, I apply some of those techniques directly to the tissue that we see. And all I see it do is return once again. So what is it that causes the change? Is it the nervous system?

Steven Bruce 26:08

Indeed, just going back stays there, you kind of implied that we could be damaging the structure by trying to stretch the fascia would we presumably have to work quite hard to do that. We can do so much. So if there's a lot of practitioners who treat ballet dancers, I'd say yes, and these buggers have damaged their system, because they don't have the what's the word integrity that they might have?

Gary Carter 26:30

Recoil gets lost. And that's something that is of interest to me, as I'm getting older, got to a certain stage now I'm being asked to, from workshops over a certain age. Recoil in the system, I think, is something that's really important because bounce reduces and as people move on in their years, we start to see the juiciness of the tissue disappear. Commonly, what we know is that as people start to get to my age, I've just turned 60 is that the muscular tissue starts to atrophy a little so that there's there are certain degradations of muscular tissue through the ages. And some way through the mid 60s, it happens again, in the 70s, it occurs and in the 80s, it speeds up a bit. And what's understood is that the more muscular tissue that we're losing, the body's replacing that with more collagen, which is stiffening the system. So if we can maintain muscle density, then we can maintain the juiciness within the connective tissue as well. So we're not laying down too much camaraderie.

Steven Bruce 27:31

So what then can we do about it?

Gary Carter 27:35

Well, load bearing work, you know, the classic, progressive resistance training is always useful put load through the body, it's, this is a structure that's built to take load, it can do it through its lifetime. But, you know, here we are sitting on chairs. And this is the world that we now live in. And we've kind of developed an environment around us that the body is actually suffering for. So

Steven Bruce 27:57

one of the challenges, isn't it, though we load bearing work requires getting doing some exercise. And given that many people's day is spent in front of a computer before they get into their car before they sit on their sofa. Finding the opportunity for that load bearing work is quite difficult, isn't it? Absolutely. I know, we were just sort of stating the obvious here. So I'm hoping you're going to come up with some magic wand because they want your five minutes a day we can show our patients how to improve the

Gary Carter 28:25

five to 10 minutes a day, you know, it is possible. But it requires an amount of exercise to be done. So I still am personal training some people as well. And I also still trade myself and some of my clients because I travel on our, with my teaching and work as well. So especially with our projects in Germany, I was away for almost five years. So I had to give my students and clients a lot of work to

do on their own. And that's something I called 30 fives, which they do 35 reps of a particular exercise. And we work that out relative to their needs. So each person is slightly different. And they send me a text when it's done. And it's 30 fives and they're done in 15 minutes, pretty much, right. So I'm really excited, we're doing our 10 exercises, about six or seven, because that's all it needs to be really not too many. And then of course, if that by then if they're interested in doing more work with themselves, they'll start to seek out those kinds of practices as well. I also come from a yoga background. So multiple directions in movement is really useful because our fascial structure different to the musculature is sort of omni directional. So you know, we might see the covering of a bicep, and course we'll see the basic green of the bicep muscle but what we'll see is the wrappings around it and the more superficial fascial coverings around it moving every direction, that the bicep is connected to the tricep through those fascial coverings as well. So creating multiple movements is really useful at some

Steven Bruce 29:51

point presumably that that structure within the fascia is laid down in response to the stresses it's undergoing rather like Rebecca Lean in bone, can that be adapted later in life? Or is it kind of fixed after you reach 1890

Gary Carter 30:07

It's a constantly adaptable thing, I just see that people have certain ages. And I can't even say older, because older could be 25 Just depends on how people are behaving with their body and their attitude. It's that it's still got the ability to remodel. However, when there's a restriction that happens in the tissues. And maybe that's the an age type stiffening that starts to occur, it becomes more uncomfortable for that individual to move. So that for the general public will see that they would rather not move, it's too painful. So they limit their potential to move into their environment. But gradually, if we can educate them and help them to find different movement patterns for themselves, they start finding that these tissues soften up that can be a combination of movement work and manual therapy, because the two really go well together.

Steven Bruce 31:00

Interesting, actually get you to spend half an hour with a 92 year old patient of mine who shares my surname is my father. Because after he broke his hip recently, he's doing an awful lot of sitting and he can't move because it hurts, but I keep trying. And he's saying, Well, I've got new muscle in my legs and you want to get them unless you do some exercise. Chicken and egg, isn't it?

Gary Carter 31:19

I've got a slide I'll show you later. Hopefully in a while my father because there's your father was a sprinter. He's a he's a Masters athlete. He's, he's 86 now. And he's a hurdler and 500 metre sprinter stills still. Yeah, and 81 is running a 16 second 100 metre sprint. So my brother and I can just about keep neck and neck with him. Well, and when we're behind him, when we're running on the track, I'm I can't get past him I just stay behind. But there's there's an incredible run, he has a an athletic run. It's not an old person running around the track. It's quite incredible. But he does the work on himself. He's interested in this, he's been to a few of the fascist symposiums as well out of interest and doesn't understand it all. But he's got a good engineering brain, so he can relate it to the body that way. Yeah. And he just applies five to 10 minutes of that work into his training, and it's enough for the bounce that he needs.

Steven Bruce 32:17

Yeah, we're gonna come on to that, I hope because then we do talk about elastic recoil when we were discussing this before the show. And if there's a way of encouraging more of that into the system, I'm sure it's going to be really, really helpful for our patients. Talk to us a bit about the basics of the structure of fascia, then,

Gary Carter 32:34

well, well, the the fascia is, is created by ourselves called a fibroblast. So I guess similar to an osteoblasts, where we see trabeculae being laid down, that's also happening in the fascial medium. The fascial structure is being created by the fibroblasts. And the fibroblast is, it's a cell with many tentacles simply put in quite fuzzy bit like my head. So it's got cilia all over it, and has something called a primary cilia, which is more of a stiffen structure and their direction sensitive. So the more we start to put regular movements through the body in particular directions, the fibroblasts will organise themselves along those particular directions. And then the fibres, primary blasts are producing collagen, elastin, and reticulum. And they're also producing a fluid base for them to live in called ground substance, so glyco amino glycans, and it has to borrow Tom Meyers words, it's basically snot, it's got a kind of gooey mucousy kind of quality to it. And that that material, that wet stuff can either have a lot of glide to it, or sometimes it can thicken and becomes a bit too sticky. What's recently understood now is that fibroblasts are interconnected, every fibroblast connects to another one way or the other. So what we have from head to foot and skin to depth is almost a unicellular web. So we could say that within the fascial network is another connected network of cells. And they are all feeling stresses and strains and so on. So, so the primary ingredients are the collage in the last in particular, and within that fluidy network, and we our primary protein for the human and animal kingdom as a vertebrate is collagen.

Steven Bruce 34:22

Right? We had a question that relates to this coming just a second ago from Keith, who was asked about how hydration affects fascia, and does it need to change with age? So I suppose there's two parts to that out there. And we know that hydration is probably important, but the other question is, how do we how do we hydrate the fascia? Or is it simply enough to drink whatever the current multiple litres of water per day that are recommended by the government

Gary Carter 34:46

while you're drinking that amount of water, then you're probably going to end up spending more time in the toilet. So it's a lot of good hydration coming into the systems coming through nutrition. So what sort of foodstuffs are we going to get deeper? into the system. So it gets carried into the structure better than just drinking water. But also the glycosaminoglycans have got a, the nature of their structure simply to simplify it, it's more like moss. So it holds a lot of fluid. Okay, so think of a loofa, we have a dried loofa. And then you put that into a bowl of water, that's going to soak the water up. And that can kind of dry a little bit, the tissue becomes less hydrated, so it makes it more vulnerable. Movement is the thing that really helps the fluid to be taken up by those tissues. But also, again, manual therapies. And there are various foam rolling type practices out there. If I can mention it, my colleague and friend Sue headsman, she has created something called the melt method. And she's specifically organised sort of rubber balls at different sizes. And she's she's created a foam roller by sourcing the right sort of foam, and doing the research on the fascia to generate the right amount of hydration into the tissue, so it juices up. But we find that we can, we can generate that in how we palpate someone's tissues without having to go too deep. I teach you go as well. And a lot of my students at the end of those sessions find that they feel quite juicy. And the movements are quite soft and flowing. So what is Qigong and it's an ancient practice similar to

Tai Chi. So it's got roots in in Tai Chi and a way to just to simplify, okay, so that they're very soft, but repetitive movements as well.

Steven Bruce 36:37

Okay, so using the foam rollers using movement, we can hike we can cause the fascia to hydrate itself. Yeah. What's the best nutrition in order to provide the necessary fluid? Well, I've always been really, I'm glad you said what you did, because I've always been really suspicious that just drinking water isn't enough.

Gary Carter 36:59

It's not just enough. I mean, it's useful to be hydrated, but I am gonna drink some, but I don't drink those amounts of water. I mean, when I'm teaching and giving lectures, I don't have lots of water at all, because I'm going to be running out to the loo a lot of the time. But you know that the foods that carry water, and so the water base foods, which, you know, you've got good vegetation, vegetables, but a lot of the vegetable proteins that we get around as well, they will carry a lot of water, short grain brown rice draws up a lot of water as well cut, but not dried, but it needs to come in and be quite fluffy. This is a lot of stuff that was going on. For me in my bodybuilding world and water content foods were really important. Because we noticed it in the tissues. It wasn't just about having loads of protein. It was bringing fluid into the system that way. There's now a lot of talk on rubbish likely, you've mentioned has been on your show, he's good to keep researching because he is right at the cutting edge of the fascial research and how we get gelatin into the system as well. And that has an effect on the college and then it brings a juiciness to the college and then makes the college and much richer.

Steven Bruce 38:05

How do we get Joseph? I'm not too sure

Gary Carter 38:07

how we do that. So we need to look into it. Robert, back on the show for that one.

Steven Bruce 38:14

Okay, w 5.6. The system gives them these names that will they give themselves I'm not sure. Anyway, wo 5.6 says, I've heard that the ballet dancer selection process acts like evolutionary natural selection. That is they're selected for training because they're already hypermobile. And this can already assume the desired hyperextending joint positions. Stretching doesn't get them to that point. They're already there. If you've got any thoughts on that might not be something you

Gary Carter 38:41

know, I mean, I've worked with a lot of dancers and I have worked with some ballet dancers that actually have suffered the price really of trying to make their body be the classical ballet dancer body and their structure is not set up for it, I can understand, I think knowing, seeing how the structure is now. And I guess in this amount of time in my life, I can understand why the selection process is what it is. Because it's not only about the person being able to perform the way that they perform, it's so that they can sustain it. But if you've got a lot of people that try to force their bodies into something that it's just not willing to go to, they might be able to have a career for a while. But the breakdown is that the fall off from that is really quick. And an osteopath colleague of mine and myself within the same year, we're both working with ballet dancers and they both had the same degree of low back pain. And when they were laying on their back and they could take hold of their

big toe and bring the foot to the floor next to their head when they let it go. Naturally and the viewers will understand this. You know what that would feel like, if you let it go. You would see that the leg would spring back again. But when they let their leg go, it stayed there. So they had taken it to say in elastic degree, that there was no more recoil. So, so the low back was taking all the load to stabilise them. So we had to do very different work to bring more density into the hamstring structures. And we couldn't shorten the fascia, we had to actually want to try to shorten it, we had to develop the musculature more.

Steven Bruce 40:19

So you, presumably, and as you must have an opinion about stretching advice, which is given to people and I think back to a book that I saw, must have been when I was in training sort of early 2000s, late to the 1990s, where the book argue that anybody could learn how to do the splits, if that's what you particularly wanted to do. I never bothered to pursue that, because I didn't really see the need to do the splits. But it sounds as though there's a point whereby where at which stretching becomes detrimental?

Gary Carter 40:50

Yes, we lose, then we lose some integrity, so that the musculature doesn't quite have the same power. If we stretch too far, there is now some research looking into stretching before any events isn't that useful, because it can actually weaken the amplification of the muscular structure. But I think it's, it's down to the individual. And that takes a lot of practice and learning. So it's tricky to put that as blanket ideas. If I come back to my father, just for an instance, there's a book that's just been written about masters athletes, and he's been included, and one of the chapters in that. And the thing that was outstanding, Richard Asquith is the author can't remember the name of the books just come from my head. But the thing that he pointed out about my father is that my father's training time, over half the training time is spent in preparation and warming up preparing the body. And the difference in warming up and stretching, there isn't Yeah, he does some stretches, but stuff that I've given him to do. So what what we look at is, for us see something like the bane of band is that we will we will take those tissues to a point where we can just about feel it want to return and then go there and then let it return. Rather than I'm going to stay here and keep holding on to that. And just wait. So can we find where the elastic edges and and play within that edge. And for my father, in his lifetime of athletics, he's had three injuries. And he started getting into masters in his 50s. And that blew me away when I found that out, because I was expecting that he's a few injuries a year, but barely any, barely any.

Steven Bruce 42:34

It's a hard philosophy to sell, though, isn't it? Most athletes have been brought up thinking that they've got to stretch before they train. In fact, I've even come across athletes who think they stretch before they warm up, which seems even more likely to cause damage. And there must be a psychological component to doing what you believe to be good.

Gary Carter 42:55

Yes, exactly. Again, I'm sorry, I'm going to keep coming back to my father on this because that there was I was at his at one, he became world champion, again at 200 metres. And we were at one of these huge running tracks in Malaga. And they've got an underground indoor track as well. And this is where everyone's warming up and preparing. And I was down there with his prep, helping him with that, and then leaving him to do the rest of it. And it was the groups that were from 50 years up to 100. And it's all in five year categories. And they were doing all the kind of warm up work that I



would know to do. And after those events, he said to me go downstairs now and see what you notice. And it was the 30 fives the 50s group, and you could smell the testosterone. And everything that we saw was everything that we now see in terms of functional training techniques, foam rolling using bands and stuff like that. And that was the warm up. And you could see it was a bit like the eye of the tiger movie in their eyes. And I spoke to one of the coaches later on that evening and said, Do you think that all this new functional training, as I understand it, I mean, that world has made any difference to the performance of those athletes compared to what has happened in the past? And he said it's negligible. On the times. He said, It's more psychological thing. And what is the current trend of the moment? What I was told, and I don't, I might be corrected by someone out there in the world right now. But the biggest changes happened when they changed the track surface, and the running spike length. And that's when they started to notice sizable changes in times and running. But all of the stuff that we see going on, if it works for you stick with it if the mind can stick with it as well. There's a connection of the mind and body with a lot of athletes and their body already gets in tune. The moment they start visualising what they're about to do, there's evidence on that already.

Steven Bruce 44:57

But of course I mean athletics running water It's a it's a very measurable, objective performance. And if the only thing that's changing is the psychology, you could say, well, you could stop doing it provided you can change the psychology and maybe make them last longer in their careers. I don't know. So more questions. Cornell has said the recent research mentioned that fresher has some contractility, what so

Gary Carter 45:19

what's the Yeah, so where we have fibroblasts, what's understood as well is that we have cells that are called myofibroblasts. So they don't produce the collagen, but they've got contractile qualities to them. So they are within the net of fibroblasts, but some of them have got contracts or qualities to them. So they their behaviour, is, has been noted to behave like smooth muscle cells. And so they get called smooth muscle cells. But they're not that they've got a smooth muscle cell type manner to them. And that can cause a contractility to the fascia. They're responsive to hormones. So we're regular muscular structures, we've got nerve connections to them. So I can, you know, I've got motor units and so on. But my fibroblasts are more responsive to hormonal changes in the system. And what's considered is only about 30% of the myofibroblast in the body are active, the rest of dormant so that they get quite active in wound healing. So you think about burn scars, we see quite quite extreme burn scars, we see how the skin is quite wrapped up. And wrinkles, the myofibroblasts are active so that the ones that are probably dormant have come online to bring that tissue back down. But they don't stop contracting. So they keep the skin in that pattern that we understand. So again, Robert slight at one point with his research team was looking at how we could go about manoeuvring the skin, influencing the myofibroblast. To prevent him from crack contracting so much. Sorry, to carry on the low back pain. It's been understood that in some instances, some individuals have a high percentage of myofibroblasts in the Thredbo, lumbar fascia, and in the plantar fascia as well. Different to some others. So it could well be that that's the issue and so that the treatment modality will be a bit different problem is though we can't take a tissue sample from the body and stain it and to see whether they've got them. So we need to start looking at possible characteristics that they might display and how quickly they keep having that issue.

Steven Bruce 47:26

Yeah, you said myofibroblasts are particularly susceptible to hormonal change, is that a good thing or a bad thing?

Gary Carter 47:32

That's a good thing. It's that I mean, we're all not hormonal all the time. So we've got hormones running through the system all the time. For me coming in here, the hormones are up for a bit because there's that anxious moment. So there's a different quality of hormones that are coming into the system. And then you're great at making someone feel really easy and relaxed, and the hormones are going to change in that moment. So their responses to oxytocin, serotonin, and about nine other hormones that have been researched so far.

Steven Bruce 48:00

I suppose we all think though, when when we start talking about hormonal changes, we think that women throughout most of their life are more susceptible to dramatic changes in hormone levels. Does that mean that women athletes are more able to women generally are more vulnerable to injury or

Gary Carter 48:16

there is that that has been looked at now. So Professor Carter STECHER as part of our fashion research group, she has been doing a lot of research into that. So fascia and hormones, and then the effect on female sports people. So at certain times, say through their cycle, then the hormones are different. And that can affect whether they get ACL tears and so on, so that they might need to temper their training differently, and the way they they compete. So it's a very different dynamic to it to how it might be for the male. Yeah,

Steven Bruce 48:48

I was thinking about an ACL tear as being a tear of the ligaments. But clearly, there's got to be some factor involved, there is the bigger problem, which is either you can't separate or Patrick can separate them,

Gary Carter 48:58

can't really separate them. I mean, that's the strong connective tissue structure, I would say to connective tissue proper, however, is still got the components. It's got collagen, elastin, vertikalen. And it's just got high intensities. And we now understand also that the ACR has neurological. So it's got proprioceptive qualities to it as well.

Steven Bruce 49:16

We're on the subject of collagen, which of course, you've mentioned numerous times Rebecca says, you know, there are lots of collagen seq supplements out there at the moment, such as she specifies marine collagen, is that something that would be recommended? Are you aware of any benefits in terms of

Gary Carter 49:30

not to be sure No, I mean, it's, it's still a whole field that's being returned to it's, it's nothing that that I really suggest to anyone at the moment. So Rebecca, I can't help you.

Steven Bruce 49:42

Personally, I find the whole field of nutrition is one which is riddled with bias, and particularly commercial biases, and a lot of standard nutritional advice is based on very little evidence whatsoever. Yeah, I'm sorry, we can't help Rebecca. Yeah, sorry,

Gary Carter 49:57

Rebecca. I mean, my only thing with this is that if you are going to explore stuff like that, you need to give that kind of process at least six months, and you need to chart it. I had to do that. And it was a year to two years worth of dieting, bodybuilding training and to get that right, and that took a lot of fine tuning. But what I did for me wouldn't have worked for my training partner. Right, we had to do it differently. Yeah.

Steven Bruce 50:21

And I guess with all these things, there are so many factors changing at the same time, it's quite hard to nail down, which is the one that made the main differences. Yeah.

Gary Carter 50:29

And age comes into it as well. So as we start to get to a certain age, the body doesn't respond the same way. So we then adapt to our training, but then you're dealing with athletes that way that can become quite finely tuned like a race car. And that can happen to people that aren't at top level, they still feel it. Yeah.

Steven Bruce 50:46

So on the subject of supplements, and again, please feel free to say it's not your area of expertise. And what about vitamin C and glucose? Amy Lorenz wants to know whether

Gary Carter 50:53

it's an SI has been understood to have a to help in collagen synthesis. So I find that that has worked for quite a lot of people, it's been quite helpful. But that was difficult to measure it exactly. But it's always a useful thing. We know that that person is passing through the body on a regular basis. And we can we can use it, you know, you've taken too much because you're on the loop.

Steven Bruce 51:17

Well, yes, and that's that's your measure isn't the island. And actually, we've had a speaker on the programme before talking about general health saying that, you know, if you are suffering from a cold or a virus, or whatever it might be, actually you take it to overload because that part that is part of the process of getting rid of the bugs in the system is that

Gary Carter 51:36

our system is under a lot of stress. And you know, there's work stresses, business stressful, same thing, business stresses, physical stress, training, stress, as well, relationship stress, and so on. And right now in our country's in a financial stress, so all of those things, writing stresses to the system. And then if we get some kind of element coming along with it, then whatever we're taking is never really going to cover it. So we might need to bolster the system but supplements just to caveat that supplements exactly what they mean is that they supplement the diet that you have. They're not the magic bullet, food first and supplements on top.

Steven Bruce 52:15

I just one final word on that. I was very struck by a number of speakers we've had that say that the recommended daily intake of almost all vitamins is way below what it should be a beneficial effect. We won't go into detail here. Sarah wants to know if you've got any opinions about fascia and hypermobility, they think we did on Monday, it was about a 15 year old girl who has a nasty

scoliosis, but she's also hyper mobile and is getting lots of pain. So I think that might have what it does, it's prompts the question to a certain degree.

Gary Carter 52:43

Yeah, we're dealing with collagen types. And there's, I find this with various I teach a lot of yoga as well. So I'll have people come along and say I'm hyper mobile. And more, we might see the classic example of the knee hyperextension, or the elbow hyperextension. They give themselves a title that they're hyper mobile, or someone's told them. But they haven't really been tested for hypermobility around the entire body. So sometimes what we'll see is that where there's extra movement at the elbow and the knee, for example, somewhere else in the system is not moving as much. So that compensated so then there's kind of investigation that starts to go on. And that can't really be done in a big class setting that has to be done in a private one to one setting. But with the classic hypermobility, and you've got Ehlers Danlos Syndrome, and so on, then they've got different situations to deal with. And we then need to turn to the muscle. Because as we know, the myofascial element of it, the fascia is enveloping the muscle completely running right the way down to the individual muscle cells to the tufts around around the muscle as well. So where we can have the musculature expanding, and if we're more into the fascial tissues, just enough, we've got an opportunity to show a few things up. But that takes a lot of work because we then need to bring in say the model of tensegrity to that where we're looking at balance tensional forces around the entire system, so that we need to work around everything rather than just an area that we think we should because you can throw it further out of balance.

Steven Bruce 54:16

I first came across the word tensegrity. Probably 20 years ago, I didn't understand what it meant was it mean?

Gary Carter 54:23

It's it's a term coined by Buckminster Fuller, the architects and it's basically a collaboration of two forces tension and integrity. So tension and compression. There are some installation artists one called KENNIS Nelson, another one called Tom flemons. And they created this fantastic set of structures that you see standing in parks and so on, which is aluminium rods with cables suspending them and they will call them floating compression, right? So they're basically the same thing and it's a balance of forces. That the classic toys that we see are the rods we With the elastic and making the icosahedron structure, and everyone uses that saying, well, the wooden rods are the bones and the elastic is the muscle and connective tissue. It's a model, it's a nice idea. And it does show us what's going on. I've got a similar one here, which is a vertebral structure so that we've got the take those out, we've got the wooden structures of the vertebra suspended with the red and the blue elastic. Yeah, so they're not really touching. So you know, I can press that together, but it's springs apart. Once again, this is probably a nicer version of it, because we're showing some of the intrinsic muscles of the spine. So on the other ones, the icosahedron 's are well balanced forces. And if we shorten one structure, then another structure is going to have to lengthen to deal with it. They're the classic models that are used for tensegrity. And it's, it's a great example for a body wide balance, because our skeleton cannot stand on its own. Whenever we find a skeleton, in an archaeological dig, it's always independent bones, we don't really see any muscle or soft tissues there. So the only way it's going to stand up is to add the soft tissues to it. So it could be that if we disappeared, the bones from the body, it still got an opportunity to stand because of fluid pressure. That takes me back to Andrew Taylor still, because he was talking about abnormal pressures in one part of the body will create abnormal pressures. And another. So muscle is a pressurised unit. It's a fluid

structure in a tough connective tissue bagging like sausages in their skin, but multiple around the body. And their adherence towards the skin of the bone, the periosteum, as you know, and they've got certain points where they connect well, and then we can actually have the skeleton suspended. So bones don't really touch each other, in general, and they've got space between them is a great, it's a great model. This is fantastic. There are new discs holding the vertebra apart in that No, no,

Steven Bruce 56:52

I mean, they stay,

Gary Carter 56:53

they stay apart, you can play around with that there is another one that's a full size one. And I've tried pushing it together. And what happens under certain force, it resists it, and it can't get them to do that. But I've got some bits of foam that I put in there. Because once we do this just it's me playing as a kid, and I put this around it, put some netting around it, we start to see something very different occur. And I use this when I'm running my courses, is that if I can put this very quickly, hopefully this will work because I know we live. So the knitting is the fascia. Yeah, so the knitting is just an element of the fascial sheath because the spine itself is actually in a sheath of multiple planes. I'll only take it down that far. But what's happened immediately is now that structures become more stable, it's less floppy than it is down there in that. But if I put more and more of these nets, I've got loads of these come from wine bottles, so that says, but it makes for a more stable structure. So we have the anterior ligament of the spine. But in the anatomy books, you will always see the anterior ligament as an independent structure, but someone stopped masking tape along the front of the skeleton. And there it is, but that's not what you find when you come to dissect it. It's just basically a bumpy thing in the middle of the body covered in strong connective tissue. So it's a robust structure. And when we see it in that situation, we wonder how it ever moves. And I'm glad

Steven Bruce 58:16

I'm really glad that we've now got an answer to the question about whether drinking wine is good for your structure. Well, absolutely.

Gary Carter 58:22

It gives you good connective tissue.

Steven Bruce 58:28

Marcus has said is there any benefit in giving patients isometric stretches? Or should we prescribe a more dynamic fluid movement to the recoil he calls it,

Gary Carter 58:36

I would, I would suggest what Marcus said. However, there might be a certain circumstance where someone needs to spend a little bit of time in one area for a while, it really depends on the level of resistance that's come up into that area. There's a term that's used in fascial anatomy called densification. So it's where the tissue ends up more like Velcro. So we've got his gliding surfaces, every muscular surface glides against the next one between them, if I just use the webbing again, got another one. So one muscle and other muscle between them is what's known as a loose area of fascia. So it's a loose webbing. So where the muscular structure moves against the next one, the softer connective tissue between the two enables some glide, but in that space is a lot of fluid. And what's now understood from Carlos DECOs work is that she's found a whole group of cells that now exist in the fascia and they're called fascia sites. And that first came to light in the 2018 World

Fashion Congress. And they wanted to call them SticO cells. She was up for a Nobel award for this and she said, No, they're fascist structures. Let's call them fascist sites. We'll leave them like that. So they're smoother looking cells and

Steven Bruce 59:55

unheard of in academia for somebody not to want

Gary Carter 59:59

an instance Jessica's fantastic and she's she's similar. So Robert, she's got such a quality to her. And then what she's understood now is that they produce height around on so that they create a fluid that enables them to glide. And that's, that's quite an incredible quality, we've understood that they don't slide on each other, they kind of glide on each other with this, this fluid between them. But if this tissue was to thicken, now those two surfaces aren't going to glide so well. And then the fascia sites don't get to function so well. So as manual therapists, we will know that we'll be confined the interfaces between some tissues and then ask the person to add some movement to it, they start to get some motion once again. So we can thicken them, we can densify it break down the Velcro. So in some cases, just maintaining a slightly static stretch for a while if we use the word stretch, can be useful, but not taking it to a point where that person is fighting for it. I always check for the breathing, can they maintain a steady rhythm to the breath, even though they're moving towards an end range, we could consider and is being looked into that if I was to keep going into an extreme quality of stretch, I'm sending the body towards sympathetic tuning. So it's taking it towards fight or flight? Because that's your emergency measure. Yeah. So I'm going to suggest this now. And maybe the audience can do this is that if you all bring your arms up as high as you can, so if you don't mind doing that, if you take your arms up as high as you can, okay, right? Now take them higher. Right? So I asked you at the beginning to bring your arms down, I asked you to take your arms up behind you curves. And then I asked him to take them higher, and you had that little extra in you. So we've all got the extra range. But that's only in an emergency measure. And what they see in a lot of extreme stretching, people go to that place. Yeah. And then the nervous system is being tuned up towards sympathetic tuning. So can we stay within our house at a safe range, make sure that you've got as much room in it as possible to quote, Robert slide, once again, is that we have all the length in the body that we need, we just need to take away the resistance to it. Right? That's that and it's available to us?

Steven Bruce 1:02:16

Difficult question isn't just how far to push, push your stretch, because, you know, I know so many people that you're not stretching your hamstring, unless you can get your forehead on your knee, even if most of the bend is coming from your thoracic spine or whatever. And to accept that it's a useful stretch at a lesser range than that must be very challenging to educate them that way.

Gary Carter 1:02:36

Yeah. I mean, you know, the question for me is, why would we just need to stretch our hamstrings. And it's interesting, isn't it when you ask someone to show me your muscles as they show the bicep. And when you ask someone how flexible they are, it's always a sit and reach test. And yet, they can cheat on that, you know, what about, there's my level of flexibility and have a look at the tricep or something like that if we're going to measure the body that way, we've got knees, so when we bend down to pick something up, we don't usually do it with straight legs will bend the knees to get down there. So one of the biggest issues is that we sit and when we sit and I'm doing it right now, so sorry, guys, is that my pelvis is dropping on there just a little bit. So my sitting bone is closer to the back of

the knee. So the hamstring length is already shortened. And my weight of the back of especially this leg is against the chair, so that the fascial wrapping around the hamstring and between them and where the hamstrings meet the adductor magnus which they sit in a channel, all of that can densify. And the moment that densifies. If I then try to sit up or sort of stand up and go towards a forward bend, all of that tissue has stopping me from moving, and then I blame the hamstrings for it. But keeping myself in this position is shortening the structure. So then I'm creating an imbalance that it's tension or arrangement. So I might need to bring movement back to that.

Steven Bruce 1:04:02

So what's your answer? Then? Desks mounted in front of a treadmill sit to stand desks or just get up and stand

Gary Carter 1:04:08

desks. But you know, also can people get on the floor? Are they able to get on the floor sit cross legged? Sometimes if they're at home, can they sit at home with their legs crossed on the sofa rather than sitting? I mean, not many people sit the usual way on the sofa anyway, or sit on the floor with the back against the sofa. But have the legs crossed learn to find that movement. Good friend and colleague of mine is a Pilates teacher since the 1960s. She's called Hannah Jones and she's on a side from her Pilates teaching. She studied with an American tracker, who's now in his 80s Tom Brown Jr. and he learned from the First Nations individuals are what we would have called North American Indians. Yeah. She spent some time with the elders on the reservations and they had noticed the elders that the youngsters can't keep up with the elders when the elders are running in the forests. And she said, Well, why do you think that is? And they just said chairs. And she said, why? She said they don't squat. And they don't sit cross legged. We sit cross legged, there's no load on the hamstring. It doesn't compress it.

Steven Bruce 1:05:14

Like me, though I can only do it with one leg. I can't cross the other leg, I can cross both legs

Gary Carter 1:05:18

will sit on the floor, right? Yeah, that's because I want to teach yoga, I spend a lot of time doing that I'm not necessarily a lotus person, I get to half lotus, but latest requires a quality of movement at the hip. But that movement, you can get into sitting standing and for bending really quite quickly. And you haven't had to do a pre stretch for any of that it's already available to the system. Yeah. Okay.

Steven Bruce 1:05:43

Our audience will want to have something that they can actually use in practice. And maybe see you working through this on a real model. Should we go have a look at a real person?

Gary Carter 1:05:54

Yeah, there's two things I just mentioned on that then, because what I'd like to explain here is that we have the Anatomy Trains model, which is a model from Tom Meyers, where we can understand strain transmission through the system, so the body can be considered a strain distribution network. So Tom's mapped out a series of myofascial continuities that run from head to foot, I've found a few shorter continuities that are more sling based. And where we make a change in one area, we can see possible effect into the other. So I'm hoping that that will make sense on the model. But also what's now understood from cartus decades research as well. And her brother, Antonio Stico, is that the reticular. So the wrappings that exist around the rest, especially at the ankle. They are not

separate structures. Because we see them in anatomy books as white strapping around the wrist and ankle they're not they're part of a continuity that we show on Freya our form. So maybe we'll talk about that

Steven Bruce 1:06:59

shear failure thing is, is a very interesting thing. But we so we

Gary Carter 1:07:03

show that on her, but basically, they are thickenings of the deep fascia. But they are now understood to be highly proprioceptive. And that makes a lot of difference to how the system is informed for motion, especially in the lower leg. And that makes a lot of difference that people that are athletes, people that are older, because they lose motion that the ankle joint. So just a couple of things that are due that very simple things that we can do with them, we're gonna do it. I'm going to bring this along with me.

Steven Bruce 1:07:37

So allow me to introduce Jack who's one of our regular models here used to being pushed and pulled around on your

Gary Carter 1:07:44

so what I'm going to start with with Jack is to go down to Jack's left foot, and just a little bit of work on the plantar surface of the foot as well just as suggest a quality of length a foot. As a lot of you probably know you got 26 bones in up to 33 joints, there's a lot of connective tissues in the foot as well. And of course, there's the plantar fascia. The plantar fascia itself is not an independent structure. So at body worlds, the exhibits they always show the plantar fascia curled away as an independent tab of connective tissue. But it's got a muscular structure connecting to it that also contracts it as well. So that's that's a whole nother story. However, the plantar fascia we know blends to the periosteum of the calcaneus that is continuous to the Achilles tendon, but also it's continuous to the retinacular around the ankle as well. So they all blend into each other. So the soft tissues of the foot, the connective tissues of the foot, and the ligaments are feeling the movement of the bone and the bone, the bone is then communicating back to that and soft tissues are responding. So it's an interesting kind of give and take kind of relationship. So I'm just going to put this over here. So if you could straighten your feet on square your feet up a little bit more, please so your heels come more through the midline. This is something that we might look at in someone standing specially in our yoga practices as well. But organising the feet in line for a while is something that can be quite useful to understand what's going to happen with the femur too. So sometimes with some people when the feet turn out and the patella is facing forwards with the knee with the femur facing forwards. When the feet come in, you might see that the knees draw inwards, but we use this as a sort of simple starting point. And as an aside to that there's there's more of a spiral neck arrangement through the leg as well that travels up into the pelvis and towards the sacrum that is actually quite key in gait, so that the sporadic action in the game starts to throw the sacrum forwards when they walk, but what I'm gonna do

Steven Bruce 1:09:51

development spiral spiralling action

Gary Carter 1:09:55



from the departure of the foot, there's two elements to the foot that we could consider is the fourth and fifth toe, they come back to the cuboid and then relate to the calcaneus. And that's called the heel foot. And then the first second third toe, I've got stronger connections towards the tibia. So that's called the leg foot. So there's a, there's a divide like a gliding joint between the two, so that this side of the foot has got more of a chance to come back behind him, where the front of the foot can go forwards. And what that generates is a slight rotation in the foot. And that little rotation in the foot is then picked up through the fibula. Also the February's what the bone has got the strongest rotation in it, it's got a spiral in it. And that then communicates up through to the lateral hamstring, also to the iliotibial structure, which is not a separate band, because it's part of a sheath. And that whole rotation travels upwards, and you can see what Jack is going, if I just give me a little bit of motion, a bit of left, well, I'm gonna ask Jack to do is just soften his knee slightly. So that's it, once he loosens his knee, I've got more communication into his pelvis, what Jack's doing there is quite common for a lot of people is that they will end up becoming quadricep dominant, looking at the back of the knee, and I can just feel a lot of force in the system. But Jack, I don't know if you notice that if you soften your knee again, and I've got more access to your leg, your first probably has more contact with the ground. Does that make sense? We feel that. So just by taking that pressure off, he's got more access to the ground, so you can feel the ground differently. But people lose touch with the ground. And they put the ground in the knee or at the hip, which is why we see so much compression going on. So what I'm going to do now is ask Jack to bend his knee slightly at the front of the foot rest heavily so that the board or the big toe board or the little toe stay down, keep your foot just there for the moment, I'm going to bring my hand under the plantar surface so that my fingertips or finger pads are coming up into the plantar surface. Some people are going to find this quite uncomfortable. Jack might grimace and I'm going to drag that back slightly. And Jack You can probably feel it's a bit firm that bubble wrap up. Does that make sense? And then I'm going to correct the heel and ease that back and you just follow me that don't push it at me. Let me lead it you all you do is follow. We're going to drag that heel back far as it can possibly go. Good. Then you wait there just for a moment. And notice where you're landing and yourself again, notice that maybe there it goes. drifted back in a little bit. myself drift? Yeah. So can you bring the arms above the head just for a moment. Sometimes it hasn't actually happened with Jack here. But sometimes we'll notice that the arm will go up higher. In fact, what's happened is this arms going up higher. I don't know if you've noticed that in yourself. So what can what can happen with this is that from where we have the superficial back line, so again, some of the viewers will know this you've got plantar surface at the foot Achilles tendon gastrocnemius to hamstrings takes us to the sacral tuberos ligament to the pelvis goes to the sacral fascia and then up along the erector spinae. But at the sacral fascia it can switch and in some cases can take us to the other side, only some in some not not every case because sometimes it will transfer right there along the same side. So that might be that we could find that could be some restriction in the low back there might be an issue in the gluto. I don't know whether Jack's got any of those things. But if it transfers the other side, it's also going to go to the opposite latissimus dorsi and affect the arm as well. So we'll see a transference through to the arm. So we get we get transference and strain transference through the system. But this is an integrated network through here. Now the other thing that we can look at also, Jack, would you mind standing on your left foot, please? Yeah, so just notice how you feel when you're balancing that. Good. And place that foot down. And now can you stand on your right foot? Right now which one did you find was less stable, bring your foot down. Funding online was less stable. Okay, so what I'm going to do if you square your feet up again, is I'm going to stimulate the retinacular around J Jack's left ankle. Now this would usually be five minutes worth of stimulation here. Now the rest is fairly forceful. It's quite fun. You can see the sort of colour changing in the skin, but Jack is probably not too pinchy is it? And is it feel fine. Okay. I'm sure Jack would kick me if it's too much. We can do with it as well.

And people can do this with themselves, it's actually pinch it, stimulate it, because also the retinacular is actually, it's not too far away from the skin. Under that, you know, this tissue is quite soft and flexible, that the more that I'm stimulating, I'm actually stimulating not only the retinacular, but I'm stimulating all of the proprioceptive nerve endings that exist in that retin accurate running from the medial malleolus. Yep, so the inner edge of the ankle, right the way round to the back of the heel structure. So we don't press between the medial malleolus and the calcaneus. There, because there's blood vessels and nerves. People don't like that. So we're just a little bit more UK with that check. Yep.

It's bit like an ankle sock of proprioception, because the soul of the foot is also a large proprioceptive structure as well. Okay. So Jack, let you to stand now, on your left foot. Do you find that that looks more than that's more stable for you? Yeah, that feels more stable. Yeah. So in effect that's going to last, it won't, it requires regular work. But gradually, you start to find that it brings some balance to it. And what's happening, what's the retinacular stimulated, there's a communication from retinacular to spinal cord back to the muscles of the lower leg, and it starts telling the musculature, the lower leg in which order to fire, right, but don't use right using the word fire. But there's this, you've got 11 muscular structures in the lower leg, all of them reach into the foot, all of them. So everything in the lower leg moves the foot, and they've got a particular firing order to them. What we now know, as the musculature of the lower leg, is that a large percentage of them have got their origin from the crural fascia, okay, so they're connected to the crural fascia, and then they connect into the inter muscular sector. So the muscles in the lower leg don't glide in surface in their own compartments, they are connected to the compartment, when they engage, they gather the compartment into themselves and make it much more stable. And that's a particular order in which it fires. And then what Jake was finding, and most people will find it is that the ankle becomes more stable. So it's, it's, it's warming the body up in a way it's engaging the tissues ready for action. So this is now something that's been considered with athletes, before they do their thing on the sprint line, rather than bouncing up and down and doing all that warming up, to stimulate the retinacular at the ankle retinacular around the knee, there's retinacular, at the groyne, and so on. And that starts to inform the underlying tissues as to whether they're ready for something.

Steven Bruce 1:17:44

So starting at the ankle here, is this going to be something that's going to be useful in falls prevention? Population? Yeah.

Gary Carter 1:17:52

So if you think about the position that Jack's now in, is that is a common position for the ankle. When people sit and stand and Dr. Sets, it's very unusual. I'm just going to do this if the cameras okay with it. So people to come and sit onto their heels and open the front of the ankle joint up. So if people can come towards these positions, whether they need to have themselves sitting onto a cushion, they might need to have a rolled up blanket or towel under the front of the ankle, the touch makes a huge difference to the quality of the tissue and when it's touching, they can relax into it. And when they can relax into it, these tissues start to give. And this is an area that we work a lot through in myofascial techniques, especially the structure integration that I'm trained in is to bring lift into these tissues, but to get openness at the ankle, because the moment the ankle has got some range to it. We've got more of a chance to move quicker and respond to our environment.

Steven Bruce 1:18:52

Another question on the foot. Maybe this is a question for your colleague, James L. So you talked about earlier on. In an ageing body, we get a flatter foot. Yeah, more of a pes planus bit more prone over pronation. Yeah. How is that then going to affect the body? And what and what is the what's how do we had we correct it?

Gary Carter 1:19:14

Well, there's a lot of footwork that would need to be done. There's an enormous amount of musculature in the foot that if the foot stays in the shoe, most of its life and it's not moving, then what we see is atrophy. And once it's atrophy, where do we get our support from? We start to put it somewhere else. We are the only species really, that has a small base of support with a centre of gravity quite high up. So creating more space, length, width and muscular activity in the foot can really help for stability, and that can continue to happen as people move on in years sounds

Steven Bruce 1:19:49

like you're a fan of barefoot shoes.

Gary Carter 1:19:51

I like barefoot shoes, but I use all sorts of different shoes that sometimes are run in a really old pair of Timberland boots, and then sometimes I run in the five fingers And I've got a pair of Nike Air ones. So it's Nike. But I'll use those as well. And I run in those. So it's a combination of So nowadays, people got all sorts of different shoes in their wardrobe. So we've got different landscapes for the foot all the time, something that does happen as people get older, is, especially if they're not standing and walking around so much is that the superficial fascia of the foot actually lessens, so they haven't got much padding anymore. And that becomes uncomfortable to stand on. So again, what they don't do is walk so much yes, or they use padded shoes to walk on and then they're not getting the right support and information back in a padded shoe causes the body to drop into the structure, rather than what the foot's got the ability to do is to give us up lift, and that's one of its prime jobs is to maintain up lift in the system. The clues in the word stand up, it's an underneath process. Okay. Thank you,

Steven Bruce 1:20:57

Jack. Thank you. So this is something we could incorporate into our practices. Absolutely.

Gary Carter 1:21:02

And I would suggest that on a regular basis, when when we're working with with our clients is to, is to add footwork pretty much all the time. Yeah, there are some key areas really, that we that we need to consider. And I would say the soul of the foot movement of the foot, keeping it active keeping it. It's flexible, it's durable, it's stiff, and it's soft, that has all of those abilities to it. So can we maintain its dexterity. With that, from an embryo logical, not for an embryo logical, but from a developmental movement perspective, within the first year of life, if a baby's crawling, the moment they get the base of the big toe to the ground, the arch of the foot engages, and at the same time, you start to see the curves of the spine engage with it. So they're developing Archer the lumbar curve and survival curve within the same year. So you've got relationships with foot to spine all of the time. So those are useful places to go to and then the cranial base. So we see in dissection, that there can be a lot of thickening that happens around the Achilles close to the calcaneus. So there's lack of motion going on there. So something's densifying. And commonly, we see a restriction in the cranial base, because the head force position is catastrophic to the structure. This maximum weight, as we know, is 14 pounds. So what's that about seven kilos or so we've weighed the arm in a lab, and

on average size, one with the shoulder blade intact, and the tissues 10 kilos. But that's a heavy object. Yes. So if I've got 10 kilos dropping forwards on one side, and this way, dropping forwards, these tissues have to maintain it all of the time. And that's all day long. That's a habit. So we're looking to reintroduce new habit and help to break down the restriction in those tissues that suboccipital muscles, as you probably well know, are highly proprioceptive, they have the highest percentage of muscle spindles than anywhere else in the body. So for the baby, when they first start under, they're constantly wandering the head around. So the wobble is something that's really useful for the system is to gradually bring that mechanism back because that's where it's learning the most. And then the other place that we notice is the area lumbar ligament, from L five through an L four across to the iliac crest, we see quite often that that's calcified. So then L four and L five might as well be part of the sacrum. And then if they're calcified towards the iliac crest, then nearly the ilium aren't moving with the sacrum and they're walking so then you've just got a fixed unit, right? And then we see constant compression and reversible design calcification depends on the individual. So I will have people on all fours and look at very localised movement at the pelvis. So if they can start to get a rocking of the pelvis by bringing the tail under only, or they think about that region moving only at the hip joint, rather than just going straight up through the spine to make the movement, we start to try to get some localised movement back into the lameness

Steven Bruce 1:24:20

kind of take you back to jakim for a moment that work you were doing on the rest and accurate. We had a question come in from Bridget. And she's what she wants to know. Does he have to be weight bearing while you're doing that work on the return? No,

Gary Carter 1:24:35

no, you can do that. Um, usually, I work with this with all sorts of students and I'll go through the same exercise and sometimes it's just to make a point about what's happening in your neurologically there. So you'd have a group of people get them stand on one leg on another and then we sit on the floor and massage retinacular sometimes it works weight bearing. In other cases, we can just sit down and then you've got some relaxed time to massage it. And if Amina group it will be five minutes because I'm talking to them to keep them busy and distract them.

Steven Bruce 1:25:06

So this is something you could suggest to a patient. Do this while you're watching casualty on television or whatever,

Gary Carter 1:25:12

get the fingers between the toes if they like touching feet. Some people don't like to touch their own feet, but can they start massaging the foot, toe spaces are fantastic. Get toe spaces between the foot because it just starts to generate the space in the toes that they require. The foot's got the same dexterity as the hand. We just don't use it that way.

Steven Bruce 1:25:33

I suppose as evidenced by those people without hands you learn to write with a piece

Gary Carter 1:25:37

of paper that don't like touching their feet. A great example is to have them get toe socks because it means they've got to fiddle with the toes to get the toe socks on. So at least it's get that gets them stimulating the foot slightly. Yeah. Okay.

Steven Bruce 1:25:52

Lawrence has asked whether you have any advice we can pass on to Ehlers Danlos sufferers.

Gary Carter 1:25:58

No, but there's, there's a wonderful woman called Jeanne divan. I can pass information on to you about her because she has that condition. And she's done a lot of research on it and a lot of work on it. So well, there'll be helpful she will be best off talking to you about that. And I think it will probably be good maybe to speak to her sometime.

Steven Bruce 1:26:17

Yes. Well picked up a couple of potential guests names from you, as we've been going through this evening. So that's John's asked if there's any effects that you know from myofascial cupping.

Gary Carter 1:26:29

I don't really look into that work. I do know that some people get great benefit from it. In the only company I've had is from acupuncture practices and practices, but it does have some effect on some people this is the thing is that there's so many different practices out there that work for certain people and some that don't. So for some individuals, cupping just hasn't worked. But you know, from what I know, it's it's been quite useful. But it's, you know, I'm coming from constantly coming from the school of thought is that once we start to work with our own body, you've got all the resources yourself that you need. And that's my specific sort of aim in practice really, is to help the individual find it for themselves. So they don't need me anymore.

Steven Bruce 1:27:14

Yes. You talked about quad dominance earlier on when we were looking at Jaco of Lancers, how do we help people who are called dominant? Because as he sees it all the time, yeah.

Gary Carter 1:27:25

Or God, this is a big subdivision and a whole nother session on that one. That's, that's, yeah, in terms of moving. Yeah, we could have a whole movement session on that. So what I do with this, specifically, especially when I'm coming from the yoga perspective, I'll use some of the elements on that, which is born out of the work of Vanda scaravelli. And what I've understood from the martial arts is where, and contact improvisation if you've heard of that, it's a movement form, where we give weight to the ground. So how do you let your bodyweight meet the ground well, so the idea of contact improvisation, which is a movement form, and a dance form, you see two dancers give their body weight to each other and roll with each other. That means total commitment of bodyweight knowing that the other person isn't going to just fall over and get out of your way you meet each other and you move with each other. We do that with the ground. Animals give one their whole body weight to the ground when they move, so that they move elegantly with it, humans for some unknown reason, hold ourselves away from the ground and our foot doesn't meet the ground very well. So when it comes through certain movements, and I will suggest maybe a squat type movement with the knees on the floor and the toes tucked under the hands down. So it's like a full on all fours position, but with the bum on the heels, and then learning to roll up towards something that looks like a downward facing dog. But to give the weight fully through the rolling part of the foot, and the quadricep start to let go. But what a lot of people do is jump into the quadriceps first the brace against The Movement. And it takes a lot of practice because there's some unlearning to take place. And from a manual perspective, we might need to go in there and do some work to free

up the quadricep region and certain lengthening type arrangements to take out the tone. Because we see high tone. Yeah, so it's how the the, I'm going to come back to the fitness how the foot settles on the ground on where they can centralise the load. We noticed on our model, that the moment the sole of the foot open, just with quite a small move really it wasn't a huge treatment is that his body weight started to drift back just primarily on that side. And quite commonly what we'll see is that the tone relaxes from the quadriceps so it's not being pulled forwards. And it's a common pattern that we see.

Steven Bruce 1:29:54

We've got a question here from Hannah, who is known to many of my audience as Hannah Dissector because He says he's brilliant when it comes to dissecting all sorts of mainly real things, maybe horses and dogs that she encountered and

Gary Carter 1:30:05

how they sections and come on our dissections, I'm

Steven Bruce 1:30:08

pretty lucky. Yeah, she wants to know how you'd go about rehabbing a fracture when there's metalwork presence, which is present, which is going to reduce the normal, normal mobility of the bones and fracture.

Gary Carter 1:30:19

Or depends on the kind of metal work really, I mean, if we're dealing with someone, say, with a wrist break, and you've got some metal work in there, that's a combination of movement and manual therapy. So we're looking at the, the interfaces within the muscular structures and how we can generate some movement and glide within those once the the scar tissues heal. Well, sometimes, with some individuals, I leave them for a while with it so that the scarring happens as it needs to, because we want the stability there, rather than just let's go in there and do the body work straight away, I can compromise them. So let's make it stable first, let it let it scar up a little bit, let the fascial tissue densify. We know we've got a process. So we then start getting on to the process some few months down the line. And you know, if the person is engaged in that process, then they also do the work. And we started to find that they can get full range once again. I had one client who had an quite a nasty fracture of the lower leg and had a rod put into that. And he caught himself unfortunately involved at the end of some international football events. Somewhere in that world, there was something that broke out and he got involved in a fight and that leg got broken again, quite nastily, and it was one of those rotational breaks with the rods did and so there was a fracture around the rod. So that affected the entire leg structure. And gradually, the size of that leg started to atrophy. And he used to like boxing. So that's what he did is a sport and a hobby, but he couldn't fight that way anymore, because that leg couldn't come forward. So he used to be self poor in the lower body, but normal in the upper body. So his coaches said you just can't do this. So He then turned towards martial arts, but he was depressed for a long time wasn't moving, couldn't run. And we gradually just started to work with all of the fascial sceptre of the lower leg. By palpation, we could feel that most of it had densified and the musculature atrophied a lot but gradual work on it meant that he could slowly start to bounce again. So tiny bounces like skipping but without the rope. And that sort of work is really useful for collagen turnover and fibroblast activity. And he slowly started doing more and more of that work. And what we noticed after about a year, there was too little screw had OMPS appearing in his shin. So he had two minor surgeries to remove the screws because when we saw the X ray they had broken, the bone was beginning to remodel, the lump in

the bone was beginning to reduce, because all of the fascial sets are from the lower leg, like spokes of a wheel going to the bone. Were beginning to change the load on the bone and the bone was remodelling. And eventually, we started to see more of a calf form once again, he has now become a personal trainer, he runs marathons and so on the boxing, he does martial arts now he's got involved in when shall I say martial law, the idea that he prefers it. And it's not about economy of use of the body, and so on. But it's fantastic. But that took him a good two to three years of dedicated practice off his own. To do that he now knows what to do with himself. He doesn't need me anymore. He's got it for himself. Yeah.

Steven Bruce 1:33:38

This is slightly unusual, Vlad having a second bite of the chariot. He says, Could you comment on buffalo hump? What are the fascial links there? And what's your opinions on how it can be worked with? He imagines it's a case of working far away from the site of the issue rather than directly with it buffalo hump? You know, I've not heard that before the seeming damages have bought me what might be called down.

Gary Carter 1:33:58

Yeah, I mean, it's if it's done, which is, then what we see really is that the the habitable structure has totally changed its orientation. So where we see that that lump of skin at the top there basically where the spinous processes taking hold of the fascia is poured it up. And what the body lays down and is more adipose into the fascial structure to protect it to stop the spinous process going into the skin because usually the skin up there is quite thin. So we wouldn't want a change in orientation because it's not built to have that. So it's trying to protect itself. So we would look at how we could start to bring the tissues down the back a little more. But a lot of the work is into the depths of the throat as well. So we start working towards the longest collar in places like that to gradually bring that structure back up again, along with movement disciplines as well because manual therapy is not going to cover it all that there needs to be the person engaged in the movement because their body weighing on the motion, and then doing the work is thing that goes

Steven Bruce 1:35:01

into the effect of needling not saying acupuncture, not Chinese acupuncture necessarily, but yeah,

Gary Carter 1:35:06

dry needling. I've had some myself and I had a little bit of an injury on the outside of my leg. And I think that can be really useful in some cases. I don't know for the Dow just hump. Of course,

Steven Bruce 1:35:16

we were in the course we run a couple of weekends ago, one of the muscles that was looked at where as long as collar. And but we're dealing with trigger points here, which are tight shortenings in the muscle, and possibly are a way of addressing that, that flexion in the neck?

Gary Carter 1:35:32

Yeah, I think I think it is. It's part of a toolkit, you know, bring those tools out at various moments. Because we're, you know, we're in there for the long run. In some cases, it's quite a process. Yes.

Steven Bruce 1:35:44

And treating trigger points is only any good if there are trigger points to be treated.

Gary Carter 1:35:47

If they are, yeah, Antonio staker has got his ideas of what they might be. You know, when we look in dissection, we don't see anything that could be a knot in the muscle, and we don't see anything that could be a trigger point. But his work with how fluids densify, between fascial layers and muscular layers is that some of those fluids can end up becoming quite thickened, quite suddenly bit like corn flour that's gone a bit stiff. But the moment you touch that area, as it relaxes that it releases a whole group of muscle fibres that are close to that fascial structure. It's an idea.

Steven Bruce 1:36:22

And it is quite possible that trigger points don't exist exactly in cadavers, but certainly, certainly where we have Professor ball go, we didn't hear he was saying that there is no good electronic biographical evidence to show the existence of trigger points. Yeah. And of course, there's a theory on what they are and what causes them. And there's some reasonable evidence on the fact that you can release them with with kneeling or with inhibition and other and other techniques. I agree with that. Getting back to the questions from our audience, hear her Robin. And this is the Robin who is a great fan of barefoot running and so on. That was one of the reasons I brought it up. How do you rehab an MCP and a hip fracture? With significant stiffness, no metalwork, but he's asking for a friend, he says.

Gary Carter 1:37:03

MCP. Can you explain that

Steven Bruce 1:37:07

metacarpal fell?

Gary Carter 1:37:09

Terms? I'm used to instruction integration work? Yeah, no matter what did he say no matter working? Well, it depends on how we start to get around the ankle joint in that particular region. But it's tricky, tricky to say really, because without seeing the individual I can't, I can't really say anything on that. Because the way that I work with people is so different, I would look at how the footfalls the movement of the whole leg above that, and look at where the ranges are and aren't, but then go to the tissues further away to see what's happening because you're dealing with di wires here. So what's first of all, what's the organisation of the foot what we see sometimes if this, there could be an issue to the plantar fascia. And when the arch of the foot drops, the plantar fascia on one side is going to lengthen and the plantar fascia on the lateral side will shorten quite considerably. And we might need to go there, but yet the individual is going to say, Well, why are you working locally to the problem, but we need to start to get the structure underneath more functional again, then we go to the next area.

Steven Bruce 1:38:14

One of the questions I always ask when someone like yourself comes on the show is how much of what you're saying here would be accepted or recognised by a conventional medical audience by an orthopaedic consultant or GP? Or because it all makes perfect sense to people involved in osteopathy and chiropractic and the therapies and the disciplines that you're involved in. But is it accepted more widely?

Gary Carter 1:38:39



Yes, and no, we're finding in surgery now, say in your traditional appendectomies is that at one time, they used to say all of the peritoneal tissues together because they just thought it's like wrapping paper. And nowadays they they address each layer when they bring that together because we want glide there we don't want a decision that then travels because that adhesion of an appendectomy can actually wrap into the psoas and we've seen that in dissection. In one of our dissections in the UK, we had a knee surgeon come in private knee surgeon who got really excited about the work. I've been doing the new sling on the leg. And he he's designed a tensioning structure to help people that have had total knee joint replacement when he was doing the surgery. He was tensioning the fascial tissues around it, he could measure the tension to give that person back the best fascial structure that he could. And because he knows that taking away the cruciate ligament means they've lost proprioception in the centre of the knee joint. He creates extra sutures in the joint capsule to give it proprioception through the fascia. So in some cases is happening and they're just not making a noise about It seems like the new fascial world is making a big noise about everything the medical was getting on with it. Good information.

Steven Bruce 1:40:07

So it has been pointed out to me that the metacarpal phalangeal joints in the hand, not in the foot, and I always get them confused. I'm sorry, sorry. Okay, principles are exactly the same, I imagine.

Gary Carter 1:40:18

Okay, so yes, it would be the same. But I would then keep working into the tissues that are further away, because we know that everything that crosses at the hand, and the wrist as well, is going to come from the forearm. But we will still look at the amount of space that we've got within the structure, first, go further away from it until we start to get local. But again, without without seeing the individual, it's really difficult to be able to say,

Steven Bruce 1:40:42

interesting question about the foot that came in from Keith here. I'm gonna read it out, as it's written on my minus foot to spine with impaired feet, say an obese patient with flat foot or post pregnancy dropped arch. Now we're talking firm base orthotics, is that correct? Or do you think it's possible to get the arches back,

Gary Carter 1:41:03

there's work to be done depends on the, we know the excess of the obesity. Some individuals, they're going to need some firm base orthotics just to be able to deal with the load that's coming down to the foot. But the first trying to do is give back to it, but at some points, those tissues are gonna give, that's where stretch happens. Right, because it's constant load in the direction that you're not useful for it. Yes, and we see heavy footedness is damaging to the chain to where we've weighed an arm and a leg, we've weighed an average leg, and let's say average, I mean, you know, maybe some, that's about five 820 kilos for a leg. Now, we, we don't notice 20 kilos when we move it around. But the moment the structure is slightly out of balance, weak become heavy in the legs, and we hear people talk about that. So once that load starts dropping downwards, the structure underneath is struggling. So in some cases, with all sorts of orthotics, I can say the word, it becomes a tool. Now, again, if we're working with someone is interested in themselves, they get footwork to do. And it's daily, because they're on their feet every day, so the field work needs to be daily. And in some cases, we'll use the orthotics as a tool along with their footwork until gradually, at some points in the day, they can take it out, but they keep it in their bag, put it back in, and so on until eventually they start to feel more confident with it. We've Sorry to interrupt we we find I find quite commonly,

again, with the person that's interested once they start to balance well within gravity, they start to change the amount of mass that they've got on the body, because they become more efficient in the standing position. So that there becomes a redistribution of load around the midpoint. So some people that can be quite heavy if that heaviness is too far forwards, they become compromised, the movement proprioception has changed. But if it can be balanced evenly around the frame, someone that's quite heavy can move like a dancer, if it's more balanced, okay.

Steven Bruce 1:43:09

We've got very little time left, so it'll be quick answers on these ones. I had a question come in ages ago from Marie, with the lack of serotonin uptake in adolescent Idiopathic Scoliosis does the fascia of an adolescent scoliotic teen have less collagen?

Gary Carter 1:43:24

Not too sure about that. But this has been an area in my structure integration works that I've looked a lot into scoliosis and you know, the hormonal changes, and that is something that's really been looked at because the, the, the hormone dump that goes on in irregular patterns and in teenagers are going to change the tensions of the fascial structure. So you'll find that some elements of the fascial structure have got more collagen, that it's causing more contracture to the muscular tissue within it, but in another part of the spine, on the other side, there'll be too much elastin, so there's an unevenness to it. So when we're trying to find by putting work into it, you know, that's used the word energy as in terms of force, then maybe the fibreglass fibroblasts are got more of an opportunity to lay down more collagen and we just need to make that habit.

Steven Bruce 1:44:17

Gary, we're out of time you've had well over 50 slides in your deck and we've used one of them one of their all beautiful slides. Can I share those as a handout anyways? Yes, you can. There's also information and we didn't talk about Freya

Gary Carter 1:44:32

now I'm gonna flash her research education initiative fascia revealed revealed so it's the first time educating interconnected anatomy so she's the first ever will sugar book fascial. Best full body, plus,

Steven Bruce 1:44:50

we'll share the links to all of this after the show. We'll I suspect that you've got courses we can show links to as well.

Gary Carter 1:44:55

Yeah, so we have a dissection course that we run out the plus in there and where we created I'm Freya and I take people to Berlin to see her because she's on a permanent exhibition there. And then we do a week's worth of dissection of one of the best facilities in the world. Wonderful. And we're fasho anatomy labs.com.

Steven Bruce 1:45:12

And we will we will share all that with you. In the email that goes out.

Gary Carter 1:45:16

For another conversation, that's 40 elements in her each runs about two hours worth of education well, okay, it's a lot of work that we did.

Steven Bruce 1:45:25

Thanks for your time this evening. It's been great,

Gary Carter 1:45:27

thank you.

DRAFT TRANSCRIPT