Academy of PHYSICAL MEDICINE

Transcript

DOMS and Patient Compliance; Rebalancing the Equation - Ref 234

Steven Bruce
Good afternoon. Welcome to another of our CPD sessions. But have a busy week really having had 90 minutes to CPD last night and now we're back on our straight straightaway again, if you didn't join us last night, it was largely aimed at new grads and undergrads. But anyone who's actually building an osteopathic chiropractic business would have benefited from it. And I know that the students listening benefited from hearing all the advice from those experienced practitioners. Today, we're getting back to some normal CPD, some proper clinical clinically relevant, CPD, and I have got the wonderful Claire Mitchell on the line to talk to us once again. Claire, great to have you with us.

Steven Bruce
Claire, welcome. It's great to have you with us.

Claire Minshull
Thank goodness for that.

Steven Bruce
I've got I've got one issue. And that is the fact that you're there. Not here. But I'd much rather have had you in the studio.

Claire Minshull
Yes. Likewise, it's always a pleasure.

Steven Bruce
However, it is fantastic to see that in your own little home office there, you've actually got your weight training kit as well.

Claire Minshull
Lots of costs.

Steven Bruce
Now, I suspect most people, I suspect most people know who you are, Claire, because we've heard you on the show three or four times before. You are a superb strength and conditioning trainer and expert. And just to reinforce your credibility, tell us what you were doing in the meeting immediately before this show.

Claire Minshull
Oh, goodness. So yeah, I was in a meeting with some high level executives for a hospital in Wales. So we're running gay, a prehabilitation programme with stage four long waiters for knee replacement surgery. So those people that have been waiting the longest of time, so way over a year. So delivering Yes, and strength focused exercise alongside a complimentary series of psychology focused education and mindset training to improve a physical and psychological health and resilience going into surgery. So we're looking at extending that trial. So speaking very nicely to some some of the funders and giving some of the amazing outcomes that we've been seeing kind of just halfway through. So yes, that's what I was doing. Maybe that's why I couldn't hear me quite well.

Steven Bruce
By the reason I think it's important, Claire is because it's all very well being a strength, strength and conditioning expert like yourself, as well as being a former World Champion in Powerlifting, and all the rest of that stuff. But the point here is that you've got the evidence behind what you do to convince the NHS that this is a route worth pursuing, haven't you? And of course, your PhD was I think it was in something very complicated to do with the knee. So clearly, this is an area of great interest to you.

Claire Minshull
It is it was actually a British champion, but thank you for for accelerating that. So yeah, I mean, I'm all about data. It's actually a neuromuscular physiologist by I guess, if you're going to call it a trade, but people understand strength and conditioning. And I think that's fine. And absolutely, we need data. We need to evaluate things. We need to have an evidence informed approach, if not based on we're generating that evidence as we're as we're kind of intervening particularly with this population. So if Taking fastidiously outcome measures, and also not just objective outcome measures, but the the qualitative data, so people's lived experience and how that relates to the bigger picture because we can often lose some of the fuller picture of what's happening with interventions, if we just rely on numbers. And I am guilty about because I'm definitely a numbers person and qualitative, quantitative data, lines of inquiry for me, but you know, with the quantum qualitative data, we're seeing some really profound statements and changes to people's lives, which is, I mean, it's absolutely beautiful to hear that people are now able to walk up stairs when they couldn't do before and go on holiday. And you know, so yeah, providing that, that that evaluation for audit. And ideally, we're getting to, you know, we will be able to publish all of this as well. So, yeah, absolutely. We need the data.

Steven Bruce
Now, as I take that on board, it's very easy to look at numbers, isn't it? But actually, quality of life is what's most important to the patients wherever the numbers might happen to be taking them. We wrestled with today's topic for a little while, didn't we? Before we decided what we were going to talk about, and we're going to talk about Dom's. At least that's what we're going to start depending on well. You can you can do the singing, I'll just do the talking. Yeah. So start us off thing. Is Dom's a problem. And we better tell us what Dom's is and why it happens. But is it a problem in getting patients to comply with their exercise programmes?

Claire Minshull
Yes, so first of all, you definitely don't want to hear me saying else we'd lose all your viewers right now. So Dom's delayed onset muscle soreness, so that that feeling that you get and I'm sure everybody who's listening, Ms has had it before where either some bout of novel

exercise or ramp up your training or do something got to not do the gardening that you haven't done for months. And you wake up the next day and you know, you wanting to walk down stairs backwards because you're just so sore. And so that that that feeling of soreness that peaks a day to two days after a novel or higher intensity exercise which is principally generated by the eccentric component of work. So the lengthening of muscle whilst it's undertaking accommodating load and, and actually, you know, this is something that we've, we've considered as well within the joint approach programme as well. So it's, it's something that if you're a habitual exerciser, you might even like that feeling, because you've feel like you've done some work. And if you're knowledgeable about what's happening, you understand that the tissues remodelling, it's becoming stronger, etc. But in those patient populations that may be struggling to get to exercise or indeed haven't exercised, but are willing, the Dom's response can often be a real difficulty or a barrier to get people to continue to adhere to exercise, they may in mistakenly attribute that to actual injury. So you've you've hurt me, you've made me worse, through to actually adult like this sensation. I don't want to again, so you know, you're right. I won't come back and see you again, or do those exercises.

Steven Bruce
years ago, it didn't people used to attribute it to lactic acid buildup, which I think has now been completely disproven.

Claire Minshull
Yeah, so it's very, very different. The mechanisms are very different, the sensations are very different. And the time course of of change and feeling of that discomfort is very different. So lactic acid and it's the hydrogen ions when they're lactate and hydrogen ions disassociate, it's the the hydrogen ions that cause a discomfort in the musculature, it builds a.ik environment. And you'll feel that if you're doing some high intensity work, let's say pick resistance exercise as an example. So you're kind of working really hard to 10 repetitions 12, and you're really pushing hard and the thing that stops you is just that awful burning feeling in your in your muscles, that's really different to then muscle damage. So during the exercise, you probably don't feel that you feel the discomfort days after. So it's there and the mechanisms are different. So it's not down to lactic acid. It's not down to accumulation of hydrogen ions, per se. It's something that's a little bit more structural.

Steven Bruce
Would you say to a patient would you use the expression muscle damage when you're talking to a patient about this?

Claire Minshull
Depends on how How educated they are in the world of exercise. So if they understand and then very versed with with training, then they probably know if they already. If they have any awareness, then absolutely not. No way. Damage is not it's quite a fearing inducing word, they've come to you probably because they are damaged, or they feel like they're damaged, or there's something that's not quite right. So, you know, it's absolutely, we need to mention it, and we need to manage people's expectations. But to make sure that they understand that that's normal, it will subside, it means good things.

Steven Bruce
It's very tempting in the clinic, isn't it? I mean, I find myself explaining to patients, you know, what we are trying to do, we're inducing micro tears in the fibres, and, and all those things in

a patient's mind could be quite intimidating. The idea of damage, the idea of tearing, and so on. But of course, without it, there's no remodelling, is that?

Claire Minshull
Yeah, exactly. And I think, if you can, if you can describe it in a way that, I mean, you'll get a level that have a fair understanding. But if you kind of provide a framework whereby if you, things get better by providing a stimulus and a stress, so you become I don't know you, when you're learning things, you need to, I guess stress your mind to incorporate different information, remember, and be able to then critically evaluate in the future. If you're thinking about muscle, and adaptation and muscle to get stronger, we need to challenge it. And by challenging it, you then that's how you become stronger. If you don't challenge it, you will go the opposite way. You don't need to accommodate the stress. So therefore, you will become potentially weaker if you're certainly in that older category. So yeah, they don't frame it within the context of damage and repair. It's more of a stimulus and adaptation.

Steven Bruce
Okay. I've got a question coming in from Vlad already about Dom's. And let me get this up and read it because it's a long one. He says, Is there any reason a person will suffer with a very high level of Dom's? He's talking about himself. And he's not a stranger to exercise. But as of a few years is dumb seem to be debilitating. For full disclosure, he has a diagnosis of Ankylosing Spondylitis and has been taking anti TNF medication for the past three or four years. It seems that chronologically the two are related. Do you know if there's a link? Perhaps he says he's imagining it? Sorry, if this is the wrong question for the broadcast? I don't think it is the wrong question. Is it because you know if there are reasons why people might suffer extreme Dom's and we ought to be in a position to tell them about it?

Claire Minshull
Yeah, I mean, forgive me, I don't know about the interaction there with with the medication. Although there are some supplemental strategies that might try and impact that, though, in terms of susceptibility to damage, there's a few things so that higher, if broadly speaking, first and foremost, that the males tend to be slightly more susceptible than females, if we're taking a massive population here. And adults more susceptible than children. And what that's principally related to is the sensibility of tissue. And the, you know, the stiffness, if you like, if you've got more compliance, then the stress is taken up, proportionately more by that non contractile tissue, which are this is kind of some of the fields of thought. The other things that predispose higher levels of damage are higher levels of eccentric exercise. So if you're doing a resistance training programme, it's a lowering phase of that weight against gravity rather than the concentric phase or shortening. So if you're undertaking new exercise, novel exercise, you're ramping up your exercise in terms of intensity that will likely present as a stimulus that the you get the response. Thereafter, you get proportionately more damage on the descending limb of the length tension curve. So that means long muscle lengths where if you're thinking about if it's acute micro trauma to the musculature, and there's, again, some emerging fields of thought that we might also be related to the connective tissue as well. But if you're thinking about that, you know, the actin and myosin kind of overlap, the one of the hypotheses from from many years ago was the popping RecycleMania hypothesis. So the you've got the overlap of actin and myosin if you've got muscles that are a long length many of the sarcomeres are in a position where they overlap is very little. Some of them are you get pockets of damage whereby then you apply a high load and then that sarcomere pulls apart effectively. And that becomes then unusable and so that occurs that's one of the reasons why it occurs more longer muscle lengths. So there's a variety of reasons why you might experience Dom's. And those are just just a few of them. As I said, Forgive me I don't

know the interaction with the medication. But have a think about your training and what you're doing. And you know, if we get into it, we can discuss some strategies that might attenuate some of those uncomfortable feelings of Dom's. So there's things that you do pre new exercise that might reduce some of those uncomfortable sensations.

Steven Bruce
And that's definitely where we go with this. But there's a few questions before that if I may, carries us where Dom's Dom's increases with age generally, as opposed to affecting, not affecting children as it were.

Claire Minshull
Yeah, well, probably to a point. And obviously, in physiology, everything's an inverted year, isn't it. So as we start to get older, and if we don't do much about it, we can start to lose a lot of our fast twitch capabilities. And, you know, the fast twitch muscle muscle fibres, and those are the ones that are most susceptible to muscle damage. So potentially, as we get older beyond a certain point, then older adults might experience less muscle damage given equivalent exposure to exercise and the same expert exercise then potentially younger adults. So you know, that's it's not as linear relationship as we get older. In chronological age, the amount of muscle damage for any given bout of exercise will be to increase it will most likely taper given where you are in your conditioning status relative to your muscle fibre makeup.

Steven Bruce
And Jason's sent in a comment related to this saying that, as he's got older, the dogs comes on two days later, rather than one day, one day after exercise. Is there any reason why that should happen?

Claire Minshull
Well, could it be that actually, the severity of Don's is less? So had you done that same exercise exactly the same relative dose? Would you have had a response that you'd perceived that was peaking at day one, that you're just not seeing now, in addition to that different muscle groups have different profiles of peaks on us? So you might notice this as well? Or if you haven't, think about it when you next? Can I do some new stuff? If you doubt the quadriceps and either the hamstrings with exactly the same level of exercise stress? So clearly, it's got to be an equivalent dosage?

Steven Bruce
You'll say No, when you say so when you say an equivalent is Do you mean the same number of reps to failure? As opposed to the same weight?

Claire Minshull
Yes, yeah, yeah. So one. So you can use muscle damage as a tool to perturb the neuromuscular system, to then investigate other things, which is the way in which I've used it in the past and published on it in the past. So what happens when we disrupt the musculature and cause this sustained loss in performance capacity and strength? Does it impact things like your switch on times of muscle, your proprioceptive acuity, etc. So if you're using it as a tool by which to perturb the system, then, you know, you've got kind of a dose that you give and I explained that for a reason in that that many, many years ago, one of my PhD students was looking at trying to evaluate whether or not you can perceive how much literally fuel you've got left in the tank, how long you can keep going for. So whilst you might write, you know, in writing perceived exertion, how hard is something? Can we evaluate how

much longer we can keep going for, which is a really interesting question. Now in order to do that with if some known bout of exercise to cause a predictable level of compromise to muscle, you know, if we're doing under fresh conditions and damage conditions, so he I didn't know loads and loads of stuff on the hamstrings, and you get a very, you know, if you will did six sets of 10 isokinetic contractions at 60 degrees per second, and you know, is pretty damn uncomfortable the day after two days after, so you'll get a peak soreness in the hamstring muscles around about two days after. And then it was really quite severe soreness, it continued for several days. But he when we apply that same protocol to the knee, extensor group, and between populations, males and females, etc, we didn't see anywhere near the same level of of, of compromise. And in addition to that, when we could level cause the same level of compromise in terms of loss of peak force, then the peak soreness and the peak loss of performance occurred around about up to 24 hours post or not 48 hours post. So there's a different profile of I can be a different profile with according to different muscle groups, which is quite interesting and probably related to habitual activity and the like. But, again, that's another influential factor.

Steven Bruce
Yeah, I guess one of the muscle groups that we're all prone to rehabbing most is the quadriceps isn't it? It's a very common one. And I guess if someone has physically damaged their biceps, then you might well give them a biceps rehab programme, but the quadriceps affects the knee and people with bad knees come to see us quite a lot. And as you have a blee explained on previous shows, actually strengthening can be very, very helpful with with knee problems. And so that being one of the groups, which does tend to give a bit of grief when You've overdone the exercise, I'm thinking that some patients might be put off the exercise. We actually had a comment from Robin earlier on few minutes ago, saying that he's a habitual exercise only ramped it up yesterday, and he has done today and he doesn't like it. Of course Robin is a bit of a worse and the only answer, get his barefoot shoes on and start doing it properly. But my Alright, so I'm going through a few questions here as well. My Henri has asked again about the differences between lactic acid buildup and Dom's. Now you did explain that. So I mean, I think I wonder if you seem, you know, what's the difference in the sensation to the patient? Or how would they feel about it?

Claire Minshull
So with, so it's, I like to describe the two things as so if you think about the lactic acid and the that buildup of the acid adata environment, that's muscle fatigue.

Steven Bruce
It's acute, and it's immediately immediate, isn't it? Yeah.

Claire Minshull
It's acute, is immediate, and it recovers really quickly, the muscle damage, exercise induced muscle damage is you it continues to get worse in terms of the loss in performance capability, following cessation of exercise to a point now that will be determined on the extent and how much you've done, how intense it was, etc. How much e centric loading, it was dosage was. But you know, the profile of change is very different. So whereas you get an acute impairment to muscles strength, if we're defining fatigue, as a loss in muscle strength, you'll get an acute loss of muscle strength performance during that that buildup where the hydrogen ions etc interfere with the fueling and muscle contraction. But that will recover really quite quickly. And within maybe two, three minutes, you might see a restoration of muscle strength performance. With muscle damage, you might not see a massive change in strength performance after cessation of this type of exercise that induced

damage acutely. There might be maybe, I don't know, arbitrarily templated change next day, you might it might be 20 25%. And that soreness Will not you will not feel the soreness whilst you're doing the exercise, you'll feel it the days after. So it's the very very different mechanisms very different profile of performance enhanced performance loss and adaptation as well. That's why it's really important you know, the damaging process is important for the adaptation. Whereas in a fatigue fatigue environment you're not getting an improvement in muscle strength in certain acute compromising muscle performance that you then recover very quickly from

Steven Bruce
regarding overcoming Dom's and we're going to get to your theories on how we minimise the risk in a minute. Christina has asked if there's any merit in the idea behind hot and cold therapy for I'm presuming she means for Dom's. She didn't specify.

Claire Minshull
Oh, we can get into a lot of strategies here. So When you come in from a patient perspective, it's it for me, it's finding that balance of what's going to enable them to adapt and what's going to, you know that they're still going to keep coming back. So if you want to, and again, also just there's a lot of caveats here. Dom's is one thing and loss in performance is another, and you can potentially influence one and not the other. So if let me give you the example, if we can reduce Dom's, but muscle performance is compromised substantively, then you're not getting that cueing, that that cueing of discomfort when you engage in maybe it's if we're talking maybe higher level performance and you go into unpredictable situations with a lot of joint perturbations expected. If you haven't got that cueing, then actually are we doing the individuals a disservice by reducing Dom's because their performance characteristics are impaired and potentially this the stability or the ability to stabilise the joints dynamic grading, we've got loss of strength and rate force development, electromechanical delay proprioceptive acuity if that's all compromised, but you don't feel it. You know, there's a there's a there's a question there. But in terms of hot and cold therapy to reduce Dom's, you might get a little bit of downregulation of that, that uncomfortable feeling. It depends on how you do it. And if we're looking at those big systematic reviews and meta analyses, cryotherapy and cryotherapy can mean a lot. So whether you put a bag of frozen peas on your on your leg through to super cold chambers where you you're in like a really low minus temperatures. And then you intermediary you've got ice buffing so it's it's difficult to answer that question. They're unbalanced and might be a little bit of reduction acutely in in sensation of Dom's with inverted commas to cryotherapy, but it depends how you apply it. So we need to be quite careful as well, depending on how we're applying it. Because by rapidly cooling the musculature, it can influence the calcium dynamics in the contractile muscle or the crunch contracting muscle. So it might in some circumstances, make the recovery impaired and or make them more susceptible to future damage. So you know, whether or not you're being those things where you are applying a lot of very cold to imagine for prolonged periods, it's I don't know, in terms of heat, it might feel a little bit nice, but there's there's no real evidence to say that that again, it mitigates effects of

Steven Bruce
No, I didn't think there was much as for heat or cold therapy out there at all. But clearly you've got some there for cryo therapy. And I certainly wasn't aware that the possibility that might impair muscle future performance. One came when one question here from Anita coming earlier and she says she sees this Dom's effect more in older patients. Do you think it is aggravated by muscle wastage? sarcopenia.

Claire Minshull
Think it's more related to the fact that its lack of familiarity with exercise and habituation. So which again, possibly is exacerbated by that that loss in in performance overall, it would be interesting to note what the difference is between those habitual exercises and those individuals that are I guess, at entry, but it's it's an important part of the remodelling process. So is it that those individuals are and how are you judging you see it more in in older populations and younger populations? What's the metrics by which you you're able to assess that is it that you give relatively similar doses of exercises to different patient profiles and you see relatively different profiles of soreness responses? And then have you taken into account their exercise history as well? So and I don't even necessarily mean are they out running lifting weights? How much are they doing in their daily living in that sorry, the activities of daily living so even thinking like how many times you stand up and sit down what that's one of the theories posited that the quadriceps are such a, you know, they're a local motor muscle. You're doing a lot A lot of lower grade in E centric work with the quadricep muscles, as you stand up, sit down, go downstairs, think about all that you do. And in your normal daily activities, is that basal level of activity less in your older populations? And if so, that also influence why people are coming, as you would say, generally sought more so then the younger comparators but there's something you know, the things we can do about it, you know, if the if it's a barrier,

Steven Bruce
should we talk about that we do to minimise the effect. So it's quite hard. I think I'm possibly interrupting you, because you're so out of sync on my screen thanks to Microsoft Teams that I'm never quite sure when you finish talking, because you stop on the screen, but then sometimes the audio carries on.

Claire Minshull
Okay, I'm seeing myself on the screen and I'm about 30 seconds, but Well, no. 10 seconds behind myself, which is about normal for me anyway.

Steven Bruce
Yeah, well, you did say you got a nasty concussion from being knocked off your bike about a year ago was something new. But should we talk about what we can do to minimise the impact of Dom's?

Claire Minshull
Okay, where do you want to stop? Well, I think there are a multitude of strategies that have been investigated for reasons of a multitude of reasons, actually. But if we, if we hold that down to kind of a clinic environment and a patient environment, and if Don's is something that would absolutely get in the way of people coming back, or an under engaging in things that's going to enhance their recovery, then clearly we need to look at that. So they're, you know, depending where you're, you're at, in terms of what patients you, you see, there are loads of research themes on supplemental strategies, there's things so prior to exercise, there's things that you can do post exercise, but I think really the the most pragmatic thing that you can do, and the things that are easier to implement is prior exercise. So something called the repeated bout effect whereby a dose of eccentric exercise because it's the eccentric exercise, it brings about this, this soreness, this, you know, muscle damage if you like. And so the repeated bout effect refers to you give somebody a dose of eccentric exercise of a standard description if you're doing this experimentally. And then you will see symptoms of Dom's, you'll see symptoms of loss of strength, force around all the things I said before, if it's if it's intense enough, then if you were to repeat exactly the same exercise

or exactly the same rep sets intensity, you know, as I say, a week, two weeks later, the consequences to performance and the experience of Dom's and inflammation and you know, loss of range of motion will be attenuated. So it's an inoculation effect against a future bout. Now, you know, initial studies in this area were, let's do a heavy battery centric exercise. And then let's do exactly the same heavy about of eccentric exercise that was weeks, three months, maybe even six months later. And the more severe and intense it is, the longer that protective effect lasts for now, in patient populations, we aren't going to do because we're trying to avoid that, that that, that Dom's response. So this is where kind of the more recent streams of literature that are really interesting and have a from my view, a real clinical utility, and that is we can do submaximal levels of eccentric contractions. And by that I mean maybe even around 10 to 20% of one rep max. So thinking about the maximal strength of a muscle can generate 10 to 20% of that done in a lengthening modality. Now doing sets of that can provide a protective effect of then a subsequent bout of quite high intensity eccentric exercise. So think about you, you know, seeing a patient and you are wanting to introduce some resistance or resistance work. How can you mitigate the effects of that? Well, one strategy is if you let's say you're going to see them and importantly, this does not last for a while. In time, this this protective effect, but it's long enough, I think, again for a clinical application, so it might last for up to possibly a week. So if you've seen me on a Monday and you've seen them the next Monday, I've seen somebody on a Monday, you've seen them on a Friday, you could go about doing this is the first session with a view to then being reassured that in that second session, when you're going to ramp it up a little bit, then you're not going to see the same level of unpleasantness that that individual is going to experience from from a Dom's response. So that's the minimum

Steven Bruce
time between the sets, let's say, if I'm in Sorry, I'm interrupting you again, I think sorry about that. If you're in the gym, and you do the the lower intensity set now, could you then do the higher intensity set after 20 minutes? And would the effects still be there?

Claire Minshull
So it doesn't really present after a day, it might be maximised after two days, okay? And it might be again, depending on what you do, you might have lost it by two weeks. So you've got like a sweet spot there. And it's similar as well. So to not doing eccentric work, actually isometric work as well. So maximal contractions, isometric contractions, which, again, the consequences of this initial bout will not be enough to generate that soreness and compromise capable capability. So about of of maximal isometric work, again, can have a similar influence on mitigating that that Don's response. Such that, again, it's a short lift, inoculation, but clinically, it can have utility.

Steven Bruce
Just putting that into this, how would you prescribe a maximal isometric exercise for let's say, the quadriceps? What would you tell them? To do?

Claire Minshull
Yeah, what did they have around them? Do they go to the gym, do they, you know, their home. So if you're doing let's say, let's pick a home environment. And you could have a, let's say, a dining room chair, so not a chair on wheels. So as you get goods as a genuine chair, so they've got a maybe then a couple of cushions on on the chair. So they're just raising that the leg off the ground a little bit. And then what you want them to be doing is pushing, maybe in a 9080 degree position against potentially a wall. So if you've got a gym ball, you can put that on the shin, if you haven't got a gym ball, you can, you know, the walls robust enough,

you can push it with your foot, or get a series of that from an interface between the wall and your shin. Or indeed use the, if you're strong enough, wrap the other leg on top, so you're using their hamstrings to pull down and push up against anything where you can, you know, push against something that's immovable. And, Max, go, I'm sorry,

Steven Bruce
no, no, I was just about to say, Where's the max? Are they do that for as long as they can possibly stand it?

Claire Minshull
No, because if we were able to measure force output, that will decline over time after about five to eight seconds to maybe 10 seconds to push. So you'd want people to ramp up to get to maximal within a two second period, push as hard as they possibly can. And we hold that for maybe five ish seconds. So the contraction is in total, then with a relaxation, it's less than 10 seconds. If they were to hold it continually for 30 seconds, you'll see this you'll get that that lactic acid feeling Yeah, that that fatigue will happen and force output will decline so it's better to do so where you are able to push maximally have a you know 32nd rest between each repetition and then and then go again.

Steven Bruce
Okay, but some of the questions that have been coming in to sell me Olivia has asked what nutritional or other supplements might help with Dom's, if any

Claire Minshull
kind of Weldon's. Right, so supplemental strategies, there's all mine if you go to PubMed, and you kind of flock into what may attenuate and again, don't don't think that dumbs and muscle damage exactly the same thing. Dom's is an indirect marker of muscle damage. If you take away Dom's, it doesn't necessarily mean that you're improved improving the recovery profile of muscle as well. So supplemental strategies are loads around at the minute long Kikkoman I turmeric and it may that may have a an M for lunch, there's a lot of research kind of looking into that however, you need to eat a lot. So it probably won't come from just your regular curries. We're talking maybe up to 1500 milligrammes as a, as a supplement, and you know, what's available from turmeric is not a one for one ratio, I don't even know exactly, it might even want to be five to 8%. So it's quite a lot. And this new traditional strategies, or bar, potentially one are supplemental, so you need to take something of a high concentration. There were a few years ago on vitamins C, and E. We did a bit on that. However, again, we're looking at the systematic reviews and meta analyses probably doesn't get high doses, probably doesn't convey an effect. Systematically, should I say, so might see so many might not there's not enough evidence to show that it does. And actually, we saw the opposite, it actually increased susceptibility. Tart cherry juice, again, beetroots you know, all these kind of super concentrated nutritional or parts of nutritional supplements may again, convey a protective effect, but they are, it's not like you can just have that regularly in your diet. Something that might, you might be able to do is this fantastic drink, called milk. Soy milk has got quite amazing properties. But from my muscle damage Bective. Again, not consistently, but you if you take maybe half a litre of semi skim milk after having done a high intensity bout of exercise, it may attenuate the Dom's response, possibly not so sure about the recovery profile of, of force and rate of force development, and it may well help with that as well. But again, it's not something out there that you know, it's it's across the board, but most people are many people who are not vegan drink milk. It's also very good for hydration as well. And it's also very good for protein

synthesis. So it's something that that I wouldn't be adverse to just saying, try if you wanted to try some

Steven Bruce
point why, why is it called me skimmed? I can't stand that bloody stuff.

Claire Minshull
It's just, and this is where I'm going to defer to my nutritional colleagues, but it's to do with the fat profile. And I think getting through the, through the stomach. So it's good. You might even be skimmed milk looks better. So the protein, if we're looking at protein synthesis, and potentially hydration, I think even skimmed milk is actually better because of that.

Steven Bruce
Okay, that'll be an interesting one to pursue, but it's not for today. And it's going to take a long time to convince me to drink skimmed milk, because it's just chock flavoured water in my opinion, but the water is good for a couple more questions here. Fleur has asked if a patient is doing strengthening exercises, but they're not getting Dom's does that mean they need to lift heavier weights?

Claire Minshull
I'm gonna ask you what strengthening means and how heavy are people lifting? And in what positions are they lifting? So ultimately, no, but just question whether or not the if you want them to get stronger, it has to be high intensity. So if it's dynamic repetitions, you really need to be failing around about five repetitions, maybe six, you're struggling with that six, seven rep repetition. You just can't do it. That will give you the optimal benefit for muscle adaptation for strength. If it's actually

Steven Bruce
that's a much better indicator Dom's that the fact that you're failing at five or six reps is a really good indicator. Yeah. And, you know, flow should look at the recordings we've had you review before because you've talked at length about this. And it came as quite a surprise to a lot of us, I think to learn that the number of reps was so small for strength builder.

Claire Minshull
Yeah, and that you will get some strength adaptation. If you're doing slightly lighter loads for a number of repetitions, but going to failures absolute quota, you must do that. So if they're lifting 10, which which three sets of 10 is a selector isn't it, which isn't, but fail at 10. And you'll get some strength benefits if you want even more, lift heavier. If you do an isometric work, it's and you probably will get Dom's with that. If you do an isometric work, then you probably won't get Dom's. But you still can get strength benefits. And depending if you, depending where you are in that range, if you're doing a long muscle, short muscle lengths, sorry, long muscle lengths, then you can get actually adaptation through range as well. So isometric can be really useful. So bottom line, no, but question what you do in terms of who this person what this person is doing in terms of actual loading?

Steven Bruce
Clear off a dozen questions I haven't had time to answer ask. And I've really only just realised that we are out of time. And I'd love to run on but I know that people have patients at two o'clock, and you've got things to do. So we're gonna have to wind it up there. We've had 365 360, we'll do, we got 365 people watching this. So what we also need to do is make sure they're aware of the various facilities and resources that you provide for people, which I

will do in my follow up email. But thank you so much. And I'm so sorry that I insulted you by promoting you to a world powerlifting champion at the beginning. But the fact that you are merely merely a British powerlifting champion, then yeah, but it's been a great it's been a great chat, as it always is, I'm looking forward to for getting you in the studio with your partner back in December, so that we can talk about some more of the psychosocial aspects of what we're doing on we, which is going to be fascinating stuff. I'm really, really looking forward to it. Good luck with the hospital business. I hope that goes through because it sounds as though this is this is evidence based medicine, which might actually be quite good evidence based medicine, as opposed to a lot of the stuff that seems to get through the NHS net.

Claire Minshull
Oh, thank you very much. Yeah, we've got a lot of interesting conversations around the country at the minute. So I'm really, really hopeful. But you know, we've seen some fantastic results. So thank you. Brilliant.