

Shockwave and Vibration Therapy With Tim Watson

APM: Ladies and gentlemen, welcome, once again, to one of our 90-minute CPD sessions. That's 90 minutes of learning with others if you're a UK osteopath or chiropractor and it's 90 minutes of great CPD if you're any other discipline. I'm very pleased to say that as always, we've got a number of new faces joining the broadcast this evening. So once again, I'll run through the housekeeping rules. This is a live broadcast. So please, be aware that we are at the mercy of technology to some degree but most importantly, what we rely on is your questions. Keep them flowing. If you haven't got questions, send in your opinions and I know that we've got people watching this evening who have a particular interest in the technology we're going to be talking about. You do that by clicking the button at the bottom right of the screen. Send your questions in. They are completely anonymous so we won't know who's sending unless you tell us. That's very nice if you do but otherwise, you can be completely open about your knowledge or lack of knowledge of what we're talking about this evening. If the technology lets you down...and I say you because I know that we have a very, very good Internet signal at our end this evening. If it lets you down and the screen freezes, the simple answer is to hit the refresh button and that should work within 1 or 2 tries and you get the video feed back again. Normally, we would have an option of an audio only feed and there's a button on your screen for that but I'm sorry to say that this evening, the audio feed doesn't work. So please don't click that button because you'll disappear off to another page where you get absolutely nothing. At the end of the broadcast, you will be eligible for your certificate for your learning with others. Don't click the certificate button until the end because the certificates aren't available until we get to the end of the broadcast. That's the method by which we reassure the general councils that people genuinely did attend the whole of our broadcasts. So that said, this will be a stimulating evening in more respects than one. I'm absolutely sure we are going to have some excellent CPD because this is the third time we've had tonight's guest back in the studio. He is Tim Watson. He is professor of physiotherapy at the University of Hertfordshire and his sole responsibility at the university is research. He still does treat patients but the only reason he's in this game after 40

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years of being a physiotherapist is because he absolutely loves what he does and Tim, it's a great pleasure to have you back with us this evening.

TW: Thank you, Steven, very much.

APM: I'm kind of thinking this is our third session together. It's beginning to turn into a little miniseries, isn't it? Eastenders on electrotherapy. We're going to talk about electrotherapy, of course, but electrotherapy's a bit of a misleading concept and we're going to cover not just shockwave therapy which is in the title, not just vibration therapy but we're also looking at two added bonus electrotherapies as well. What would you like to start with? So we're going to start with shockwave —

TW: Well, shockwave, we dabbled a bit with shockwave last time and I said if you were brave enough to ask me back, I'd bring a machine. So Roy from EMS has very kindly lent us a machine which I'm grateful for because I haven't got one and we talked a bit about shockwave. We talked a bit about what it does and what it doesn't do and then I think if you're brave enough to roll up your sleeve or roll up your trouser leg, we'll give you a blasting because that's one thing talking about it. It's another thing seeing it happen. So if you're not brave enough then there's my trouser leg but that's not a pretty sight.

APM: No, I can do that but I think what we should do, as we've done in our previous broadcast, is to make sure that our audience know that, you know, we are demonstrating some specific machines this evening. Tim will be completely honest about everything that he discusses with the machines, regardless of the fact that we have a representative of the manufacturer of the shockwave therapy machine in the studio with us. He's not endorsing machines. He's giving you the down and dirty on all of them, as well as all the good stuff and it's all research based, isn't it?

TW: It's research based, yeah. I wouldn't be comfortable sitting here...if I couldn't talk from a research base then I'm afraid you'd have to find someone else because it doesn't bode well. I'm not into advertising, endorsing or promoting. If it's good, I'll tell you it's good. If it's rubbish, I'm going to sit here and tell you it's rubbish. That's my job.

APM: And actually, Tim operates his own private charity in this regard because he gets no kickbacks from any of the manufacturers of the equipment that he talks about but he does have his own website, electrotherapy.org, if I'm right.

TW: That's the one, yeah.

APM: From which you can download all sorts of material and I learned from him this evening that he's got so many people downloading equipment that the bill for his website is going up and up every month. So I'm trying to encourage him to ask

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for donations to pay for that because at the moment, he's doing it out of the goodness of his heart because he genuinely is into dissemination of all this information for the good of the clinician. Can we —

TW: That makes me sound really pious.

APM: Well, you're a nice guy.

TW: There you go, thank you.

APM: So I've seen shockwave machines before and they stand on great big pedestals. Is that all window dressing or —

TW: Well, the pedestal... a lot of them have got a compressor and that's what sits in the pedestal. They're getting smaller, they're getting cheaper. I'm going to guess five years ago, you were probably paying £25,000 plus for a shockwave. Now, you're way under £10,000. If you shop around a bit, you can... some of them are rubbish. Some of the really cheap ones, direct imports from China, are pretty rubbish and their lifespan is going to be about, you know... no good for you at all but you can get good value and... This is the small unit and again, it doesn't matter to me who makes it but it's a small unit. It does the job. It's easy to use and it would deliver what the evidence says you need to deliver to be clinically effective and therefore, from my point of view, why do I want to spend £25,000 on a high-profile machine on a big pedestal that takes up half the clinic? So —

APM: So how is one of our watchers, viewers this evening going to know whether it's good quality or bad quality?

TW: Well, you can go to some extent by what they're prepared to guarantee you. If they're not prepared to give you a guarantee for more than six months then that starts to... moving backwards fairly swiftly. There's an on-cost with shockwave because you buy the unit and it's got sort of a mechanical operating thing which we'll turn on in a minute but that's got a lifespan and on the really cheap machines, the lifespan of this thing may be, you know, 500,000 shocks whereas on a good machine that's got some quality behind it, you may be on 2 million, 3 million shocks before you've got a mechanic... you change the mechanical blaster in here and therefore, that will change your running cost and that's something you need to take account. Don't just think you've got a bargain machine because you got it cheap. It may not last and you may have high operating cost. You need to balance the two.

APM: Have you got machines on your website which you've reviewed?

TW: No. I mean there's a function on the website which is due to come up and running which is a... I'm considering doing machine reviews just like every other website does reviews. I haven't. So at the moment, they're not on there. Watch the space

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because if I can find the time, the effort and the web space then I'm looking at doing reviews but yeah, there are some well-known machines out there and there are links to manufacturers on the website and I would not put a...none of the manufacturers pay for their links on the website but I will not put a link up to a piece of kit that I would consider to be dubious. I'd simply take that link down. So

APM: Again, you answered my question, "How do we know it's a good machine?" We go to your website, we have a look at what's on there.

TW: If it's on the website then it should be trustworthy.

APM: We're calling this electrotherapy but this is mechanical therapy, isn't it?

TW: Yeah, it is.

APM: Do you want to talk us through the principle of what this does and how it differs from ultrasound which is the other —

TW: The other mechanical one. We talked ultrasound. When was that? Edition one, show one?

APM: Yeah that was back in Edition One—

TW: This is shockwave. So instead of ultrasound which is delivering this mechanical energy maybe a million times, maybe 3 million times a second, we're down to a few hits a second here and we'll play around with this but maybe 10 hits, maybe 20 hits a second. So it's still fairly fast but it's nothing like as fast as ultrasound and the clue's in the name. When they called it shockwave, it's deliberately sending this mechanical pulse into the tissue and originally, when these machines were first used, they were used to treat patients with kidney stones either for whom surgery was not appropriate or patient didn't want surgery and they were using a machine much bigger than this but they were using this machine, sending the shockwave in to smash the stone into powder and then to put it crudely, you pee the powder instead of peeing the stone. Now, peeing the powder is not nice but peeing the stone is described as the most uncomfortable sensation known to mankind and it lasts for like...the pain lasts for up to three weeks or something.

APM: Are they still using it for that?

TW: They still use that. That's now routine. So in the '70s, late '60s, early '70s, that was the new treatment for kidney stones. When they were doing the research, they discovered that the shockwave, they aimed it in the wrong place. It was kind of breaking up bone and destroying musculoskeletal tissues, slightly inconvenient. So your kidney stones turn into powder but so is your spine. Not popular. So they got around that and then effectively, what we're using in the clinical world is a

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toned down version of that and —

APM: Toned down in terms of frequency or power?

TW: Power, sheer power because we don't need the amount of power going into the tissues which you need to smash up a kidney stone. You need less power if you want to have a positive effect on the musculoskeletal tissue. So therefore, they're toned down in power not because they don't trust us with the big powers, because we don't need big power. The amount of power coming out of these machines is the amount of power we need to have an effect on the musculoskeletal tissues. Even so, it's not subtle and, you know, this will have you squirming in your chair before we've even started. You know, it's not gentle. Ultrasound, you can't even feel ultrasound going into you. Trust me, you're going to feel this. It's not painful but most patients would describe it as disconcerting or uncomfortable rather than painful but it's... I guess we'll talk about what it's good for later but primarily, it's really good for the chronic, chronic problems that just will not go away. So your chronic Achilles, your chronic plantar fasciitis and issues like that, been sitting there for two years, everything you've tried treatment wise, will just not shift it. That's the kind of time when you, well that's when I would call in the shockwave and that's when the evidence says if you're going to use the shockwave, that's when you call it in. And you're not using it instead of your other treatments. You're using it in conjunction with, just like when we talked about ultrasound or TENS or all the other things we talked about. We've talked about using those modalities in conjunction with a treatment package rather than this being the treatment package.

APM: Would you use this in conjunction with ultrasound?

TW: Not necessarily. I'd use it in conjunction with a... like an eccentric loading. So if we're using... in chronic tendinopathy, we're getting the patients to do an eccentric loading exercise program which we know is effective then I wouldn't stop them doing the exercise. I'd use this in conjunction with the exercise. I mean you could use this with ultrasound if you wanted to but there's no benefit going —

APM: I guess that was my point, is there a benefit of combining those two therapies as opposed to physical therapy —

TW: Don't know. I combine it with exercise. Maybe combine it with some manual therapy, some stretching, some postural work, core stability. Combine it with those bits of the package rather than combining it with laser or ultrasound and stuff.

APM: Does this operate at a single frequency or can you adjust the —

TW: You can adjust the frequency and we'll try different frequencies out when you get

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brave. I'm just going to wind you up a bit first but when you get brave and try it, we'll try different frequency but actually, the frequency of which you deliver the shock doesn't change the treatment outcome. What matters in terms of treatment outcome... we kind of jumped ahead a bit here but what matters in terms of treatment outcome is how many shocks you deliver and typically, in a treatment session, we might throw 2,000 hits at your tissue and somewhere 1,500, probably 2,000, the best evidence at the moment is pointing very clearly at around 2,000 shocks, we're using that and we're probably only using that once a week, all right? So unlike ultrasound... if we're doing ultrasound on an acute lesion, ideally, we want to do that every day but with this, if you did this every day, well, you wouldn't come back on day 2 or day 3 because it would be quite unpleasant. So you're using this to deliberately wind the tissues up, if you like. You're taking them from their chronic state, excuse me, and you're deliberately making it more acute, more responsive and once you've made the tissue more responsive, the shockwave's done its job. It's just a provocative treatment and we've done that in the past. We've done that for donkey's years. I learned about doing provocative treatments back in the 1970's, when I did my training but we were doing provocative manual therapy and deep frictions. Whatever deep frictions are supposed to do, they're certainly provocative and you could do, you know, provocative manipulation. You could do provocative stretching. This is just a machine's version of being provocative. I'm not dismissing it. It's damn good at being provocative but the clue's in the name. It's not subtle, it's not gentle.

APM:

So what we're... we're going to provoke the body into generating a healing response as a result of this. I remember looking through one of the reviews on this and it suggested it also works on pain gating as well. Is that right?

TW:

Yeah, there will be a pain gate activity. So if I just got, I don't know, a metal strip and just kept tapping you with it then that would stimulate the pain gate but it wouldn't be shockwave and it wouldn't be ultrasound. It's just mechanical tapping of the skin. So any pain relief, any immediate pain relief you get with this is almost a by-product. We're not doing this to get you pain relief now. We're doing this to take your chronic unresponding tissue, deliberately winding it up, deliberately making it acute and using the acuteness as the driver to get you through the repair sequence and that's what it's good at.

APM:

What wasn't clear in what I read was whether that pain gate effect was transient, only while the machine was on.

TW:

It is. Well, it's transient in the... within, if you're lucky, 10 to 15 minutes afterwards. It's as long as you're going to get and if you got to go through that treatment in order to get 15 minutes pain relief, you might as well take a paracetamol. I mean, you know, it's not good in doing that job. It's good at winding the tissue up.

APM:

What are the typical conditions you'd use this on?

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TW: In terms of where the evidence currently sits, the strongest evidence, by a long way, sits in favor of the tendinopathy type problem. So if you can work from distal, back up, plantar fascia, Achilles, patellar tendinopathy...the only one that's not really a classic tendinopathy is like greater trochanteric pain syndrome. That's been treated a few times and then you come up, medial and lateral elbows...the golfer's and the tennis which we don't talk anymore but medial and lateral elbow things, supraspinatus, a bit of biceps, tendons. So any of those which are tendinopathy, chronic, non-responsive, that's the classics.

APM: Is it going to have an effect on calcification?

TW: Yeah. There's a couple of studies of that...there's more than a couple of studies. A few studies has been done on like calcification and supraspinatus where they've got a tendinopathy and they've got a calcification and they've used it to try and see if you can...if it can break up a kidney stone, can you break up a calcification in a tendon? At this kind of level with this kind of machine, I don't think you can. You can get high powered machines...well, I guess in a minute, we'll also talk about the difference between focused and not focused shockwave but you can get high powered machines. You can use them to break up calcification. I don't think in the therapy world, that's our primary target. I would leave that as a nice side issue and a limited number of practitioners are going to have those big berth machines that are really going to do that breaking up and that's not in regular practice. So those tendinopathies are plantar, Achilles, patellar, trochanteric, medial, lateral elbow, biceps and your rotator cuff, especially supraspinatus. That's the classics. That's where the evidence bulk sits. And I was looking through the other day...because I was doing a review on this and some review stuff up on the website. I was looking at all the other things people are currently saying, "Well, if it's that good at the chronic tendinopathies, what else?" And they're trying everything. They're trying it on fractures that are not mending. If I've got a fracture that's in a state of non-union or delayed union, I don't think I want somebody pointing this at it but if a fracture's not mending and the options are getting pretty limited, I think I would try it but at the moment, I don't think I would because it feels wrong to point this at a fracture. The evidence is looking quite good. They're pointing it at chronic wounds. They're pointing it at —

APM: I saw that. What's the theory here?

TW: Well, the theory here is a chronic wound, just like a chronic tendinopathy, just like a non-mending fracture, needs provoking into action and you can do electrical stim which I guess we're talking about later but you can do electrical stim to a wound, really effective. We don't do it in this country but the evidence is stunningly good and you're provoking the wound into responding. Well, this is just mechanically provoking the wound instead of electrically provoking the wound. So it may not sound attractive but it works and it's an effective thing to do. So you've got fractures that are not mending, you've got wounds that are not

mending and then people are now trying it on a range of musculoskeletal problems, so muscle problems rather than just tendon problems. Muscle problems and ligament problems, fairly obvious place to go. Early research, looking good. Muscle spasticity, so maybe kids with cerebral palsy, massively spastic muscles like all the time, 24/7 spasticity, been tried on them with some really quite good effects. I really didn't expect it to work on things like that. I thought, "what are people doing" but it's, you know...the early result's looking pretty impressive.

APM: And is that giving a long-term benefit —

TW: Yeah but they're talking about, you know, a single session of this, maybe giving reduction in spasticity dominantly in the first week or two but 5 weeks, 6 weeks later, the spasticity's not back up to where it started. So you've got a single treatment session, you've got two weeks' stunningly impressive, you know, reduction in spasticity and 5 to 6 weeks later, it's still not back to where you started. That's quite good.

APM: But of course, it's going to be a long-term treatment protocol, isn't it?

TW: Yeah. If that means...and people really haven't gone that far with the research yet but if that means having eight treatment sessions every six weeks in order to manage your child's spasticity...and their spasticity's having a massive impact on their quality of life because they're walking and they're moving around in bed and your ability to lift them and get them on to the toilet is massively affected by the spasticity. So rather than hitting it with Botox or baclofen or whatever then maybe a physical option and if the units get small enough and cheap enough, it might be the kind of thing that becomes a home-managed treatment. We're a long way away from that but it could go there.

APM: But if it's only a weekly treatment, unlike ultrasound, it's more manageable to come into a clinic and —

TW: It's more manageable, 10 minutes once a week or 10 minutes once every two weeks. It's not outrageous and if that gives your child a quality of life that they can't currently enjoy then that will be really quite useful. If I had a child with that kind of muscle spasticity and it was affecting them and if a one 10-minute session a week actually helped them to manage that, I reckon I'll be up for it. I reckon.

APM: Do you have any idea what the people generally charge for a session of —

TW: That vary. I mean some people, I'm almost ashamed to say, try to rip-off and they'll say, "This is shockwave. This is the special treatment. It's more expensive." And some practitioners actually charge hundreds of pounds for a session and get away with it and they charge hundreds of pounds for a session and they get the patient to pay upfront and they say, "You must pay for six sessions upfront," whereas from my point of view, it's no different from any other...I

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wouldn't charge anybody any more than I would charge them for a normal treatment session.

APM: For a normal —

TW: But that's —

APM: You don't use your...you've spent 10,000 on this machine and you've got to get that money back as well as pay yourself.

TW: You've got to get the money back. But you see, if you imagine...if you're living in town X and you're the only person in town with this kit, all the chronic tendinopathies in town who nobody else has managed to get better, you can actually promote a line of practice that says, "OK, look, we've got this kit. This kit is evidence as having a, you know, 80%, 85% success rate in chronic tendinopathies. Come give this a try," and therefore, you're pulling the numbers and that may be sufficient. I understand why people are potentially charging more for treatment sessions and to some extent, it's nothing to do with me and I understand why but it doesn't need to be more expensive.

APM: But in fact, you can put in a lot more treatment sessions that are only 10 minutes long. So it's not as though...

TW: So it's not a killer.

APM: Now, I don't want to offend any of our viewers this evening because I have delayed asking some of the many questions that have come in already but I don't want to lose my thread in this. So far, if I can summarize what you've said, Tim, we can use this to treat everything from headaches to hemorrhoids, more or less. It treats —

TW: People are. In fact, I'm not sure I can say this. Can I say this live? They're also using it for treating erectile dysfunction. Well, you know, with all due respect, I do not want —

APM: Which party? Which party's using it?

TW: Quite a lot of parties. I do not want that getting down my trousers. Thank you very much. If you want to try that, I think they'll probably cut us off air but —

APM: We are going to demonstrate this a little later on but we're not —

TW: But we're not doing that one.

APM: We're not going to go down that —

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TW: But they are literally trying it on almost everything because it's turned out to be so successful, the tendinopathies, inevitably, people are saying, "Well, why don't we try..." People are trying it on dental problems. There are dentists out there doing that. Now, I don't want that down my trousers but I really don't want it in there either but —

APM: Well, not if it's been down your trousers.

TW: If it's been down my trousers, it's definitely not going in there but the point is, you know, a lot of people are trying a lot of things. If I was going to sit here and say, "What can you use it on for which we've got a strong evidence base?" I would put your tendinopathy list way up the top of that and the rest is interesting developmental, experimental.

APM: Where I was going with that question, what are the contraindicators? Where you can't use it? When we sat down here and we said, "OK, we'll practice this on my knee," I showed you my replaced knee and you said, "I better not do that one." So you're going to loosen up a —

TW: Well, there's an argument that if you apply too much energy to a cemented implant, it has the potential to loosen it. People have used it deliberately to loosen implants when they're doing a re-implantation on an implant. They try and get the old implant out. They've deliberately used it to try and loosen the cement, the bonding but that's the focused shockwave. That's the high power stuff. I'm pretty damn sure...I don't think I want to run the risk but I'm pretty damn sure if I put this on your replaced knee and I turn it up and just put it there, I really don't think I'm going to make your knee come loose. On the other hand, do you want me to take that risk? No. Do I want to take that risk? No.

APM: What if I've come to you with a tendinopathy on that replaced knee?

TW: I would find an alternative. As my first choice, I would choose not to use shockwave, all right? If you're on anticoagulant, because it's mechanically quite irritating...and if you're taking an aspirin once a day to stop yourself clotting up then that's not going to stop me but if you're on active, you know, warfarin or whatever based therapy, I'm not going to do it and, you know, those kind of things are the major issues. I mean I don't know why I do it over a pacemaker but I wouldn't, you know. Why would you do that over a pacemaker? Crazy. You know, so the contraindications, a lot of the contraindications were actually developed from the high powered focused shockwave which is the destructive shockwave. They've been taken as being...applying to this radial shockwave as well and I suspect, give it another 2 or 3 years, we'll probably sift some of those listed contraindications out because I really don't think they are —

APM: Osteoporotic patients?

TW: Osteoporotic patients, that wouldn't stop me. I wouldn't take that as being a contraindication. In fact, some people, not surprisingly, are trying to see if the mechanical stimulation from this will actually help to reverse an osteoporotic bone by mechanically stimulating it.

APM: The research I read said that there had been no benefit from using shockwave in improving bone mineral density.

TW: People have tried it and they've tried it...but then it could be that they've only tried it once which is...there's probably about two papers out there, both used the same dose, both didn't find anything. So it could be that the dose they've used is missing the target. It could be that it genuinely doesn't work which is why it's in that big experimental part. It got the potential but ultrasound...and, you know, other modalities have got the potential but the problem with...if somebody's got generalized osteoporosis, where do you point this and which bit of bone do you target? You can't. So, you know, if you did it on the femoral neck then that's a localized treatment and I can almost see a rationale for that but if somebody's generalized osteoporosis, that's really not the treatment. We might talk about the vibrating platform later on, that's on our agenda, actually, there's some pretty good evidence about using the vibrating platform and exercising on a vibrating platform. That's currently got better evidence than the shockwave for a generalized osteoporosis and BMD issues.

APM: You've talked about using this over a hip problem. Does it not have the capacity to irritate a bursa? Would that be —

TW: Yeah, it has but I wouldn't use it on...if somebody came to me with an acute problem like an acute bursitis, that's not when I'd pull this out of the cupboard. If somebody came to me with an unresolving chronic bursitis and I needed to get that bursa to respond because it wasn't responding to anything, it's really just a non-invasive version of like dry needling. Dry needling is provocative, isn't it? So this is just being provocative without the needle.

APM: Would that cause the bursa then to flare up before it started to heal? I imagine it would.

TW: Yes, it would. Yeah but then —

APM: So patients need to be warned about that in advance.

TW: Absolutely. I wouldn't pretend to the patient that this is subtle and gentle and I wouldn't pretend to the patient it's going to make everything better by the time you walked down the road. And I would explain to the patient this is deliberately going to have the effect of irritating...in a positive way, irritating the tissue, provoking the tissue because your tissue...you're the patient. Your tissue is in a chronic state and it's not responding. It's not responding to anything I'm doing,

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you're doing or anybody else's doing and therefore, I'm trying to get it to respond and therefore, we've got to be pretty not subtle about doing that. If, therefore, it feels worse in the next day or so or over the next week, you know, don't panic because that's, you know...you've got to sign up for that. You, as a patient, have got to sign up for the fact that I'm deliberately provoking your tissue and that sounds crazy. Maybe that sounds illogical but if you've had that plantar fasciitis for two years but nothing has shifted it, a couple of weeks worth of irritation is something that you're going to be well up for if we've got a 70%, 80% chance of succeeding of getting rid of it.

APM: Maybe you were going to talk about this later but since you've brought up plantar fasciitis again, what would be your protocol for that if someone comes in with unresolved plantar fasciitis?

TW: Unresolved plantar fasciitis, I would aim to do a provocative treatment. I would aim to treat them once a week and I would estimate, based on the research evidence we've got, once a week for somewhere between 3, 4, 5 sessions. That would normally be sufficient. If you're lucky and in three sessions, we've got the response we're looking for then you don't need 4, 5 and 6. If you get to five and it's resolving but hasn't got better then maybe another couple. There's no problem doing more than five but typically, 3, 4, 5 sessions at weekly intervals and you're taking 2,000 shocks in a session but that's, you know...if we deliver in that...at a fairly standard rate, that's probably only a 5-minute, 8-minute, 6-minute kind of treatment, depending on how fast we set the stimulator to run at, you know. And that's what I would say is fairly typical. Now, you know, that means you got to turn up once a week for the next 3, 4, 5 weeks. It means you need to combine that with your eccentric loading which I've already given you to do and by itself hasn't worked but in conjunction with this has got more chance of working. If you're up for that then I'm up for giving it a try.

APM: I'd like to ask some of the questions that have come in though because —

TW: They're flowing in, are they? Are they asking you not to roll your trousers leg up?

APM: They're certainly asking me not to put it down my trousers. Somebody's asked what this machine is called. Now, generically, these are shockwave therapy machines, aren't they? The fact that this is provided to us by EMS and it's called a Zimmer according to —

TW: Zimmer's the manufacturer. EMS are the distributor and there are half a dozen machines around in the UK which do the same kind of thing.

APM: But they're all called shockwave therapy machines?

TW: Shockwave is a generic term. The bit I was going to mention earlier...and we kind of got excited about all kinds of things we shouldn't have got excited about but

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the bit I was going to say is you can get two versions of shockwave which is effectively focused shockwave and that means that the energy coming out of here...there's basically a mechanical vibrator in here and the energy coming out of here on a focused unit, the energy comes out of the applicator and then at some distance into the tissue is more concentrated than the point of delivery, all right? That's what they were doing when they were smashing up the kidney stones and you want to be really sure that the operator of your focused shockwave machine knows how far in your kidney stone is and how far to focus their machine because you don't want to them focusing it in the wrong point because the energy is much higher density down here. That's the kind of machine that's not used widely in therapy. The kind of machine that this is, is a radial shockwave machine and effectively, all that means is that the energy coming from this applicator will diverge in the tissue and therefore, it never becomes more concentrated than at the point of delivery and therefore, it's nondestructive. It still does the job but it's not destructive. That diverging kind of energy, this kind of stuff is generally referred to now as radial shockwave. So to differentiate between the destructive focused and the radial nondestructive, that's the term —

APM: I mean at clinic, what we're going to want is radial.

TW: Radial. You want radial.

APM: The person who asked what type of machine it was tells me that he or she has a Lycon AcuPulse machine. Is that a shockwave therapy machine?

TW: No. Not that I know of. I'm sure I've seen a Lycon machine and I'm sure it's not a shockwave.

APM: The fact that it says AcuPulse suggests that it may be —

TW: I thought it was a stimulator. I didn't think...I may be wrong. I wouldn't swear to to that one. I —

APM: Well, if that viewer would like to send us in some more information, we can have a think about it and maybe we can get some answers after the broadcast.

TW: Or ping me an email or whatever. I'll happily look it up and check but I don't...by instinct, I don't think it is.

APM: Her question or his question was is this vastly different from...we can't answer that question. How different are the machines on the market, other than reliability, in terms of what they deliver?

TW: Reliability and cost, size but in terms of what they do, you know, it's getting the dose right that matters and that will be true for ultrasound. That will be true for laser. That will be true for electrical stim. An ultrasound machine that delivers

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dose X, and dose X is the evidence dose, will do the job, all right? And you could buy an ultrasound machine at 150 quid, probably pretty rubbish, probably going to fall apart. You can buy an ultrasound machine at £2,000, you're probably being ripped off. So, you know...but the same is true for the shockwaves. If you get the dose right then getting the dose right would determine the outcome of your treatment. Some people prefer to buy low cost and accept that it's going to have a faster failure rate. Some people prefer to invest a bigger lump of money. They do the same plinths. They do the same with, you know, whatever in the clinic, don't they? So it's the same choice but there's no fundamental difference. Some machines...there's a couple of machines out there which actually offer you one base unit and then you can get an applicator which is like this one, a radial spreading out shockwave or you can attach a different applicator which is a focused shockwave. So you've now got both versions of shockwave available from the same base unit. That's going to cost you a bit more. You've got a treatment option but in the therapy world, most of us are not going to use the focused option. So you just paid for an option that you don't need.

APM: Are there occasions when you would?

TW: Yeah but they're rare and that it would be a specialist...from my point of view, that'd be a specialist practice. Your regular practice, your radial will do that job.

APM: You talked about there's two different types of shockwave. I notice you've also got a number of different applicator heads.

TW: There's different applicator heads. So you can change how concentrated...that's your fairly standard head on there which is basically 15 millimeters across which is the kind of one that I would try on myself and I'll try on you. So that's fairly standard. You can use a larger treatment head or bigger diameter. That's the kind of applicator people are using on the muscle. When they're trying it on muscle, they tend to be using those bigger applicators. You've got hamstring spasticity, chronic hamstring tears. They're tending to go for the bigger applicators because it's a more practical thing to do. These are wicked. That one, that's like six millimeters. So instead of 15 mill, that's less than half the size but you've got the same amount of juice going through a very small point applicator —

APM: And that makes me ask this next question which is are the heads small enough to use on ankle ligaments? That looks like it'd be bloody painful on an ankle.

TW: That 15 mill is fine on ankle ligament because if you can get that around your malleolus or between your malleolus and your calcaneus, you can get that head in there. No problem at all. That's fine.

APM: So what do you use that one for?

TW: I wouldn't. In fact, I use that for —

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APM: What did the manufacturer say to use it for?

TW: I don't know what. The manufacturers just made these things up. I'd use that on a patient who is rude to me and haven't paid their bill, you know, because that's revenge treatment. I'm sure there are times when that's very, very clever but I can't think of a patient I would want to use that on. That's unkind.

APM: Thumbs, fingers, anything —

TW: That could do but even on a finger, even on an MCP or a wrist or a thumb, I...15 mill, 12 mill, that kind of size is fine. I really don't think —

APM: Doesn't look as though that would do damage.

TW: It's wicked.

APM: So who wrote this rule you got to have 2,000 hits?

TW: They didn't. There's —

APM: Has any research been done on —

TW: Yeah, lots of research have been done. So they started off at much lower level. So they were starting off...when you look at the research from maybe 10, 12 years ago, they were probably delivering 500 hits in a treatment session and they were getting some benefit. In fact at one point, in some of the early stuff, they went down to 100 and then they said, "Well, okay, if 500 is getting us an effect but we need 6, 7, 8 treatment sessions. If we make it 1,000 hits, do we get the same response with less sessions? Let's try it." So they tried it and they did. And then it went up to 1,500 and really, for probably 5 or 6 years, a lot of people were using 1,500 shocks and then somebody says, "Well, 1,500. There's no limit here. Let's try going up," and they've gone up to 2,000. I'm pretty sure...unofficially, I know but I'm pretty sure people are trying even higher. So if 2,000 worked which is the kind of number I would be working to based on our current evidence, I'm pretty sure people are out there trying, "OK, well, if 2,000 worked, let's try 2,500." And at some point, we will find a number whereas you've actually just gone too far. You've actually been over provocative. You wound the tissue up really more than you want to and we're going to end up saying, "OK, well, your window is in here." I reckon, at the moment, the window is sitting around about 1,500, 2,000 shocks in a session and that's what the evidence would currently support. I'm pretty sure people are trying higher numbers and we might slide up a bit further but there will come a point where you deliver too many shocks in a session and the patient just never comes back.

APM: So the poor old cameraman keeps rushing around because he thinks we're about

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to do the —

TW: Right, sorry.

APM: I'm going to keep him in limbo for a minute or two. Where's the best place to buy these things or is it just a straightforward Google search and then have a look at different manufacturers or —

TW: I will —

APM: Obviously, we put a shout out for EMS who had been very kind and provided this for us but they're not the only provider.

TW: EMS, bless their cotton socks and thanks to Roy for bringing that along but EMS are a distributor. They don't manufacture this. EMS are a distributor of electrotherapy kit and that's where I would go. You can buy these direct from China and they'll come in a plastic bag with a bit of cling film around them but you're running a risk because, you know, this has got to go back and you've got to replace this mechanical piece in here. You don't want to send it back to China and have the machine disappearing for six weeks. So I would go to a mainstream distributor. They're listed on the website. I'm not going to name them now because I'm bound to forget one and then I'll be in trouble because I'm trying to be nonpartisan. Mainstream manufacturer, mainstream distributor and they will give you, A, the service, B, they'll give you a quality guarantee, C, they'll give you a replacement guarantee and they'll be able to service the kit. So yes, you can find them cheap. You can probably buy them on eBay. You can buy blinking anything on eBay, all right? But that doesn't mean to say it's a good thing to do. It just means you can.

APM: Just one thing before we go any further. What's going on inside that head? There's a bit of metal whacking —

TW: There's basically... imagine we got a kind of a tube done the middle here which is filled with oil and you got a ball bearing and there's a firing piston at this end and it's blasting the ball bearing down the tube. It hits the end which is what's in touch with you and that's where your shockwave is generated and it's a bit more complicated than that which is why it's worth a few quid but that's the essentials of it. Yeah. So that thing at the end there is just the endplate with the ball bearings hitting and that's transmitting the energy into your tissues, all right? You don't have to use it with the... these ones come with a little sleeve on it which partly makes it a little bit less irritating.

APM: But you can use it through that sleeve.

TW: You can use it through the sleeve. You can use it without. It's more irritating without and again, I don't think it makes any difference in the treatment outcome,

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you know. And some of the manufacturers will try and send you the sleeve as a bonus. Some of them will say, “Oh, ours hasn’t got a sleeve because you don’t need a sleeve.” I can’t see any evidence one way or the other. You know, if yours come with a sleeve and this one does then use it with a sleeve. If you want to use it without the sleeve, if you want to —

APM: But in terms of hygiene of these between different patients, what do you do?

TW: I wipe. I mean the ones I’ve used clinically have not been ones with the sleeve on so I simply wipe the head with an alcohol-base wipe, so those injection swab things. That’s all I use and so that’s sufficient because you’re not using it...I mean if I was using it on wounds then I’d be having a sterile barrier between the wound and the bouncing bit but I’ve never used it on a wound but I know people who do. I’ve seen the research where people do. I’ve never seen a patient with a venous ulcer or pressure sore with one of these rammed in but you have to have a sterile barrier over there but you only have to take the same hygiene precautions as you would take on an ultrasound treatment head because you’re not in touch with open tissue, you know, most of the time.

APM: So I’ve come to you with my patellar tendinopathy.

TW: So you come in to see me and you’ve got patellar tendinopathy. But oh god, look at that. We’re going to get X rated. OK, so I’ve given you the told talk. I’ve said this is not going to be comfortable and effectively, what I’m going to do is I’m going to set this at a fair... I’ll set this at the kind of power level I would want to use on you clinically and I’ve set this, at the moment...let’s just go for 15. So this is going to deliver 15 shocks per second at a power level which is appropriate for a chronic patellar tendinopathy. If you were a patient, what I’d actually get you to do is to try this on your hand first just so you knew. On your non-damaged bit, this is what it’s going to feel like, all right? So that’s it. So it’s not going to be any worse than that. It might feel a little bit different because that’s a problem tendon.

APM: Before you go on, that’s quite useful, going through that, how you would prepare your patient. Are you going to talk about contraindications or the fact that it might be sore after you finish treating —

TW: That’s all the blurb I would’ve gone through. Before we get to this point, I would’ve checked your contraindications. If not, there’s no point getting the machine out of the cupboard. I would tell you that this is not subtle. It’s a provocative treatment and it’s going to wind the tissue up. That’s what we want it to do. If you’re not up for that as a patient, tell me and I will find an alternative, all right? I probably haven’t got much of an alternative because the reason you’re here is because you’re in deep doo doos and we’ve tried everything else but I’m being kind —

APM: But it’s not your first response. If I come with an acute problem, you’re not going

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to use the —

TW: No. I mean there are people trying it on acute but my reading of the researches, at the moment, I wouldn't use it as an acute treatment. I'm using it as a treatment for chronic.

APM: Because there is no research or because the research —

TW: No because it's...at the moment, there's very little research where it's been used on the acute and there's certainly not enough for me to sit here and confidently say, "Use it on the acute. You'll get a good result." I can't say that because there isn't that volume of research and my view has always been I'll carry on researching anything but I'm only going to promote, support, endorse a treatment which has got adequate research to actually support its use in the real world. Experimental people are doing it. Research wise, people are doing it clinically. I'm sure there are people out there using it on acute problems. I can't see the logic. I can't see the evidence at the moment. OK, so if I'm using that straight on to your skin without the shield then you really want a squirt of gel.

APM: Because?

TW: Because you want the energy transmission into the tissue and it also makes it a whole lot more comfortable. So I've either got to put a squirt a gel, standard ultrasound gel and effectively, the naked head, the bare head or like on this machine, if I've got the silicon sleeve cover, I don't need the gel because the silicon cover will get the energy into you.

APM: And you want a flexed knee?

TW: Yeah but I mean ideally, I'd treat you on the treatment couch and then I'd have you with a 15, 20 degree flexion of a knee over a pillow but, hey, we haven't got a couch and we have got a chair so we're just going to make it up, all right? So there's your patellar tendon and let's assume you've got a patellar tendinopathy. It's been there for quite some time. I'm trying to find the most aggravated part of that patellar tendon whether it's right up here on that patellar bony junction, whether it's right down the tibial tube or whether you've got a mid-insert. Whatever I can find as being the most obvious part of that problem, that's where I'm going to focus, all right? And I'm going to try and deliver 2,000 shocks. My intention is to deliver 2,000 shocks. If I've got that sitting at 15 times a second, it's going to take us a few minutes and what I'll say to you is, "Right, let's start over this side." So I'm now on the medial side, pointing into the patellar tendon and what I'm going to do...I keep forgetting there's a foot switch control on this one. So I'm just going to start delivering those shocks, all right? That's it. And I've got a counter on the machine that says I've delivered 300 already. I haven't actually because I was fiddling around a bit, wasn't I? And then I'm moving to the center of your tendon and I'm doing the same again here and then I'm moving

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over here.

APM: So one-third on each bit.

TW: Yeah, that's all I'm going to do. Right, so if —

APM: For the benefit of the audience here, that is not painful.

TW: It's uncomfortable. Well, it's disconcerting —

APM: It would be more uncomfortable perhaps on a damaged tendon but it's not uncomfortable on a normal —

TW: Well, you're not just being a hero and being brave. Actually, it's not as bad as people think it's going to be, all right? And that's at a clinically appropriate hit level. That's not —

APM: I'm not sure I'd want to try that little head on it, though.

TW: No. I think if I got that out, you'd be off and somebody else will be doing the interview. OK, if you said to me...and I would say to you, "Look, I can stop this at any point." If I'm doing this and that starts to feel uncomfortable, you want me to stop...just like the dentist says when he's drilling. He doesn't mean it, of course, because he pretends he can't hear you and he carries on drilling but, you know, if you say to me, "That's not comfortable. Can you just back off a minute?" it doesn't matter whether I give you a minute's break and then start again. As long as I deliver my 2,000 hits...if I give you 2, 3, 4 breaks in there, because that's what suits you, that's fine. Some people...and I normally set these at around about 15 times a second because it keeps your treatment time reasonably short —

APM: What could —

TW: It'll go down. This one will go down to once a second. So if we do that on once a second, right but you've got 2,000 of those. It doesn't change how many shocks you get but it does change how long it takes to get there. Now, if I think you're a cracking patient and I want to have a great old chat with you then I'm going to put the frequency...that's a joke. Perhaps you'd take it literally but if you said at 15, "I don't like that," I will actually try...this machine's great because you can actually go up and down in real time. "Is that better?" You say, "It's better but I still don't like it." OK and you say, "OK, that's it. I can deal with it." I say, "Right. OK, that's at five times a second." It's going to take us longer to get through this treatment but if five times a second is acceptable to you and you can get through that treatment, yes, it will take us longer but yes, you'll get the effective treatment. If we take it up as high as it will go...I don't know why it stops at 22 but, hey, it does. So just for the sake of completeness, let's try 22. Like a bloody machine gun. So therefore, the treatment's going to take less time. Now,

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you haven't flinched at any of those.

APM: No.

TW: So therefore, it genuinely doesn't matter whether I deliver those at once a second, 22 times a second or any number in between. When you get the...yeah, I think we'll put that away, if that's all right with you. When you get these machines, what they —

APM: I'm going to get my notes back. Keep talking.

TW: I'll keep talking. When you get these machines, and this one does as well, they tend to come up with lots of automatic programs on them. I'm a bit wary, personally, we talked about those before. If it's got an automatic program and you press the Achilles tendiopathy program or the dodgy knee program or the tennis elbow program, it will say, "Oh, for tennis elbow, you deliver the pulses at four times a second and for Achilles tendinopathy, you deliver them at eight times a second." I can't find any evidence for that at all.

APM: Really?

TW: So the manufacturers, therefore, are coming up with automatic treatment selection things which are making it sound like the number of pulses a second you deliver matters and I genuinely cannot find any evidence that says the total number of shocks matters, the power level, how strong we make the hit matters. And treating at weekly intervals, that matters and if you want your key three parameters, to me, that's what the evidence —

APM: I guess instinctively, we all want to think that the tissues will respond at a specific frequency rather than simply at the number of hits but —

TW: When we talk about electrical stim, frequency matters a lot. When it comes to this mechanical stuff, if frequency matters, I can't find it in the evidence and nobody's ever pointed me to the evidence that says frequency matters.

APM: And you did say, as we were talking about TENS before, manufacturers come up with all these wonderful programs but actually, it depends entirely on the patient. So maybe there's a bit of an issue there —

TW: Maybe there is and if you will accept you will take a treatment at 8 hertz and you will not accept a treatment at 22 hertz, why am I going to try and treat you at 22 hertz? I do not need to treat you at 22 hertz and if 8 works for you then, hey, guess what I'm going to do?

APM: So clinically, we know this works for a lot of things and probably a lot more things are coming —

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TW: Probably more things than we've got listed, yeah.

APM: It's very simple to use. The only thing I'm going to look for if I buy one of these is the degree of confidence I have in the supplier, that I can get it replaced, repaired, serviced and so on and that I can vary the pulse rate, the shock rate —

TW: You want to be able to vary how powerful the shock is, how much energy is being pushed into the tissue. You want to have control. If it was me, I would want control over the frequency, not because it changes the clinical output but because it changes patient acceptance and therefore —

APM: How do you determine the power? What would be your deciding factor?

TW: Well, the research evidence, we know what the research evidence says on power. So for example, for your patellar tendinopathy, I would want to deliver something around 0.1...just down to numbers here, isn't it? But it's somewhere between 0.1, 0.12 mJ/mm², OK? Don't worry about it but that's just a dose. That's a power. That is an energy density, isn't it? Millijoules, that's energy, mJ/mm², energy density and you need a control over that and if you've got control over that and you've got control over the frequency, that's a comfort thing and you can deliver, preferably, with a choice of treatment head. So you can do larger and smaller bits of tissue. Job's a good'un, but that will have a life, you know...this barrel will need to be replaced and typically, that's probably going to be between 2 and 3 million shocks. That's going to need a replacement. So if I'm looking at the cost, bear in mind there's a cost for this and there's a cost for this.

APM: How much do they cost?

TW: I don't know. No idea.

APM: Haven't got that far yet.

TW: I'd have to ask the man or whatever but...yeah, so when you're pricing up, "What is my actual cost?" you could...if I were you, I'd take into account both things but you can get these on lease and again, I'm not selling or promoting anything. Companies will do these on lease. So if you're not sure...if it was me and I'm tight, I'm going to get one of these on a lease. I'm going to see how well I get on with it. If I get on well then great, I now know and I'll get them to take the lease price off the purchase price. They're going to kill me for saying that but, hey, I've just said that. That's what I'd play, "OK, look, I've had this off you, I paid six months lease on it. I'm pretty good. The patients are getting better. I'm getting a response, getting a bit of a reputation so I now want to buy one. I've given you six months money already. Give me a balance on that machine. Thank you very much."

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APM: Well, we better move on —

TW: We better —

APM: If we can find out before the end of the program what the running cost of the treatment head is, how much we have to pay for that to be serviced or replaced...which we might be able to given that we've got a rep in the room —

TW: We might able to find —

APM: And we will pass on to our audience but let's move on. What are we going to do now?

TW: Any more questions on shockwave that we need to tackle? We need to move on.

APM: No, we're okay on that. We're going to move on now to muscle stimulation.

TW: Muscle stim, OK.

APM: So what's muscle stim? It's the same as TENS, isn't it? Because you can stimulate muscles with TENS.

TW: It's like a TENS and, you know, strange you should say that because we talked about TENS before and I don't want to go back to talking about TENS but I do want to outrageously use a TENS machine to do something a TENS machine is not supposed to do, all right? So a TENS machine is designed to stimulate the sensory nerves and when we talked about TENS before, we were talking about using it as a way of stimulating sensory nerves to activate either the pain gate or the opioid system where we were changing the settings on the machine to do that. A TENS machine and a muscle stim are not massively different. We talked about this before, all right? In the TENS machine, it's very good, efficient at stimulating sensory nerves. Your muscle stim is very efficient at stimulating motor nerves but they're not exclusive. Your TENS machine doesn't only stimulate sensory nerves and your muscle stim doesn't only stimulate —

APM: What's the difference, the frequency or —

TW: There's a couple of minor differences we'll talk about in terms of how clever the settings get. OK, so this is a cheap as chips TENS machine. Don't worry about who makes it. It's cheap. It's a 10 pounder, 12 pounder, all right? And I've got it stuck over my forearm flexors and I'm going to put it on a low frequency. So I'll stick it on two hertz. Turn it on, actually very —

APM: Better hold it on the other hand.

TW: Very silly doing it with your stimulated hand, Tim. Try this one, OK. So if I turn

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that up, I can feel the tingle now but that doesn't mean anything —

APM: We can see the muscles activating here as well.

TW: But if I keep going, right, I've now gone beyond the tingle. So I've now got a TENS machine firing twice a second and my muscle is firing twice a second. A TENS machine is not a muscle stimulator but the motor nerve is firing and if I turn it up to ridiculously high levels, my muscle will fire. That's not comfortable. I would not do that to a patient. That's unpleasant but it happens and if I turn the stimulation frequency...so if I make it fire more times a second...so let's go to...where can we go on? Go on to about five. Whoa, love it, right. So the stimulator is going five times a second. The muscle is going five times a second. It doesn't have a choice. The muscle doesn't say, "Oh, for heaven's sake, Tim, why don't you get a muscle stimulator?" The muscle, the motor nerve is firing because I'm forcing them to fire.

APM: So in theory, there could be some benefit from this.

TW: In theory, I've got no idea what the benefit is apart from a whole lot of pleasure but, you know, it's crazy —

APM: You're going to tell me that you use it on erectile dysfunction again in a minute, aren't you?

TW: It is being used on erectile dysfunction, yes, absolutely right. So if I go up to 10 hertz...we're going to get in trouble on this one, aren't we? We're going to attract the wrong audience. There we go. You see...I don't know if you can see that. That's 10 hertz. So the motor nerve is firing 10 times a second. It's got no choice. The muscle is firing 10 times a second, lots of little twitches and you know as well as I know that if I...that's the wrong way. If I turn that up, faster than that, there's going to come a point which is...on me because I've done this so many times. I know it's just over the 20 hertz mark. So whoa, that's about there. TENS machine firing at 20 times a second, that's not twitching anymore because the muscle...sorry, come back. The stimulator firing 20 times a second. The first impulse goes down the motor nerve, the muscle twitches. Before that twitch has subsided, the next impulse arrives. So now, I've got partial tetany. That's not full on tetany because if I want to...I'm not going to touch the machine. If I want to, I can overcome that.

APM: There was some effort involved in that.

TW: Yeah, there's some effort. I can overcome it and let it go, goes back to a contraction state. If I go faster than that —

APM: Is this Faraday's law or something —

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TW: No, it's not Faraday.

APM: No, it's three fingers, electro...

TW: That one, sorry. Yes, Faraday's rule of thumb, yes. Right, if I go up to about...on me, it's just over 30 hertz. So let's go up to 35, whoa, which is about there. Remember, this is a TENS machine, not a muscle stim. Very silly way of doing this. I'm just trying to make a point. That is now in a tetanic...that's tetany, all right? And there is nothing in the world I can do that stops that contraction being a contraction. The only way to stop that is to turn the machine off, all right? There's no clinical value in doing that apart from patients you hate, won't say thank you, won't bring you chocolates.

APM: And a whole lot of entertainment brought to our audience —

TW: I'm sure it's entertaining the crowd then fine but that's not therapy. All I'm doing is demonstrating that if you get any stimulator, you can make a muscle fire. Right, so...but you're not making the muscle fire. You're making the motor nerve fire which is making the muscle fire. I know that sounds pedantic but that's what we're doing. Right, that's really quite enough of that. So if I can do that with a TENS machine then why do I need a muscle stim? Because a muscle stim is bigger, it's more expensive and it's got a whole lot of things on it. Why do I need that? Well, because what I've just done makes for a great camera demo but it's never going to be acceptable to a patient. So what I'm doing with a muscle stim is I'm getting the machine to have that effect, the contraction effect but instead of just bringing the contraction on and leaving it there forever, it's bringing a contraction on, hold, let go, have a rest. Bring the contraction on, hold, let go, have a rest and that's what the muscle stimulators are really doing that's different. They're putting a pattern into this and the patient is working with the pattern. They're working with the machine. You can...and I'll use this machine because it does everything I'm going to ask it to do today. Again, I'm not promoting or advertising. It's up on the website as one of the machines. All the manufacturers have got these machines. That one's from...and again, they've lent it to me so I'll tell you who it's from, a company called Win Health, W-I-N, who were kind enough to lend it to me to do clever demos tonight but, you know, there are loads of machines out there. So if I put that machine on and I'll...it does a lot of things, all right? But I'm just going to try and show you, let's say, something fairly basic. So it's set up...and I can do lots of clever things. Don't worry about the screen but I've told it I want it to work me for five minutes. I've told it that when it makes my muscle work, go at 30 hertz. Thirty hertz was...remember, that was the beginning of when I get that full on contraction. When it's having a rest, I don't want it to do zippo. I've told it to stimulate at four hertz. So it's going to do some work, contraction and then rest and while it's resting, it's going to do that twitching thing. That will help the local blood flow and I've told it to work me for 10 seconds and rest me for 10 seconds. Now, let's just assume that that's a sensible thing to do and let's assume...I can't remember which channel I'm

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attached to and let's do it. OK, so I'm turning that up now and it's producing a contraction. That's enough of a contraction. So now I'm going to let go. So the machine is now going to do what I've asked it to do, all right? Bits of rest, bit of twitching and then when the twitching finishes...I'm going to get 10 seconds of twitching because I told it to. Yeah, right, that stopped and now it's going to go back into a contraction. If I did that with just the machine, I would actually get an increase...if I did that for half an hour every day, I would get an increase in strength over maybe a 3-week, 4-week period, all right? If I use that and if...when the machine makes my muscle contract, I join in. I actively join in —

APM: With the contraction or —

TW: No, with the contraction so that it's now telling me to contract. So I'm going to join in much as I can, much as I can, much as I can and when the machine stops stimulating me, I let go as well. OK, now I rest. If it wants to do a bit of twitching, fine, just let it twitch. I don't want to join in with that. Now, that, A, means I am doing something because I am joining in, B, the machine by itself will have an effect. I'm adding to that effect and that's about as simple as you would want to get. You can't do that with a TENS machine because you can't program that cleverness and that's really simple but you can't program that.

APM: And you're going to send people home with this, aren't you? Because you —

TW: Yeah.

APM: How many times a day or a week are you going to want to do this on a damaged muscle?

TW: On somebody who had muscle damage or an injury where I needed to do this kind of treatment, ideally, I'd be wanting to do this to them every day. I got a big pile of questions brewing up here. You want to do that to them every day, probably 30 minutes a day. There's no way they need to come into the clinic because they don't need me to sit here, watching the machine while they watch the machine.

APM: You made it sound as though it's very complicated to come up with the right protocol for this machine —

TW: We know what the protocols are.

APM: So for this machine...and it does work, unlike TENS where you can't say, "Hit this button. It's right for everyone."

TW: But on a machine like this, if I just keep going back...and again, you won't be able to see it on the camera so I'll not try but there are lots of protocols. So if we go into the stim thing, it's got a number. It's got 1, 2, 3. It's got five on there. It's got five preset protocols, one of which is for incoherence, one of which is for

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pain, one of which is for rehab, etcetera, etcetera. So you can use their automatic protocols but in the therapy world, we know if you...this is a fairly silly place to be doing this, isn't it? But if you wanted to help me strengthen my wrist flexors...maybe I had a nerve lesion or my wrist flexors were weak. I've been in plaster for 10 weeks with a scaphoid and I've come out and my flexors are really weak. You want me to do some exercise and if I just do the exercise, I will get better, all right? If I use this in conjunction with my active exercise program, I will get better in less time. So I'm not using it as an exercise replacement. People get the wrong end of the stick. They think of slender tone and all the rest of it. It's not a replacement for exercise. It's to use in conjunction with exercise if you want to play the evidence game. If you just want to give the patient or lend the patient a machine, charge them, of course. You bought this. You can charge it out £10.00 a week. So you can say to the patient, "Look, just plug yourself into this and go. Do this every day while you're watching EastEnders and you'll get better." It's not completely true but it's not a complete lie. You will get better—

APM: It will make a little improvement.

TW: --a little bit if you use the machine every day and all the time the machine is telling you to contract, you join in. You'll get a better result, all right? So imagine...OK, so that was fairly simple. We're not going to get too complicated here but imagine I run the other lead set on to...because I've had a scaphoid. I just made this one up, haven't I? I have the scaphoid fracture and it's not only my flexors that are weak, my extensors are weak as well. So I plug the other channel into my extensors and then I tell the machine, "Make the flexors do their thing for 10 seconds then give them a rest. While you're giving them a rest, get the extensors to do their thing." So you've now got automating. If you want to, you can make them both go at the same time. Absolutely crazy but the machine will let you but, you know, I'd be going for muscle groups, I'd be going for automating muscle groups and that's kind of useful.

APM: And it's easy enough to be able to tell a patient how to do that once you send them home.

TW: If you came to see me, I could teach you how to use this machine, where to put the electrodes and how to use it, 10 minutes max, 5 minutes probably. If you have half an ounce, five minutes. Ten minutes will get you there without any problem and patients like it because, A, they don't have to come in and see you, you like it because you're earning money even though you're not doing anything because you're renting the machine out to them, the patients like it because —

APM: And you get good clinical results.

TW: And you get clinical results, you know. What's to lose, you know? So you can do that then you can do some additional things but that's...I'll show you a couple of the other things in just a moment but that's the essentials of what it was we were

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trying to do, all right? So if —

APM: If I can interrupt you there, the one question that's come in about this from a patient is that...from a viewer is that they were concerned that this was something more appropriate to hospital use rather than clinical use but everything you've said about it is actually domestic use but with a clinical guidance.

TW: It's domestic. Absolutely, I'd be using this and whether you've got a machine like this which was a bit clever or whether you've got a more basic one...and you can get...I didn't bring one with me tonight but you can get some really, really basic ones, you know, £30.00 and I don't mean weight. I mean £30.00 as in cost. For a £30.00, £35.00 machine, you can get it to do what I've just done there. You can get it to do contraction, hold, let go, contraction, hold, let go and you do not need a big clever machine. This machine is clever because it does lots of things, all right? And if you know what you're doing with this, it's stunningly effective.

APM: We're going to need to move on very quickly about this—

TW: Because we're running out of time.

APM: --because we're running out of time because as always—

TW: We're running out of time.

APM: --we get quite excited about these things. Quick question, one viewer's asked whether it has any benefit in Parkinson's and perhaps even stroke as well.

TW: It used to be said that you never use any electrical stimulator on ~~muscle~~ in a central nervous system patient problem, so stroke, MS, Parkinson's. There's now a very substantial body of evidence on stroke that says this facilitates recovery. So yes, I'd use it in central nervous system. The old story is never do, the research says, "Go and do it. It works."

APM: So you've got two more minutes —

TW: I've got two more minutes, right, OK. So if I just do the naughty thing and just take those off and then put them on my extensor group now...so what I'm going to do is the same kind of simple thing. I'm now going to stimulate my extensors instead of my flexors and I'll leave it on the same program. No, I'll change the program very slightly. I'm just going to get rid of that twitching in the middle. So I'm now going to have one channel on the extensors, 10-second contraction and when I do the 10-second contraction, it's going to make my extensors work just like it made my flexors work. Here we go, whoa. All right, that's the machine. I'm not doing anything. That's the machine, all right? And let go. What I'm going to do now is next time that contraction comes on, instead of me working with the extensors, I'm going to work against the current, all right? So effectively, here it

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comes. It's on. The machine's making me extend. I'm working against it. That's eccentric. Let go. Eccentric, let go. So I can now, you know...your imagination is the limit here, not the machine. The machine will do clever things and you can get the machine to do a marvelous array of things. The patient's working with it, the patient is actively involved. It's not passive. I'm working, let go. I'm working, let go. That's quite hard work. If you do that for 30 minutes, you're going to be knackered at the end of 30 minutes —

APM: And that's the sort of length of time you will be setting somebody a program on this.

TW: Yeah, I'd be setting them up for doing that 30 minutes a day and if they did that for 30 minutes a day...if nothing else, it's reminded them to actually do something —

APM: And we could do it in the office, couldn't we? If it's not the dominant hand —

TW: They can do it in the office. They can do it watching the telly. They can do it...washing up probably's a bit iffy but they can certainly do it while they're sitting there watching the telly.

APM: Once a day is enough?

TW: Once a day. We could do all day on that but we haven't got all day, have we? Because we got to move on.

APM: A couple of things have come in though. From our expert in the room, I have learned that a replacement head for this costs £350.00.

TW: There you go. That's the answer.

APM: So that's every two million shocks and that's not too exhausting.

TW: That's not a killer.

APM: One of the questions was would you be safe using that on the neck at all?

TW: Yes, people have used it on their neck. People have used it on trigger points. They've used it on upper fibres of trapezius trigger points.

APM: Specifically, they want to know of any problem with baroreceptors or —

TW: No. I wouldn't come on the front. I mean, you know, back of the neck, side of the...you know, paravertebral, yeah. I wouldn't be coming under the jaw line but yeah, no problem on the back of the neck. It may not be nice, may not be comfortable but, hey, we're not talking comfort here. If we want comfort, we

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want a nice heat pack and lay down in a bubbly bath.

APM: Right then. Let's move on. Tell us, what's the evidence... what's the point of a vibration plate?

TW: Vibration plate started off as a trendy thing in the gym. I don't mean trendy in a disparaging sense. I mean trendy as in that's where they got trendy. And the idea was that you exercise on a plate which is mechanically bouncing around. Not earthquake bouncy but just a very fine tremble and it was supposed to enhance the effect of your exercise —

APM: And there's some logic in that —

TW: There's suppose logic in it and there's evidence in the sports science and the sports physiology world, there's evidence out there that says, "That's jolly well true." So if you do quads exercise or, you know, the equivalent of a squat, half squat and you do it on a vibrating platform, you get a better result. So that's been creeping... over the last 5 years, 8 years, that's been creeping into the therapy world on the basis that if it's good for exercise, if it improves the exercise outcome, why don't we do that with patients? So it started in sort of the sports injury rehab world and it's sliding further and further. We're now... if we look at the evidence base, it goes from the elite sportsman to the professional sports player who's trying to reduce their recovery time after exercise down to the patient who's had knee surgery and wants to strengthen their quads after the surgery, down to elderly patients who are not ill, nothing wrong with them but their propensity to fall and their balance is diminishing with age. If they exercise on a vibrating platform, their propensity to fall is reduced and their balance is improved. Now, it's probably neural as well as being muscular but the fact is... and there's places in America, there's care homes in America that now routinely have these available to their elderly residents and they encourage their residents to participate in exercise on the balance platform because it reduces their risk of falling. These people are in commerce, they do not put these in there for the will of mankind. They do it because it works and if their elderly people fall over less often, they've got less bills to pay.

APM: In some of the research that I was looking at about vibration plates... and as you say, there's a lot of it around. You said there's about 2,000 papers you've seen.

TW: I've got a couple of thousand papers on them, yeah.

APM: The manufacturers of the plate that we're going to look at have given me about 36 to look at which I presume is because those are the ones that looked at their plate —

TW: It is a plate which happens to have been, you know... there's a fair amount of research on that particular plate. So that's why.

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APM: But I noticed in the tests, there was a lot of evidence for stuff like sit to stand was improved, reaching from a sitting position was improved. Balance was improved —

TW: A lot of that's with elderly patients and a lot of that has to do with improving core. So if my ability to lean forward without toppling out of the chair is reliant to my core and my core stability which is a bit trendy at the moment, you know, that kind of...that's useful and if...when I get up out of the chair...sorry, we're probably getting out of camera shot here. If I'm disappearing out of camera shot then I'm probably just...if I'm getting out of the chair and that's the point at which I'm likely to fall, if it improves my capacity to do that and therefore, reduces my risk of falling then, hey...now, you can get that improvement with exercise. No one's knocking the exercise element. All we're saying, all the research evidence is saying is if you combine the exercise with the vibration element, you get a better result and it takes you less time to get there just like we were talking about for the other element —

APM: We better have a look at this, don't we? Since we've got one here—

TW: We have got one.

APM: --we'll have a look at this. Now, this has been provided to us by PCS Global. It's called a Power Plate and I'm going to mention that not because I think it's a brilliant machine, I know nothing about the machine, to be honest, until you tell me about it but they were kind enough to let us have one at very short notice. So we're going to try this. This is a brand new model, apparently, because it's portable.

TW: I think this is portable, yeah —

APM: And it costs about £1,200. So that's actually —

TW: See, it's relatively cheap. The clinic machines, the ones we tend to use in the clinic are like that but they tend to have a sort of hold on bar just like you'd have on a treadmill, whatever. So there's a bar that you would hold on to but, well, this is —

APM: Now, what we need is we need its controls. So let me get those.

TW: So we'll take the straps off for the moment, all right. So if you —

APM: You can have the controls.

TW: I don't know how you work this —

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APM: It's the same as those. Now, this has got on it...it's got a play button which gets it going. It's got a repeat button. It's got the timing and apparently, you can set it for 9 minutes, 1 minute or 30 seconds and it's got a power button. So there's two settings on power. In terms of power, what does that change —

TW: It really changes. Well, the thing with the vibrating platform...because some of them vibrate laterally i.e. you got a side to side vibration, some of them vibrate vertically and it tends to be...the vertical vibrations are the ones that people are getting the best strength changes from. The lateral vibrations are the ones people are getting the best balance and falling effects on. So —

APM: So if I stand on it —

TW: So if you stand on it...now, it is off.

APM: I know I'm going to be facing the wrong way on this machine but it doesn't matter which way around you stand but I don't want to turn my back on my audience. So I'm going to stand this way around. Here I go. OK, it's quite wobbly —

TW: It is. Right. So effectively...the machine's not on. We're not vibrating anything. Effectively, what you could do...if you imagine you're going down into...let's just go into quarter squat, a half squat. That's more of a quarter. That's half a squat.

APM: Like that?

TW: So yeah, that's fine. OK, so you're elderly, a lot more elderly than you really are. So you're —

APM: I'm not asking you back

TW: Right, you can go back up. Sorry, you don't have to stay there. It's not a —

APM: I thought it was a test.

TW: It's not a ski training. No, the ski training's next time. Right, so effectively, you're a bit of an old codger but I'm trying to improve your quad strength and reduce your ability to fall, all right? And a squat will clearly improve your glute, your hammies and your quads. So I'm going to get you to do those quarter squats, just in your own time, nothing...I'm seriously not trying to pressure you into anything, except that we're going to add the vibration, right.

APM: So I'm going to do that, I'm going to sound like Darlek.

TW: You are going to sound like a Darlek while we're going. Right, so actually,

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vibration, we're talking about millimetres. We're probably talking 2 mill, 3 mill vibration here, OK? I'll turn that off for a sec. Right, so —

APM: I tell you what, it's really uncomfortable with your legs straight. Once you've got some —

TW: Once you've got some flexion up there- but all the time your legs are locked out, you've got a vibration—

APM: It's going straight up to the skull.

TW: --going straight up through and it will go up. So all we're getting you to do...and that was really simple but all we're getting you to do is to do an exercise that is going to help you anyway. We're getting you to do it on a vibrating platform and this is the kind of thing you could do at home. That's why it's basically at the moment in gyms. People are using it in clinics and rehab centers. So we're simply adding a vibration to the existing exercise and therefore, apart from the fact you can hear that buzzing, that vibration is so small, you can't see Steven shaking. OK, If you can see the pen- very good demo. Why didn't I think of that?

APM: You're not the bugger that's having to stand on this plate.

TW: Because you're the TV star and I'm not. I'll let you go, all right. OK, so that's all you're doing as you're...in its really simplest sense. Now, people get really clever...and I'm not going to try and do this but they'll use that as a platform and they'll do pushups and they'll use the vibration. I'm not desperately convinced about that kind of stuff but certainly...sorry, do you want to park yourself back in your rightful position? Just like we talked about with the other modalities, people were finding, initially, that they were getting good effects on strength training. That's where it started. It then expanded into the older people, balance, falling, posture, activity, control stuff and they were getting good results. They're using it...they have now used it...and it's not just like one research paper. There's probably...I'd probably find you 100 research papers, I reckon where they're using it on patients with stroke. They're using it on patients with...children with cerebral palsy, spasticity, again, a whole range of things. So the range of things in the clinical domain for which it's being used, Parkinson's, lots of neuro work going on because exercise in neuro is good but it's quite difficult for some neuro patient...I shouldn't say neuro patients. That's derogatory, isn't it? Patients with neurological problems, it's quite difficult for them to manage exercise and the vibrating platform is adding benefit. The moment it and what did you say it was £1,200 or something?

APM: I believe this one's about £1,200. I suspect that's without VAT.

TW: Whatever but that's still not cheap like a TENS...it doesn't do what a TENS machine does but it's not cheap, isn't it? It's not a throwaway piece of kit but in a

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clinic, and certainly, if you've got a clinic where exercise is part of what the clinic does...now, a lot of clinics have a gym area or an exercise area or they do exercise with them in clinic. There's an argument for actually having a clinic one I certainly know of a number of clinics where they have got a couple of these in and the patients come in and pay a nominal fee to actually use the machine in the clinic. So they're not actually seeing the clinician. They're not seeing the physio or the osteopath or chiropractor. They're coming in, they're using the platform in the clinic, in a cubicle which is set aside for doing that thing and they're using it in that way and therefore, the clinic is making some money. The patients are getting the therapy that works and they're not soaking up therapy's time in doing so.

APM: There were some useful research, wasn't there, about these things being good for obesity as well? It was suggesting that it did have a longer —

TW: Long-term benefit.

APM: Follow-up was over a year in the research that I read.

TW: There was a one-year follow-up and they were getting weight loss but then the weight loss could be because the client was exercising, all right? But if it was just that then the weight loss wouldn't be sustained and they followed these weight loss clients up and at 6 months, and at 9 months, and at 1 year down the line, they've actually sustained their weight loss which is unusual. So it looks promising on that front. There's a small amount of research. It also looked promising, and we touched on it earlier, we're always coming full circle here, with the BMD, the bone mineral density and the osteoporosis because that mechanical vibration...we know mechanical stimulation helps stimulate bone density changes and there have been trials done where you get a group of people who are osteoporotic or have osteoporosis. You have a controlled group who are effectively just sitting there and you monitor their bone density. You have an exercise group who are actively participating in exercise and you have a vibration group who are participating in the same exercise but with the vibration and you monitor their bone density and the vibration plus exercise makes a significantly greater effect —

APM: I'm interested to hear you say that because I thought, actually, that it hadn't shown any greater effect than exercise alone in bone mineral density but what I suspected was that, actually, there'd be greater compliance with something like this because it's easier doing this exercise—

TW: It's easier.

APM: --than going for a walk in the rain.

TW: Absolutely. So there's an element of that in there but actually, when you take the

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range of research, it's at least as good as exercise and if you do the exercise with...if you just stand on the vibrating platform...and say the vibration will make my bone stronger. Well, you know, I really don't go for that one but if you combine the vibration with the exercise, you get changes in density. For some people, patients with spinal cord injury, some of the elderly patients for whom exercise is problematic, a minimal exercise on a vibrating platform appears to be of relevant benefit when it comes to bone mineral density. So therefore, that's, you know...it's got potential. In the therapy world, I would suggest it's still seen as the newbie. People are not quite sure whether it's just hype. Is it just the manufacturers trying to flog you a new bit of kit or is it actually something that we should be entertaining in the therapy world? I guess to a large extent, it depends on your client base.

APM: There's one bit of research that you haven't mentioned. I saw, also, that training on the vibration plate has a beneficial effect in reducing the risk of diabetic neuropathy and that's quite a convincing —

TW: That's quite convincing but there's a number of pieces of research that look at diabetic neuropathy especially...I think it was on the news that 1 in 11 or something in the world that are going to be diabetic by the end of the decade. It's not looking good. Yeah, exercise is beneficial but it looks like the vibration, whether it's a mechanical effect on the nerve or whether it's a mechanical stimulus doing something to sensory nerve behavior, I don't know and I don't think anyone knows but yeah, absolutely. So you've got a range of things from strength training to recovery after activity to balance in elder people to neurological benefit from kids with cerebral palsy to patients with Parkinson's. You've got bone mineral density, you've got blood flow. You've got diabetes. I mean that's...it's almost like, "Oh, my god, what doesn't it do?" And then some of those things, it's going to turn out to be really good at and some of those are going to be pretty marginal and I don't think we know yet but people get caught in the hype. That's what it is. It's not just hype. There is something real in there.

APM: We will move on from that. We're going to move on for two reasons, I'm fed up with being called an old codger.

TW: I kept saying, "Pretend you are."

APM: And now I've got viewers saying, "I've got a stiff left hip when I'm in flexion and I think I need to find a good osteopath." So I'm getting stick from both sides!! So anyway, we'll move on from the vibration plate. It was provided to us by PCS Global. There are other manufacturers, of course. If you look at powerplate.com, you will get access to quite a lot of the research behind the plate.

TW: They are good because they do put...I'm not advertising for them—

APM: No.

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TW: --but they do put their research up there.

APM: Well, they put their research up but actually, it's abstract but they have put up the research which isn't showing any benefit as well. In particular, they're showing that it doesn't have any benefit, they've said, in treating OA but there's a lot of papers there to look at. You have to form your own opinion about the quality of the research because as I say, all you're seeing is the abstract and some of them could be a little bit iffy but we've got a few minutes left. We need to move on to your final little —

TW: My final hit for the day. Right, my final hit for the day was just to let people know...and again, I'm not promoting or endorsing or advertising any more than I have been on any other activity. A slightly different way of delivering ultrasound. This is from a manufacturer, well-known manufacturer. So it's Enraf based over in Holland. So what they've come up with...and it really won't take long to demonstrate, it's an ultrasound machine. So inside here, we have a fairly standard ultrasound treatment head, all right? It's encased in...I guess some people would assume —

APM: A sink plunger.

TW: It's like a sink plunger. We used to do interferential with applicators like that.

APM: I remember.

TW: So what we're doing is, effectively, we're using a solid gel disc instead of squirty gel because if you put squirts of gel up there, there's a vacuum running up here and all you're going to do is suck that gel into the back of the machine. It gets pretty unhappy pretty quickly. Right, so you use a solid gel pad and you put that over the ultrasound treatment head. You, effectively...what you're going to do of course- if you can just hold that in place, I can press the buttons and then we stand a chance. Right, so that should be...that's fine. Right, so what we're doing now is we can-this will operate as an absolutely standard ultrasound machine. Any dose of ultrasound I want to deliver, I can deliver.

APM: Now, that pad is now in contact with your arm.

TW: That pad is now in contact with my arm. The pad is held on my hand, on my arm at 90 degrees, the supposedly perfect angle which most of us never achieve clinically because we lose concentration, all right? So the idea is you don't need to sit there doing ultrasound to me. You set the machine with your standard dose. The machine holds the ultrasound treatment head in place. It delivers the ultrasound that you've decided I need and it does it without you needing to be there. Some people think that's an advantage. I can see the logic of the advantage. It does not change the ultrasound that's being delivered, all right? All it's doing is

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it's changing the delivery method and historically, it's always been said that you must never have an ultrasound treatment head stationary on the tissue because it's dangerous. Well, that's just another myth but the manufacturers have gotten around that. There's a couple of little technical twiddles that go on in here that mean that is genuinely, absolutely safe to do. It's not dangerous to leave that in contact with the tissue, stationary.

APM: The danger is only if you've got reflection off a bone, was it? That was a standing wave which —

TW: You're supposed to get a standing wave and then you were supposed to produce cavitation and then you were supposed to produce all kinds of things. I'll turn that off. Yeah, you were supposed to get all kinds of things happening, most of which were only ever demonstrated in animals or under lab conditions, you know. The blood cell work, the stasis one where the blood cells start clotting was done in a chick embryo. Now, I don't know when the last was you treated a chick embryo but I don't think —

APM: Well, you should speak to my wife Claire because she's treated pigeons and she's treated... what's the smallest she's treated? I can't remember now —

TW: But an embryo, in the egg.

APM: Embryo, yes. That's rare.

TW: Pre-birth, pre-hatch, all right? Anyway, so it is perfectly safe. I checked the safety out on all these things pretty damn carefully. I do not want to be standing here, saying... or sitting here, saying, "This is safe," if it turns out to be rubbish. I've checked the safety out. It is a perfectly safe thing to do. You can get that machine with a standard ultrasound treatment head. All these guys are doing is they're offering it with that static treatment head as a new option. The only thing you've got to remember is do not squirt on that inside there because it's going to go straight up that tube and you'll have a very unhappy machine but it's an option. We thought we're going to run out of things to talk about and we didn't, did we?

APM: We never do, do we? We never do. That's why we get you back so often because it's always great fun. You've always got such a lot of information to share. We have actually come to the end of our time where we're going to talk about shockwave and vibration therapy and we've thrown in two added bonuses for the audience as well. It's a great privilege. Thanks. I really enjoyed talking to you, Tim, and that's a huge amount of information to share with our audience.

TW: Steven, thank you for having me.

APM: I'm sure we will get you back again in the future.

This transcript will shortly be replaced by a concise text summary.

TW: OK.

APM: Wow, that's it everybody. That's the end of this evening's CPD. I hope you've all enjoyed it. Thank you all for the questions. They are very helpful. I hope I didn't miss anybody's questions out this evening. If you've got more, send them in because we will ask Tim whether he likes it or not and we'll try and get the answers to you offline. Shortly after the program, there will be some credits in which you'll have the website for the Power Plate machine. If you need to know any more about the machines that you've seen this evening, again, send those emails into us and we will get the information to you as quickly as we can. Don't forget the things we've got coming up in the future. We have hypnotherapy as our next broadcast. We'll be looking at its effects in pain modulation in terms of its effect on the biopsychosocial system. We have cryotherapy. We have an expert in what he still prefers to call regional sympathetic dystrophy and treating hypermobility in children and I know he's going to be fascinating to talk to. He's treated a patient of mine with excellent results and you can see there's a lot of other things coming up on the program as well but don't forget the courses. We have Eyal Lederman in September in the Birmingham area. We have Laurie Hartman with a two-day course also in the Birmingham area. There are discounts for our members on booking those courses and do remember that they are few and far between. Very difficult to get on a Laurie Hartman course particularly so don't delay in getting your names there. We have, actually...we had one cancellation today for Simeon Niel Asher's course which is happening in 10 days time, just north of London. We have a couple of other places still available. If you'd like to take those up, do let us know as quickly as you can and we will get you on the course. That's it for this evening. I hope you've enjoyed it and see at the next broadcast.