Turning Electrotherapy On Its Head – Ref 192

with Tim Watson

6th October 2021

TRANSCRIPT

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Steven Bruce
Good evening, welcome to the Academy. Great to have you with us as always and, as you can tell, first time back in the studio for at least 18 months, apart from one show that we did. And we're all getting used to the setup where we've got cameras and camera people and all that stuff going on. And yeah, sometimes the host forgets that he's actually gone live. Anyway, what are we going to do this evening? I am talking to Professor Tim Watson this evening. We can't remember if it's his fifth or sixth show with us. But the last one he did, he said was going to be the last one he was doing because I think he retired from the university three years ago, but he's still working at the university, he's still talking about his specialist subject, which is electrotherapy. And as you will have seen from the emails that have gone out, we're going to be talking about various different modalities, we're going to be addressing your concerns about which therapies might be best for which particular conditions and any other concerns or worries about contraindications that you may have. And we're also going to be demonstrating some equipment this evening. We've called it Turning Electrotherapy On Its Head. I think that has something in common with a title of a book that's coming out soon by Professor Tim Watson. And he'll be explaining why we're turning it on its head. But Tim, fantastic. We've got you with us for the umpteenth time. I'm convinced it won't be the last time, I'm hoping it won't be the last one. It's always a joy to talk to you. You became a physiotherapist back when the tendon hammer was high tech, I think, and you've been teaching electrotherapy since. Are you still running the website electrotherapy.org?

Tim Watson
Yeah, the website's still running and it's still free and it's still open access. Until I run out of money, it's there.

Steven Bruce
So, as I've emphasised on these shows in the past, one of the great things about having you talking about electrotherapy is that you've got no particular axe to grind about this, everything you do is evidence based, isn't it? Although we're going to be demonstrating a particular bit of kit you're not going to sell it, nor recommended it. You're not going to tell us whether if it's any good or if it's not, and I'm sure you'll be able to tell other people what sorts of things they should or shouldn't buy if there's evidence to suggest that.

Tim Watson
Absolutely, but I'm really keen to point out that I don't endorse, people say, "Tim endorses our product." No, he blinking doesn't, I don't endorse, I don't advocate, I don't advertise, so if there's pictures on the screen or if we're using a bit of kit, I'm happy to work with a bit of kit we're going to be working me but I'm not trying to subliminally advertise it, that's not my game at all, never has been.

Steven Bruce
People might argue we've covered everything in the electrotherapy basics, because we talked about lasers and interferential and ultrasound and the shockwave and stuff and wobble boards, vibration platforms and things like that. But actually, things have moved on, there are new things which are being discovered that electrotherapy might work with. Shall we turn back to the basics to start? What's going on with TENS?

Tim Watson
Well, TENS have been around for a long time, since the late 1960s when Melzack and Wall were coming off the pain gate. It was part of the proof of the pain gate, so it's not new and the machines are not new. A TENS machine is nothing radical. The bit I was interested in, a couple of people have asked me through you, about electrode systems and the way we've done it in the standard world is to use these kind of pre-drilled, self-adhesive, five by five centimeter, standard sticky stuff. If you've got a patient with widespread pain, if you've got a patient, let's say rheumatoid, and they've got pain, every IP joint, all their MCPs and the CMCs and their thumb. Where would you put the electrodes? It's not a rhetorical question, but where would you put the electrodes to effectively get TENS pain relief, which it will do, for all those joints at the same time? And a few people haven't realised, which is why I'm pointing them out, and again I bought of different ones, so it doesn't look like I'm advertising anybody. These garment electrodes are really for that kind of problem, really very attractive. The advantage is that that as a garment is woven with a silver mesh. So that is an electrical conductor. And that will take the place of one electrode. So if I put that on my hand and connect it to my standard TENS machine, and I use one standard TENS electrode, stick it up in the arm, for argument's sake, when I turn the machine on, the whole of my hand is going to get the TENS at the same time. Now if I've got multiple, multiple joint problems or widespread pain in my hand, then that is a distinct bonus, it doesn't change the TENS, it doesn't change its efficacy, it doesn't change its effectiveness or its evidence, it's just a different way of making the application. And you can do that with sock electrodes for somebody who's got exactly the same thing, you just plug your electrode lead onto the sock. And that becomes an electrode someone with multiple pain in their foot, widespread pain in their foot, that's a real bonus. We've been doing some blood flow work and I've talked about this on a previous occasion, blood flow work with electrical stimulation, and those kinds of socks are great. But the other sneaky, good one is a sleeve, which are pretty universal.

Steven Bruce
It's like Tubigrip.

Tim Watson
Yeah, it's exactly like Tubigrip, it just happens to be silver, conductive Tubigrip. So I could put that on, for example, up around my elbow. And if I have a patient with widespread elbow pain, or widespread knee pain, I'm not going to roll my trousers up, everybody will be unwell. But you know, you can put that wherever it fits, and you can get small ones and large ones, I could put that on-

Steven Bruce
Where's the other electrode if you're dealing with elbow pain?

Tim Watson
It doesn't matter, it can go up on my shoulder, it can go down on my hand, it doesn't matter, it genuinely doesn't matter. But I could put that sleeve on and that glove on, one lead goes into there, one lead goes into there. And for a patient with one of those really widespread pains from their lower arm right down to their fingertips, I've got the whole blinking lot. You can use these over and over again, you can wash them, you can rinse them under the tap, you can stick them in the washing machine, take the lead off, but you can stick them in the washing machine. And I've certainly got patients who've used these, and they've washed them every week and a year later, they're still using them.

Steven Bruce
How much are they?

Tim Watson
If you shop around, I'd visit Google, but if you shop around, you probably get them as low as about 10 pound, 12 pound you can pay more, but if you're tight like I am, if you're tight then you pay, you know, buying expensive doesn't mean you get better treatment just means you've wasted money. So I just buy them cheap.

Steven Bruce
I'll tell you what, though, I mean I think it's worth us going over some of the things you said previously about TENS because there will be a lot of people watching this evening who didn't see the previous show.

Tim Watson
Someone's missed it?

Steven Bruce
After this they'll probably go back and watch it, but the thing that struck me when you first, God knows how many years ago, when you first talked about TENS was saying that most TENS machines are equal but it's all individual. So the TENS machines you buy which have preset programs are going to be less effective overall than the ones where you can fiddle with the controls.

Tim Watson
The point about TENS is, firstly that your classic TENS which is that high frequency tingley buzzy sensation TENS, which we would call normal TENS or conventional TENS. That kind of TENS works when it's on. Once you turn the TENS machine off, the carryover pain relief you get is pretty minimal. And when I recently tried it with acute low back pain, I didn't volunteer, I just copped it, and it was outrageous. And I now have more sympathy for my patients than I ever had. It was taking me 15 minutes on all fours to crawl to get to the loo, horrible. I stuck my TENS machine on, and I put it on absolutely full whack and I stuck it on for as many hours a day as my battery would last. All the time it was on, I was getting good pain relief. Once I turned it off, within a limited number of minutes, 10 minutes, 15 minutes, that pain relief was starting to ease off.

Steven Bruce
I thought if you're on the low frequency...?

Tim Watson
The low frequency works by stimulating the opioids and you get a carryover with that, but for the acute pain, you're more effective at the high frequency and that works while it's on. And then you see these pieces with people saying, well, the current NICE guidelines or the Cochrane Reviews say don't bother with TENS for low back pain because the evidence doesn't support it. Well, the evidence they've included is patients who've got acute low back pain, they're being given TENS in the clinic for 20 minutes, twice a week. So therefore you're giving them pain relief for 20 minutes twice a week and the rest of the week, which is quite a lot of the week left over, they're not getting any pain relief.

Steven Bruce
And after we spoke to you before, I mean we immediately in my clinic invested in, I don't know, half a dozen, a dozen TENS machines and we started either selling them or renting them to patients, because they're so bloody cheap, they can afford to buy one and if they get the settings right...

Tim Watson
If they get the settings right, which I'm pretty sure that was the focus of your question, the thing about the TENS machine is that we know roughly what kind of stimulation frequency is going to be effective. So with acute pain, you want it up and around about 100 Hz, 100 stimulations a second. You might get your best pain relief at 90, I might get my best one at 115. Who knows, but it's around about 100. So the trick is to teach the patient where to put the electrodes, how high to turn this up. And it's got to be a strong tingling sensation. That's the level, it doesn't matter whether you get that at number one, or you get that at number six, who cares, it's what it feels like. And then you fiddle with the frequency dial, and if you think you get your best pain relief at 90, you don't even need to look at the dial, just feel it. If it feels best to you in that position, then that's the position you use it in. And it will be different to my position. That's just a difference between your physiology and my physiology.

Steven Bruce
Is there a range outside which is never effective? You've mentioned 90.

Tim Watson
I mean, most people with acute pain will get their optimum somewhere around 80, at the lower end, up to about 120, 130 at the other end. So if you imagine a range between about 80, up to about 130. That's the kind of range which most people will find effective for acute pain. For the chronic pains, we're coming down to the low frequency, five Hz, five stimulations a second or less. And that works for the chronics, because it is stimulating the opioid system, which we know clinically is more effective for the chronics. That does have a carryover. So I can do an hour's worth of TENS at low frequency and I might get two hours worth of pain relief after I turn the machine off. But in the acute setting, where we're going high frequency, it only works while it's on. And my biggest beef about the research, and there's a lovely couple of studies that have come out in the last few years from a group over in the state of Iowa, and they demonstrated over and over again with scientifically strong research, it works when it's on. And therefore doing it twice a week and your last TENS treatment is on a Thursday and your final assessment is the following Monday. And it says, oh, it didn't work. Of course, it didn't blinking work. The last TENS you had was four or five days ago. It only works while it's on. But it does work. It does work. So the TENS I'm talking about is not news, the TENS we were using 20 years ago, all I'm saying is that there are a range of application methods which make it easy for patients. If a patient's got rheumatoid, if the patient's got OA, multiple OA in the fingers, and it hurts, then TENS is going to provide them with significant pain relief. And it's going to give them function, that means it going to get them quality of life. Why would that be a wrong thing to do? I would happily do that. All I'm suggesting is that is a lot of an easier way of achieving it than trying to work out where to stick to the dose to get you the pain relief you want on all five fingers. That's not going to happen, is it?

Steven Bruce
Without wishing to beat the nail out of sight here, you can go into a Lloyds pharmacy or wherever and you can buy TENS machines which have got these programs in them, should people be wary of those?

Tim Watson
I'm sure we're going to come to it when we look at the shock wave and play around with the machines later. Personally, I'm a control freak. And I like to have control over what the machine is doing. Some of these have automatic programs on; the frustration is that if the automatic program says acute pain, and you press the button, and it decides what's best for you, if it decides that 100 pulses a second is good for you and actually your best pain relief is achieved at 120, the automatic program has just missed your best pain relief. So I mean, I'm not saying they're wrong. I am wary, but I've got some idea what the buttons do. And I understand why from a patient's point of view going into Lloyds or going into Boots, buying a machine off the shelf and taking it home and trying to set it up from the book is not the easiest thing to do. If I get the patient to buy a machine, I would show them how to use the machine and then they will get the max out of it.

Steven Bruce
We've already mentioned your website, there's a mass of information there on how to set up TENS and how to use it and then of course all the references. We had a question coming in from somebody anonymous, he says can you use TENS on the neck?

Tim Watson
You can. It's advised that the anterior neck is worth avoiding. So imagine there's a zone between your jaw line and your clavicle, just unless you're pretty damn sure what you're doing, stay out of there. You can vagus nerve stim, but if you start stimulating the vagus nerve and you don't intend to, clearly that will have some fairly unforeseen circumstances, but I've no problem, lateral neck, posterior neck, no problem at all. I will do anterior neck, but I'm doing it in the clinic under control and I'm keeping my eye on what's going on. Vagus nerve stim, there we go, there's the first topic for next time. I think vagus nerve stim is becoming very trendy. And people are using TENS-like machines to stimulate the vagus nerve to try and have effects which are fairly central. But that's really at the moment, that is desperately not a routine for that kind of thing. That's on its way in.

Steven Bruce
Somebody says that they had a bit of a problem seeing what you were doing at the start and they were asking whether those gloves were for rheumatoid arthritis. They are, aren't they?

Tim Watson
They're for anything, we use them in complex regional pain syndrome, we use them in rheumatoid, we use them in osteoarthritis, we use them in patients with peripheral nerve lesions, where we're trying to do sensory reeducation or stroke patients, where we're trying to do sensory reeducation and we want to stimulate a deliberately large area. So they're not just for rheumatoid. They are for when you need an easy access to a large area of skin and that's when I use them.

Steven Bruce
That particular TENS machine there, are you happen to mention what brand it is?

Tim Watson
That one, I think they actually don't exist anymore. So yeah, I can mention it because it comes from a company called Shrewsbury Medical, but I'm pretty damn sure they don't exist. So I can mention it because there's no advertising, because you can't buy them.

Steven Bruce
What should people look for?

Tim Watson
I would look for a TENS machine which gives you some control. And the two things that you desperately need control over, some kind of button that controls how strong is the electric current you're delivering, and some kind of button, switch or dial that controls the frequency, how many duh-duh-duh-duh a second you're delivering. And if you've got those two controls, you can make it work. And you can get a machine like that for 10 pounds, no problem.

Steven Bruce
Which is why it's so easy to go through these things with patients.

Tim Watson
Absolutely, and there are pain clinics now who buy these 1000 at a time, and they give them to the patients for free because it's cheaper than one prescription.

Steven Bruce
Robbin's asked whether you can get a knee sleeve, I presume they come in different sizes.

Tim Watson
You can. Where are my big sleeves; that wouldn't be big enough for my knee. But yes, you can get sleeves bigger than that. And if you hoik it up, the slightly bigger one of those will easily fit a knee. I've used it on patients with OA knee. And we actually put the other electrode on their thigh, but it doesn't matter it can go on their calf, we put a pad electrode on the front of their thigh. And we put a big sleeve like that around their knee. And the patients thought it was great, because it was easy, it was comfortable, it was reusable over and over again. I mean, you can use these several times, but they run out of stick, this is not going to run out of state because it's not sticky.

Steven Bruce
When you put the electrode on, does it matter how far away it is from the...

Tim Watson
As long as it is not touching, it doesn't matter.

Steven Bruce
So you're not wasting charge between pad and sleeve?

Tim Watson
No, when we did the OA knee work, we were putting a fairly large electrode on the front leg quads and we were getting them to pull that up around their knee. As long as they're not touching, there's no sparks if they touch, it's just that the current will go from the electrode straight to the sleeve and won't go through the patient. But you can have it there and there. You can have it down on the calf. If they want to put it under the sole of their foot, they can. A bit daft, but they could.

Tim Watson
Someone's going to ask me if there's any problem with DVT and doing things like that on the calf?

Tim Watson
No. DVT is not a contraindication to TENS.

Steven Bruce
I'm going to move away from TENS in a second, but rheumatoid patients are likely to have problems in both hands, aren't they? So are they going to be wearing, how would you set up two gloves? One electrode to each glove?

Tim Watson
Yeah, that would be a fun thing to do. Don't do this at home, folks. If you were to put that glove on that hand, and that glove on that hand, I'm not actually going to do it. But if I then gave you the TENS machine and you plugged one end of each wire into each of those, the current is going to go from that hand through my chest to that hand. And I really wouldn't do that. If you want to do a bilateral treatment, absolutely no problem. glove, electrode and a pad, left hand side, one channel. Glove, electrode and a pad, other channel. The current doesn't go through the chest absolutely safe. Absolutely safe. But I wouldn't deliberately, well, I've done it just to see what happens, sent a current through the chest or from foot to foot. But I wouldn't do it to a patient. I only do it because I'm stupid and I'll try things in the lab to see what happens.

Steven Bruce
Okay, well, that's good advice isn't it. I've got more questions aboutTENS, what about animals? What about dogs and horses?

Tim Watson
Yes. Yeah, I was doing a talk the other day to a group of animal therapists. Animal therapists historically have not used TENS because the whole point about TENS is I've got to ask you, I'll get the glove off , it's the wrong size for me, I've got to ask you, as I turn this up, you've got to tell me when you can feel that tingling. You've got to tell me when that becomes strong, and if you're treating Dobbin, how do you ask Dobbin, is that tingling? Is it very tingly? Is it strong tingling, or does that hurt? Dobbin can't answer. What you do with animals is, same TENS machine, same settings, same electrodes, same wires. As you turn this up, normally actually, when they start to feel the paresthesia, the tingling, you actually see a reaction

if you watch the animal's behavior. If you keep turning that up, you get to the point where the muscle starts to twitch, it fasciculates. You've then gone over the sensory threshold, you've hit the motor threshold, if you then turn it down till that fasciculation just disappears, you're at the right level. You don't need to ask Dobbin his opinion, you can actually do it by going up, hit the motor level and then turn it down till you're just below motor. That's the right level. And yes, you can use it and the discussion we were having was ain relief in post-op in equine and canine, that was the discussion that evening. And it works. If Mavis goes in and has a hip replacement, she gets pain relief. If Dobbin goes in and has surgery, a lot of therapists and vets, think that the animal does not need pain relief. And if it was me, I'd rather have the pain relief and if it's my dog, I'd rather my dog has a pain relief.

Steven Bruce
Yeah, it's very easy to ignore that animals are in pain, isn't it?

Tim Watson
Absolutely. Anyway, we could do TENS and animals therapy all night, that's probably not on the agenda, but who knows.

Steven Bruce
I mean, the great thing about these conversations and the fact that it's live and it follows the flow of everybody's questions is that whatever we start out with might be nothing like where we finish. And one of the questions, I think Robin brought this one up as well, is does the level of stimulation depend on the size of the electrode, you put a wide pad over your knee and knee sleve on, does it matter what size electrode you use? Could you use a little one?

Tim Watson
You could do but if you if you're going to stimulate the knee and you're going to use small electrodes, I'll stick them on top of my trousers because that's safer for everybody concerned, that would be cruel. Because the amount of current I've got to put into my knee just to get pain relief in my knee going through a small electrode means it's high. High current, small electrode uncomfortable. So certainly on things like the knee and the quads and whatever, I'm using large electrodes purely because you will get the stimulation and you will not get the discomfort and therefore the patient compliance will go up. And there's no point making it hurt, they've already got the pain, you don't need to add to their pain, use big electrodes. Okay, and that's the other advantage of the other garment electrodes, the surface area is big. Therefore the discomfort is low.

Steven Bruce
Excellent, that's something new. I don't mind doing the recaps because the recaps are always valuable. So let's let's leave TENS for a moment. I suspect there's more questions I can see loads of them. One of the things that's always tickled everybody who watched the show is that I think the second, maybe the first show that I did with you, and I said to you, could you tell us about interferential? You said, yes, it doesn't work, you said, and that was it. That's all we did. Interferential doesn't work. Have you changed your mind?

Tim Watson
I've kind of changed my mind or my mind is sliding in a direction?

Steven Bruce
Actually that's a bad question, isn't it? Because what you said then was based on the evidence at that time, so any changes in your mind are based on new evidence.

Tim Watson
So there have been a number of papers that have come out over the last 10 years, probably, a lot in the last five years, that are beginning to say that interferential is worth considering. And I would put it into that bracket. And it's worth considering in the musculoskeletal world, there was a paper that came out and it was the first one actually where they have compared different kinds of electrical stim for the same patient group. So that was chronic, nonspecific low back pain, classic, low back pain stuff. And they they did TENS, they did interferential, and they did a couple of others which were just weird and wonderfuls. And they directly compared patients getting TENS with patients getting interferential for the same problem under the same research protocol. And it's the only study I've ever seen where interferential beat TENS in terms of how much pain relief the patient got and how much functional gain they achieved. I think, and that is only one paper out of hundreds of papers, I think the advantage of interferential for musculoskeletal conditions, if it's got an advantage, is that it's less irritating than TENS. It's not as effective. Neurologically, neuro physiologically, it's not as effective. TENS wins. But if your patient is not keen on the tingling sensation you get from a TENS machine, before I gave up, I would try interferential as my next best option. It's not as irritating and therefore patients will take it. And some patients who won't take TENS will take interferential. And I think that's what it's reflecting. So that's one change. I think I was probably being a bit flippant when I said it doesn't work but nevermind that, that was years ago, I must have been having a bad night. The other thing about interferential, which is getting interesting, and we've got some research going on ourselves now, is using a interferential for a whole range of things that are not classic musculoskeletal. Overactive bladder is one, incontinence problems. We've been doing incontinence for years. I don't think that's particularly strong. But the one I've gotten interested in and we're doing some work with some kids, is chronic constipation. And these are not kids who can't go to the loo today, but will be fine tomorrow, these kids don't go for three weeks at a time, right? And particularly some of the hyper mobile syndrome kids get this, which is the group we're working with. So they're five years old, they going three weeks at a time between going to the loo and having a poo. The medical options for those kids are pretty dire. Some heavyweight drugs, or surgery. Five years old, someone's cutting their colon around and giving them an ostomy because they can't poo. And that's part of the syndrome of hypermobile syndrome. Somebody tried doing interferential through the belly, and it worked.

Steven Bruce
Is that two pads, four pads?

Tim Watson
Four pads. And I'll tell you where they go in a minute. But there must be 20 papers on it now, there's three systematic reviews, 20 papers, 25 papers, all of which say it works. It's sensory level, interferential through the abdomen. We're not trying to make abdominal muscles contract or push the poo out, that's a crazy story. We're trying to achieve sensory level stimulation. And it appears to activate, could be

autonomic, but it appears to activate the neurology of the gut and actually, what the kids do is they take a small portable, I'll put my finger over the label, so people don't think I'm advertising that one either, right? So you take a small portable interferential machine, 100 quid. You put four electrodes on, two on the front, either side of the umbilicus, and two either side of the spine, pretty well opposite the two you put on the front.

Steven Bruce
Where are the red and blacks in this?

Tim Watson
As long as they cross over, so the front left crosses over to the back right. So you've got a diagonal that way, diagonal that way. Twenty minutes sensory level interferential, twenty minutes once a day, and over 85% of them go back to a normal toilet habit. No surgery, no drugs.

Tim Watson
Over 85%. 85% is the most conservative number I could come up with in any of the trials we've done.

Steven Bruce
80%?

Steven Bruce
I know, you're not giving me actual numbers here, but that sounds as though it's got to be statistically significant.

Tim Watson
Very significant. If you compare that to the placebo stimulation, the placebo stim you're getting 10%-15% benefit. Real stim 85%+ benefit. And therefore if my five year old, I haven't got one, but if my five year old had that kind of constipation, and a 20 minute stimulation once a day at home, you're not going into the clinic, we're teaching the kids, the five year olds are doing this, they don't even need their parents to do it. They're sticking the electrodes on, they're turning the machine on, they're doing it once a day while they watch Blue Peter or whatever they watch with these days, you and I used to work Blue Peter, they probably watch something. It's probably not Magic Roundabout either is it? They're watching something and while they're watching the telly, they've got this stim going on. If that gets their bowel habit back to a normal regime, why would that not be an interesting thing to do and we're doing it. We've also now, just to throw extra into the equation, we said okay, if we've done that with interferential and it works, which it does, and the systematic reviews support it. Why don't we do it with TENS?Because that is a £10 machine. That is a £100 machine. Still cheap, but it's a £100 machine and some parents can't afford a £100 machine, they can afford a £10 machine. So we trying it with TENS, it works. So therefore, we're using TENS sensory level through the abdomen, and it's facilitating a restoration of bowel habit, however politely I can put that. They poo normally.

Steven Bruce
So I guess we could look this up either on your site or find the original papers. But presumably there are settings which are recommended for interferential for that purpose?

Tim Watson
Interferential, the classic setting, so it's 20 minutes once a day. That's your minimum. I mean, if you want to do half an hour, nothing nasty is going to happen. 20 minutes, once a day, and you set the frequency to sweep between about 80 up to about 150 or 160. Now your classic, I mean that's a fairly modern machine, that machine will do TENS, it will do interferential, it will do muscle stim. Again, it's not an advert, I'll keep my finger over the label, but it's just a multifunction cheap as chips stimulator. It's got an automatic setting on there that does 80 - 150. So you find that setting, you press the automatic setting button, you put your four electrodes on, and you turn the current up till you feel the tingle. Leave it tingling for 20 minutes, take it off. And because they've tried that on kids with these chronic constipation problems, there are at least four studies where they're now doing that on adults with chronic constipation problems, some of them after chemotherapy, some of them after surgery, some of them for a whole variety of different reasons. And the results are earlier because they haven't got as many studies but they're looking good. So it's not just that it's a kiddy thing looks like if you've got an adult who can't poo, then it's worth a try.

Steven Bruce
For whatever reason?

Tim Watson
For whatever reason.

Steven Bruce
Sylvia's saying that, I'm assuming I'm assuming she's referring to this, it's worked very well on a number of her patients who have GI system symptoms. Amanda says she's had interferential therapy before, she also uses it during careful manipulation, for example of the shoulder. And as found great relief herself, also, with many patients showing great progress with use.

Tim Watson
Absolutely, but like TENS, you can use interferential, and again, it was part of our earlier conversation in a previous life, you can use interferential to provide instantaneous pain relief. Which then means certainly in therapy, a number of people do it for the patient who's got the most acute back or the most acute shoulder and you can't even touch them before they whimper and yelp. So put the interferential or the TENS on in the clinic, use that to take the sting out of their acute pain, which then enables them to do the clever thing, which they couldn't otherwise do. I don't have a problem with that. But you've got to be pretty darn cautious. Because you've taken away, you've blocked, that pain defense thing, which, however you want to describe it physiologically, is there. So if you've got acute low back pain, you're hobbling and you can't even climb on the plinth, I stick ininterferential or the TENS on you, give you 10-15 minutes of that at high power, that pain is gone away. I can now get you on the plinth, I can now do things and you won't yelp because I've taken away, I've blocked, that pains sensation. So you just have to have that cerebral caution about how far you push it, because you couldn't have pushed it like that 10 minutes ago. But that's a caveat. But yeah, absolutely. And that used to be frowned upon. And people who say oh, no, no, no, you mustn't do that. If you're a thinking therapist, you're a thinking practitioner, why can't you do that? It's not a rule that says you can't, it's not a contraindication. You've just got to engage brain.

Steven Bruce
I guess if we want to see the contraindications, we find them on electrotherapy.org?

Tim Watson
The website's got it all. I didn't bring a copy of the textbook because it would look like I was advertising the textbook, we've just rewritten the textbook and there's a new edition of the textbook out. Myself and Ethne Nussbaum, we were editing the book, we spent two years just on the contraindications. We went through every contraindication for every modality and we said is it really a contraindication or is that just an old wives' tale? You can't have an old wives' tale, it's ageist and sexist, but you know what I mean, it's just one of those stories. You can't do ultrasound to a patient who's diabetic because it lowers their blood sugar. Load of old tommyrot. So we tried to cut through what's real.

Steven Bruce
What's the book called?

Tim Watson
It used to be called Electrotherapy: Evidence-Based Practice, and it's now called Electrophysical Modalities: Evidence-Based Practice, because that reflects the change in terminology. So it came out last year. Anyway, so the chapter in there is a chapter which lists all the contraindications, puts them in a table and explains why. And where we've got evidence, I have no problem putting contraindications on the list where we got evidence. If it's based on a load of ol tales from 1957, then let's dump it.

Steven Bruce
A question for you here from Mel, who says, what's your understanding of the use of electrotherapies with patients that have pacemakers and defibs fitted, because you can get internal defibs fitted. Defibrillators, I should say? She's asking because she's spoken to three cardiologists who've all given different answers. Don't use. You can use it as long as it's 12 inches away from the implant. Don't use ultrasound, which of course, yeah. So what's the answer?

Tim Watson
The issue is that the energy you're delivering from your electrotherapy device, whether that's TENS, ultrasounds, laser or shockwave, has got the potential to make the pacemaker, the auto defib, whatever the implant is, you've got the potential to make it go wrong. If somebody's got a pacemaker, and it is controlling the pacing of their heart, and you put a TENS machine on firing 100 times a second, and the pacemaker tries to fall into line and fire 100 times a second, they're gunna die. Pretty inconvenient.

Steven Bruce
We call that a contraindication.

Tim Watson
I would call that a contraindication, yeah. If it kills the patient, I think that's a reasonable contraindication. However, and there was always going to be a however or a but wasn't there? Not all pacemakers go wrong when you TENS them. Not all, pacemakers or all automatic defibs. Some of them, some of the modern ones, are remarkably resistant to all that stuff they'll be putting in.

Steven Bruce
But if you're TENSing, if you've got an electrode here and a silver one here. How is that gonna affect a pacemaker up here?

Tim Watson
Okay, I'll tell you round the other way. If you put an ECG electrode on your left ankle and an ECG electrode on your right ankle, can you pick up an ECG?

Steven Bruce
Probably.

Tim Watson
Yes. So your heart is generating a millivolt and it's reaching your ankle. How come sticking 50 volts into the arm is not going to reach the heart then? It could. So therefore, because, back to where I was, some pacemakers are okay, they're resilient, and some are not.

Steven Bruce
Would a patient know if theirs was resilient?

Tim Watson
No. And most therapists or practitioners wouldn't know either. So the the general rule of thumb and it's absolutely on the conservative side, for a very good reason, is that if the patient's got an implanted electronic device, a pacemaker, a defibrillator, a deep brain stimulator, anything inside with a battery, the rule of thumb would say, don't use any kind of electrical stim. If you want to do it, I've done it, I do it in the clinic. But I will take the patient down to the cardiology unit, we will do the TENS on them. And we will see whether the TENS makes their pacemaker go wrong. If nothing happens, and everything's tickety boo, send them home with a TENS machine. But I'm not going to send them home with a TENS machine unless I know it's a safe thing to do. If it goes wrong in the cardiology clinic, they can put it right in a second or two. If they're doing it at home and they ring you up saying "Oh, I'm dying, I put the TENS machine on and my pacemaker stopped, what should I do?" You can't save them.

Steven Bruce
This is probably stating the bleeding obvious, as they say, but ultrasound is not an electrotherapy is it, so presumably that is safe, unless you're doing it right on top of the pacemaker?

Tim Watson
Unless you're going directly over the pacemaker, your ultrasound is fine, your laser is fine. Because you're not putting an electric current into the tissue. The only other one we say no, is shortwave radio frequency work. Shortwave, pulse shortwave, microwave, anything which is radio frequency, can set a pacemaker off. And again, rule of thumb would be if the patient's got a pacemaker, don't use electrical stim, don't use radio frequency, you might be over conservative, but the patient will stay alive,

Steven Bruce
That is a good answer.

Tim Watson
It's a reasonable outcome.

Steven Bruce
So I think that's a fairly definitive answer about whether one should use electrotherapy with pacemakers and internal defibrillators. Sam's asked what the website was, it's electrotherapy.org unless I'm mistaken

Tim Watson
It is indeed.

Steven Bruce
And I'll send out a link to that tomorrow when I send out my email. We're rattling through the time this evening, we haven't even got off the chairs. Gail says I've currently got some work with a physio company doing online triage two days a week and she has to review some clinic reports and if they're doing a treatment that's not evidence based, I have to reject them but they're saying electrotherapy, which is pretty broad topic I suppose, is non evidence based. How can she overcome this? Especially since you were a department head where she initially trained in physio before doing her osteopathy degree.

Tim Watson
There you go. The idea that it's not evidence base is fallacy. I'm sad, I keep a database of electrotherapy research and that database currently, I was working on it this morning that currently sits at about 250,000 papers. On average, I probably add 1000 papers a week to that database.

Steven Bruce
They'll be of varying quality.

Tim Watson
Some of them are rubbish. Some of them say this treatment is not effective. But I collect it all. The evidence in that database says if you use the appropriate modality at the appropriate dose, it is clinically effective. I got into a debate on Twitter, and I Twitter feed every day, I put a new research paper out every day and I put a new review out every day. And I got into some debate and people said oh, I put an ultrasound paper out and they said well, ultrasound is not evidence. And I said well, it is evidence. And they said well, your evidence says you've got to do this three times a week and I'm not prepared to do that. I said, that is not the same thing as lacking evidence. It is evidence and if you do it three times a week, for this particular condition we were talking about it is clinically effective. The fact that that particular therapist didn't want to or wasn't prepared to do the ultrasound three times a week is a different issue. I'm not saying that's the only answer. But there is an evidence base. And I genuinely would not be sitting here or on anybody else's couch, trying to advocate clinical application of a system of therapy that was ineffective. It was overused in the past, I think, but the pendulums now swung so far the other way, everybody's "Oh, electrotherapy, it's just the manufacturers trying to make money." at some point, and it will be after I've retired for the 15th time, at some point, the pendulum will come back to yes, there is evidence, don't use it for that, do use it for that. Use ultrasound for that problem, use TENS for that problem. The evidence is there.

Steven Bruce
I believe there's a book coming out, which covers that sort of thing.

Tim Watson
I know, I was trying to do a book and clinicians tell me this is the book they want, which is, I wanted to call it, you're gunna kill me for this one, I wanted to call it Electrotherapy: Arse about Face. The publisher apparently finds that objectionable, but that's what I want to call it. It's the wrong way round. And instead of saying this is ultrasound, this is the interferential, this is a laser, this is shockwave. We're saying okay, you've got a patient with chronic low back pain, you've got the patient with acute Achilles tendinopathy, you've got a patient with a medium nerve lesion, which is recovering, you've got a patient who's an amputee with phantom limb pain. What are your electro options and how would we rank them? So if you've got the the acute supraspinatus, what's the first machine, if you're going to put any machine out of the cupboard, what's the first machine you pull out based on the evidence? So it's the same evidence, all I'm doing is literally turning it arse about face.

Steven Bruce
Which is actually very helpful. It's the way we should be looking at treatment rather than say, well, I've got an ultrasound, should I just use it?

Tim Watson
Yeah, and that's fine. I nearly finished that book about four years ago, five years ago, and then I put it on the shelf and I was gonna write the last couple of chapters and it hasn't been written. Of course in that five years, the evidence changed. So I've now got to rewrite every chapter.

Steven Bruce
When's it going to come out?

Tim Watson
I don't blinking know. When I retire and I've got time and in between daytime telly and walking the dog maybe? I don't know. It should come out soon, shouldn't it, because people tell me they want it.

Steven Bruce
Which means it ought to sell.

Tim Watson
I'll give it away for free. I don't care. I'm stupid. And that's why I'm skint.

Steven Bruce
We'll come back that. We'll look at the conditions, because lots of conditions have been sent in and you can tell us which of the machines you would pull out of the cupboard first. I love the idea of ranking that. The Guardian would have the headline "Electrotherapy Ranked!" with an exclamation mark.

Tim Watson
And then there'll be the Times league table and the Guardian league table of the rankings.

Steven Bruce
I want to turn to shockwave can we do that? Which means you get to play with the electrotherapy of the PowerPoint display.

Tim Watson
I've historically avoided putting slides up. When we were talking about shockwave before, I was focusing on using it for tendinopathy because of all the evidence we've got, and there's a big volume, I've probably got 11,000 papers on shockwave, they're not lacking evidence, tendinopathy applications clearly rule the roost and have done for the last 10 or 12 or 15 years. What I think is really interesting, and maybe we'll come back to it at some point in the future, is that there are a number of what I would call emerging applications. People are saying hang on, if it's not blinking good with tendinopathy, why don't we try it with some other chronic things that don't like getting better? And I've put a few that by no means...

Steven Bruce
People are going to send me messages very shortly saying "We can't we can't read the slides" or whatever else. Don't worry about it, we'll send you copies of this.

Tim Watson
It's a PDF and you can send them out. All I've done is I've picked on some, I've got a couple of slides just to go through quickly before everybody falls asleep, of clinical interventions where shockwave is already being used, some of it experimental, some of it clinical, and it is showing benefit. And I put them on there because it shows something about the range so from delayed and nonunions, well that's kind of fairly predictable isn't it, because it delayed and a nonunion is just a bone version of a tendinopathy. It should be getting better, but it ain't.

Steven Bruce
There's an instinctive sort of reluctance, I imagine, to inflict shock on a fracture, because they think it's going to make it worse.

Tim Watson
But actually it works and mechanically loading a fracture which is a delayed union works. We've been doing that with manual therapy, with exercise, with loading and it works.

Steven Bruce
Doesn't low frequency ultrasound work on fractures as well?

Tim Watson
Yeah, I'm in the middle of writing that book as well. But yeah, stunningly well. Stress fractures, avascular necrosis of the femoral head. It works and you can therefore have an influence and I think the current number is about 65, between 65% and 70% of the people with avascular necrosis of the femoral head, who get shockwave as a conservative treatment before the man with the knife and the drill gets in there to chop your femoral head off and put you a bit of metal in there, somewhere around the 65% mark are not getting to surgery because they don't need it. That's pretty impressive stuff.

Steven Bruce
Is that widely known?

Tim Watson
It's not widely known, because if it was widely known everybody would be using it, but the evidence is out there. And that's not because I only got 1, 2, 3, it's not because I've only got four studies, they're just the four studies I put on the screen. Now there's loads of them. Venous ulcers, I'm not saying shockwave is the best treatment for venous ulcer. In fact, there's things I'd do, a laser would probably be my treatment of choice. But it's another chronic problem which just ain't responding and therefore you're provoking it, like you're provoking the fracture, like you're provoking blood flow in the femoral head. Complex regional pain syndrome. OA knee loads of work on OA knee, everybody but everybody, myself included, researches OA knee because everyone's got it. They blinking easy to recruit to a clinical trial. We've just done a trial not too long ago on OA knee, on radio frequency and heat and OA knee, and we had no problem recruiting patients because they don't get any treatment. They love it. Anyway, OA knee. And we can go through, spinal fusion actually, that was only one decent study on that. I'm not sure if I'd just had a spinal fusion surgery, I'd go for it. The spasticity one, I think is fascinating. And if we were still sitting doing these chats in 2, 3, 4 years' time, I think using shockwave on spasticity by then will have come normal. They've done it in kids with those studies on cerebral palsy, they've done it on adults with hypertonicity, spasticity, post stroke. They're using the kind of shockwave that, if we ever get there, we'll demonstrate in just a moment. They're doing it on the muscle, they're getting a reduction in spasticity there and then, you do that with an ice pack, it's cheaper, but what they're finding, certainly in the in the spasticity in the CP kids, three weeks later the spasticity is still not back to where it was. Three months later...

Steven Bruce
Ice packs are not that effective.

Tim Watson
Ice pack will work for 20 minutes, not three weeks, not for three months. So it looks like you can have an effect on the motor spasticity type of responses. It looks like those effects last for weeks verging into months, short to medium term. That is sex on legs, because if you've got a patient who's had a CVA, had a stroke, you've got a patient who's a child with cerebral palsy and spasticity is causing them functional issues, serious functional issues and you can reduce that spasticity without a botox job, without neurosurgery, and the effect of your treatment lasts for weeks/months, that's got to be worth looking at. Which is why so many people are looking at it. And we go through carpal tunnel, trigger points, don't know why I put cellulite on there, because that's probably not the forte for your particular audience.

Steven Bruce
But it's worth knowing.

Tim Watson
But people are using it for cellulite. I've got some other oneson the last slide, medial tibial stress syndrome. Dental. Well, when we get to the machine in just a moment, just imagine when I'm treating whoever I'm treating, imagine doing that in your gob. If I've got dental problems, I don't think I'm going to

put my hand up and go for the shockwave. But there are people researching it because it looks like an option. Chronic low back pain, predictably, your viewers will love that one.

Steven Bruce
We're all waiting for you to get down to this one. Erectile disfunction, where are you going to stick the shockwave?

Tim Watson
Down your nicknocks.

Steven Bruce
I'm not volunteering for that trial.

Tim Watson
I thought that's what we're going to demo! There are actually more papers on using shockwave for erectile dysfunction than almost all the other ones on those lists so far, And the urology guys are now saying it is probably going to become the standard conservative treatment, beyond pharma, the standard conservative treatment for erectile dysfunction. It is delivered at low dose. But the idea of putting that machine we're about to play with down your nicknocks and pulling the trigger fills most people with dread. And myself included, I try nearly everything.

Steven Bruce
I'm just thinking if this is gonna take over from Viagra it's a very different sort of sex story, isn't it?

Tim Watson
Probably viagra's easier to get hold of. Anyway, my point is that the idea that shockwave is only good for tendinopathy, as what has been said for the last 10, 12 years, the evidence emerging says it has a role to play in a range of other clinical conditions, some of which I've put up on the screen, and some of those will turn out to be good and valid and we'll run with them. And some of those will drop off the radar because it will turn out to be not as good as we first thought. I wouldn't put them on the screen if I didn't have belief in the research. Some of those are looking very attractive and things like the spasticity post stroke, spasticity in kids with cerebral palsy, delayed union, non union, stress fractures, avascular necrosis, that's beginning to look really quite attractive. And a shockwave machine is the kind of machine that people are having in their clinics and therefore, it opens up a range of therapy options.

Steven Bruce
We have to get wriggle on, because we've only got half an hour left. We've got this slideup here, we don't do advertising, but it would be remiss of us not to mention the people who provided the machine this evening, which is Phoenix Healthcare. I'll provide links to those and I'll talk some more about them in a minute, because I spoke with a lovely lady, Pauline, I think it was. And I'll tell you what she told me later on. What are you going to do with this shockwave machine? Is this state of the art, this thing we've got here?

Tim Watson
Well, this is a spanking new machine. It is what I consider to be a standard therapy clinic machine,

Steven Bruce
Shall we have look at it now? Come across, Tim. Come and meet Matt. Matt is a model for the evening. Matt is a former personal trainer, he now works for Anglian Water, poor devil. He's got absolutely nothing wrong with him and we're here to see if you can change that.

Tim Watson
Right, well, I'll see what I can do. If you would be so kind, Matt, I'm assuming you haven't got a pacemaker or anything serious?

Matt
No.

Tim Watson
Okay, and you haven't had a stroke recently?

Matt
No.

Tim Watson
I can treat you if you have. If you haven't had a stroke, let's get you on the bed, lie down on your front, with your feet down that end and we'll pretend you've got something wrong with you.

Steven Bruce
So this is the machine we just saw on the screen isn't it?

Tim Watson
Okay, so this is the kind of machine, and again, I'm genuinely neither advertising, endorsing or promoting, but I wouldn't use the machine if I didn't trust it to be good as a clinical device. It's the kind of machine I'd have in the clinic and when we're coming up with ways of treating things with shockwave, whichever it is off the list, I'm going to go for tendinopathy because that's our classic. There's three basic ways of working out what to do, you can either copy what somebody has done in their public research. So you get the Wang et al paper from 2017, who did shockwave for Achilles tendinopathy. And you simply get your machine to copy what they're machine did, no problem. You can on, all these machines, and we've got it on the slide, but we've left the slides behind, they've all got automatic protocols. So you press the button that says clinical protocol, we'll put it on the screen in a moment, so you can all have a look, and it says, for example, "calcific tendonitis of the shoulder acute". Well, that sounds good. And it tells you and it pre sets the machine to do what it thinks you should do. If that was based on the evidence, and I'm trusting, because I've checked, that on this machine, actually, it's pretty damn close. Some machines are way off the evidence. It says, do 2000 shocks and do it at this kind of strength.

Steven Bruce
Yeah.

Tim Watson
And that's fine. I don't have a problem with that. But on some of the machines, not this one, the decisions they make for you are dire. The alternative is, and I'm trying to be pragmatic here, can't make my machine work because I'm sitting around the wrong way, the alternative is to set it yourself. And I've said before, I'm a control freak and that's what I like to do. And rather than rehearsing a particular dose, you can genuinely and we've got research evidence to support this, take a pragmatic application approach. So let's pretend that Matt has got an Achilles tendinopathy. Let's go mid-tendon.

Steven Bruce
Would it matter if it was insertional or not?

Tim Watson
Insertional or up at the musculotendinous junction would be safe. We're going to go mid-Achilles. And firstly, I'm finding the most problematic bit of his Achilles, of course I wouldn't normally sit in a very nice bucket chair while I did this, I'd be standing down there but then all you'd see is my backside, which is no good. So by palpation you're finding what you believe to be the most problematic error. Some people are doing it with ultrasound, some people are doing it with lots of clever techniques. Me, I'm just going for the palpation. And I'm intending to deliver my shockwave to the lateral, the posterior, and the medial aspect of that bit of the tendon that seems to be causing the problem. Wth this machine I'm using some gel on there because it genuinely gets the energy into the tissue much more efficiently. And on these machines, you can get a rubberised silicony cover thing. That's the applicator, that's where the shockwave is going to come from. If you put that onto the gel, the gel gets down the inside of there. Knackered, buy a new one. Don't knacker it, don't buy a new one. Put a silicon cap over there, the energy goes through that, straight through, no problem. And I don't knacker the treatment head.

Steven Bruce
You can get different sized treatment heads, so how would you decide which one's appropriate for that?

Tim Watson
For me, that's the 15-millimeter applicator, that that will be my standard. Certainly, for something like this. If you put the same amount of shockwave through, I don't know if you can see that, no idea where the camera is, if you put the same amount of energy through a tiny little treatment head like that, that's like putting all your TENS through a small electrode. It's blinking uncomfortable. So therefore, I'd reserve that for the patients who've never heard of please, thank you or chocolate. So that's a wicked, that's a wicked applicator. And you can get larger applicators if you're doing big muscle problems on the quads or something. But that's my standard. So I think that's the most problematic bit of his Achilles. I'm setting this machine, because we know from the research that we need at least 1,500 shocks in a treatment session, between 1,500 and 2,000. The machine defaults to 10 hertz, that means it's going to deliver 10 of those per second. It doesn't matter whether you do it with 10 or 6 or 15 per second. The slower you go, the longer your treatment takes. I don't think there's any evidence to say that it changes the outcome, it's comfort. If the patient says they don't like that, I'll fiddle around with the frequency to see if I can find

a better one, but it doesn't change the treatment. And what I'm going to do here is I'm going to start with a fairly low amount of energy. It's controlled by a footswitch down there and when I put the foot on the footswitch it delivers. If it's uncomfortable, Matt, you tell me, all right? You're going to feel it, it's not subtle, but it's not supposed to hurt.

Matt
Okay.

Steven Bruce
Even if that's a damaged tendon?

Tim Watson
Even if that's a damaged tendon because I'm starting with a low amount of energy. So I start delivering that and I I hope they can still hear us when this is going and we're trying to talk over it. Let's see. And then I'm simply going forwards and backwards over the damaged bit of tendon. I'm then going to turn that up because he hasn't screamed and I'm going to keep turning it up until he says that is my point of discomfort, that's gone from a dudududud sensation, that's now hurting, I've gone too far. So I don't need to memorize a number. I'm pragmatically choosing where to go by palpation, I'm turning the energy levels up, that's now going to be a bit stronger, Matt. If it hurts, tell me. If he was a real patient with a real Achilles tendon problem, at some point, maybe there, he would say no, no, no, no, that's too much. Just back off just like we did with the TENS. So you don't need the machine's automatic dose, you target what appears today to be the most problematic zone, you turn the machine up as far as you can before discomfort and you apply your 1500-2000 shocks in the treatment session and then when they come back next time you repeat the process. If the most tender bit is now somewhere different, treat it wherever it is. Treat it. That sounds, and it's not my style, that sounds really loose and really nonscientific but when they've tried that in clinical trials it blinking works.

Steven Bruce
I'll tell you what strikes me about this. I'm actually thinking, I'm glad we're not doing dental stuff because that's going to look really weird or the down the trousers one. This electrode, this device, this stimulator is similar to some ultrasound stimulators and yet when you talk about ultrasound, which is, I know, a completely different therapy, you're very precise about having to keep it at right angles to the skin and you weren't doing that with this.

Tim Watson
I'm literally sliding that around. You can do 800 shocks here, 800 shocks here. That goes up to too many, 3 eights is 24 that's too many. Okay, do 600, 600, 600 but it's perfectly okay, it's effective if you slide it around. So people say oh, you mustn't move the head, it must be at 90 degrees, no more than 91 degrees. It works. And if that wasn't supported by the research, I would not sit here and say it. So yes, it sounds lax, but it is clinically effective. And therefore, it means you can be clinically effective in an easy way, just like using the gloves on the TENS machine, you've made the application which has got evidence, clinically easy to apply. Now a machine like this has got a manual override, you can tell it to do anything you want it to. So if I want to change that from 10 pulses a second, I want to go down to five

pulses per second. The strength of the pulse is the same but I'm now only delivering five a second. There's no clinical difference.

Steven Bruce
This thing sounds as brutally mechanical as it actually is, doesn't it? It's a ball bearing being bounced up and down, isn't it?

Tim Watson
It's a ball bearing sliding up and down inside there, smacking that metal end plate, which is one of those. And as the ball bearing smacks the back of that, it sends a shockwave into the tissue. It's not sophisticated. It is of course because it's pretty and it's computer controlled. But as a treatment it's not massively sophisticated. Clinically, if I was in a clinic and buying machines, I would, not saying this particular one, I would seriously consider a shockwave as a piece of kit I would like, especially if the kind of patients I saw had chronic musculoskeletal problems, especially tendinopathy. I've picked on Achilles tendinopathy. Let's imagine, I know we've got to stop...

Steven Bruce
Can we do plantar fasciitis?

Tim Watson
I was going to come to plantar fasciitis in a second. We could do, let's say he's got a lateral head of gastrocs. And let's say that was torn really quite some time ago and you've got one of those really grotty lumps of fibrous tissue in there. Absolutely no problem. I'll just save gel. I'm going to move up, Matt. You probably guessed that because you can feel gel going all over the back of your calf. We'll go up, let's go 20 times a second. It only goes up to 16. Okay, 16, it is then. Turn the energy level down a bit, start with a low energy level. 16 smacks a seconds. Pretty provocative. It's supposed to be provocative. It's not subtle. We don't want subtle, subtle doesn't work. We tried subtle. We're trying to give the tissue a good smacking, and we're provoking it into a reaction. Was that okay, Matt?

Matt
Yes, that's fine.

Tim Watson
That was a bit pathetic on the juice front. So let's turn the juice up a bit and try again. I'll give it a bit longer, is that still all right?

Matt
Yeah.

Tim Watson
Okay, that's still right. Well, he's going to learn to say stop in a minute, I'm going to turn up a bit higher now. So now, I keep turning it up until he gets to the point where he says, that's just one beyond. And then I come back down a level and I'm delivering 2000 shocks over his fibrosed lateral head of gastrocs. It's not going to cure the problem, it's going to provoke it into reacting, which is exactly what I want. Once

I've got it reacting, I can use all the other therapies to do reactions. So hop yourself up the bed a bit because I need to get to the sole of your foot. I've got to sit down, I want to stand up and I can't. Let's just nick a bit of gel. And let's assume Matt's now got a plantar fasciitis and let's assume on him, his worst bit is where that plantar fascia goes onto the plantar aspect of the calcaneus. Gel all of over my shirt now. So that's his most tender bit. Alright, let's come down, because 16 is a bit wicked on that. So let's come down to 10 because that's fairly comfortable. And let's take the energy level down, because the sole of the foot is not a nice place to go, better than the underpants and the mouth, but it's not necessarily nice. So we head for the most tender area.

Steven Bruce
When you do those, you always do the mouth first don't you?

Tim Watson
You're so picky. So we're going to go with a low energy level, and that's it. If that's ok, which I'm assuming it is, because he hasn't shouted, I take the energy level up and I repeat. I take the energy level up and I repeat, At some point, if he was a real patient with plantar fasciitis, he would say, Tim, thank you very much, that's one step beyond. I come back down, that's where I stay. Now, that's actually pretty straightforward. As a treatment that is not complicated. And you can use the automatic doses on the machine, if you want to, you can copy the dose that somebody else has written about in the Bloggs and Bloggs et al 1997 paper for plantar fasciitis posterior insertion thereof, but you probably can use that pragmatic approach. And from what I can see, clinically, you will be effective. It's difficult to research, but it is clinically effective.

Steven Bruce
Tim, we've got 1000 questions, shall we go and sit down over there again.

Tim Watson
Matt, I appreciate your ability to lie still and take whatever I'm doing to you.

Steven Bruce
Matt, someone's going to come out from behind the cameras and find you something to clear up all that gel.

Tim Watson
I've got gel everywhere, including myself. Thank you, Matt.

Steven Bruce
I haven't looked at the questions yet, but someone's going to say how often do you have to do that for it to be effective?

Tim Watson
Actually, to be effective with shockwave, the average is between three and five sessions. Once a week. So you come see me today, Matt comes to see me today, and I'm going to do that, let's say with his Achilles tendinopathy, I give you these 2000 shocks today and then in a week's time, I repeat that and I

repeat that and probably by the time I get to the third session, I'm expecting a response. If I get to five sessions, and I haven't got a response, either I'm doing something wrong or he's a non responder, there's actually not many people who fail to respond to that, but there are non responders as there are with manual therapy, exercise therapy and every other therapy. Once a week. And people who work in acute sports medicine say, well, I do it twice a day. But I can't see, there's certainly no evidence, I can't see why ding it twice a day is a clever thing to do. It's provocative, it's supposed to be provocative, you don't need to provoke it twice a day to get a clinical response. Most of the patients we're seeing and certainly all the ones I would use it on, I'm using on primarily on chronic conditions. There are people doing it on acute lesions and some of those slides were looking at acute lesions. The majority of shockwave which is clinically evidenced is in the chronic persistent resistant therapy world.

Steven Bruce
I know you said, going back to this slide, we're not advertising any particular machine.

Tim Watson
Shall we move off that?

Steven Bruce
No, I wanted to keep it up for a second. Because people are asking if you're not going to recommend a machine, are there machines that you wouldn't recommend? But before we go down that route, this particular machine, the Endopuls 811 which is from Enraf.

Tim Watson
Phoenix are the company in this country who sell it. Enraf as a company have been around for 70 or 80 years based in Holland.

Steven Bruce
Is that as good as any other?

Tim Watson
Yeah, they're a good company. Their products are good, they're reliable, they don't fall apart. You can buy a shockwave from Alibaba, I get adverts every day from Alibaba because they know I've got an interest in the field, and they will tell me that their machines are FDA controlled and marked and CE marked, they're not but they just put badges on without the controls, and they're only about 25 pence

Steven Bruce
This was three and a half grand, wasn't it?

Tim Watson
Yeah or something. But in shockwave terms, I mean, two years ago they were up at 20,000. So they've come from 20,000 down to this one's certainly under $5,000, I can't remember. They've come from 20,000 odd down to 5000 odd, 4000 odd, because the volume is going up, therefore the price per unit goes down. I'd rather spend my 4K on that and get a machine which is reliable and is not going to fall apart on me and has got some longevity to it, than 25 pence on the Alibaba one, which you have to send back to

China to get serviced because nobody over here will service it and falls apart before you even got it out of its packaging.

Steven Bruce
So I'm going to disappoint you now because before this show, knowing we were going look at this machine, I called Phoenix Healthcare and I asked them, okay look people are interested in these machines, what can you do to make this more interesting for them? And Pauline, lovely lady who runs this company, it's a family company based somewhere in the Midlands, I suspect.

Tim Watson
Nottingham.

Steven Bruce
She said they cannot knock the price down because they're selling it effectively at cost because they're trying to keep pace with the Chinese cheaper versions that are in the country. However if you're interested in them phoenix-healthcare.co.uk they come highly recommended. They're a nice company.

Tim Watson
Yeah, they are a nice company. I would not have called them up to get that machine, to do the demo with it, had I not been comfortable with it. That's not endorsement or advertising. But the logic says I wouldn't put a Mickey Mouse machine there which was no good, would I?

Steven Bruce
Actually my own clinic, we're looking to invest in shockwave therapy now that we're about to move the clinic and we're definitely looking at this model to add to our inventory.

Tim Watson
So I said we have the automatic programs, so on there are a range of automatic programs from epicondylitis to tendinitis of the shoulder to calcific tendonitis of the shoulder and when you press one of those, it automatically sets the machine to what it thinks, or the company thinks, the evidence says is the right dose. I'm not saying they're wrong, I'm saying I'm a control freak and I want to do it my way but the option is there.

Steven Bruce
Six mil head.

Tim Watson
Six mil head. That's wicked if I had a tennis elbow and you were going to do that to me with a six mil head, that's evil. I'm a wicked bugger but I'm not that wicked.

Steven Bruce
We've got to deal with some questions, and we said we were going to talk about turning electrotherapy on its head as well, but let me do some questions first. Scott wanted to know which machines, in Austria this is now regarded as a standard treatment for fractures apparently.

Tim Watson
Yep.

Steven Bruce
Oh, here's an interesting one. Have you got any recommendations for a young lad knocked down by a car, asks Amanda, last week of July, post through femur and currently an external cage fixation of the lower leg, surgeon now says until January. Still limited weight bearing and immense psychological impact.

Tim Watson
My treatment for a patient in that condition would be to use LIPUS, low intensity pulsed ultrasound, which is the strongest evidenced modality we've got to stimulate healing in fractures. Whether they're fresh fractures, delayed unions or nonunions, at the moment, the LIPUS ultrasound application tops the list, there's a whole section on the website about it, purely because I get asked every week about this. It stimulates healing in the fracture but is not the ultrasound out of your bog-standard ultrasound machine in the clinic. You've got to do it every day, it's 20 minutes every day and you basically either buy or rent, lease, loan, a special little ultrasound machine that does this.

Steven Bruce
Not cheap, is it?

Tim Watson
It's not cheap. But it takes an average of 40% off the time to get the fracture mended. So if I had a fractured tib, and there was a machine x out there that increased the rate at which my fracture mended, no loss of quality, but a reduction in the time it takes, by an average of 40%, would I want you to use that machine on my fracture? Yes, I blinking would. And if I was in a position to either pay to lease, loan or rent or pay you to do it for me, I would. That's unfair, that should not be down to how much wonga has the patient got? That's the reality of life. There are clinics in the NHS that deliver it they are few and far between. And they're few and far between not because it fails to work but because it costs money to treat these things, and money and the NHS are not good friends. As we all know.

Steven Bruce
Alex wants to know if you have to have a specific qualification to use shockwave?

Tim Watson
No.

Steven Bruce
Presumably if you're a practitioner, if you can identify the tissues causing symptoms, that's all you need?

Tim Watson
You need to be, in terms of your insurance, you need to be able to demonstrate that you are competent. So the physios who trained more than a couple of years ago probably haven't done a shockwave as part of their training. Neither have the osteopaths, the chiros, the sports therapists or anybody else. So it's a new modality in that sense. And therefore you can't have to have a special qualification but if you're

challenged, you've got to be able to demonstrate you understand what it is, you understand how it works, you understand how to make your clinical decisions about it, the same as you would do if you hadn't trained with laser and now want to use laser or you hadn't trained with muscle stim and you want to go with muscle stim. It's not unique to Shockwave

Steven Bruce
Would this show count as training?

Tim Watson
No, I'm afraid not. Not with me doing a poultry demonstration like that and avoiding all the difficult questions, which you're going to dig one out in a minute.

Steven Bruce
I'm not, but I do remember when I was talking to Pauline, I said okay, well what if someone buys on these machines, what do you get with it? And they give you the training with it, don't they? They give you the full follow up?

Tim Watson
Yep, absolutely.

Steven Bruce
I think the training's with some bloody professor from Hereford, isn't it? From Hertfordshire, sorry.

Tim Watson
Yeah, he does some. I used to do these training courses morning, noon, and night. I used to do them for ultrasound, for TENS, for muscle stim, for laser. And that's the bit I'm supposed to have retired on because I was traveling, I love doing these things, but I was I was lecturing three weekends out of every four on top of working all week, I was burning out. So when I retired, that's the thing I stopped doing. I'm back doing it a bit now. But nobody else has taken over. So at the moment, the downside is that nearly all the training you get, whether you're looking for laser training, ultrasound, TENS, or anything else, is actually provided by the companies. I was doing it independent of the companies, the companies clearly are providing training because there's a need for it. But they've got to be delivering it, with all due respect to the companies, they've got to be doing it with an objective in mind: selling stuff. I wasn't selling, I'm not selling, I don't sell, therefore I wasn't running the course to make an income from selling machines. Therefore I told it like it was. Maybe I should just go back, instead of sitting in a luxury studio with you, maybe I should go back and run some ultrasound courses or something.

Steven Bruce
Why don't you come to my luxury studio and run some ultrasound courses? We've got one more slide, if you wouldn't mind. We've got so little time left. A couple of things I particularly do. We're not going to run through this, this is the contraindications for shockwave. Red is the absolute contraindications, only one?

Tim Watson
There's only one.

Steven Bruce
Only one that's repaired cognition and communication, which is a contra for any sort of treatment.

Tim Watson
Yeah, because I'm asking Matt, as he was lying on the bed, I'm asking him what he feels, I'm asking him to respond. If he can't respond, how can I safely deliver the treatment? There are other things which are probably not a smart thing to do. So the blues are what we would call a local contraindication. DVT up the top, I'm not going to go through the whole lot, it's pretty damn obvious not to do that in the immediate vicinity of a DVT. Someone's got a supraspinatus and you want to shockwave it and they happen to have a DVT, it is not a contraindication. "Oh, you mustn't do that, they've got a DVT!" That Shockwave ain't going to reach their DVT.

Steven Bruce
The reason I wanted to bring this up is because we've had a question, I think it's from Matt.

Tim Watson
Matt the patient?

Steven Bruce
No, no, different Matt. Under a Head and Hace, it says only use focused, not radial, and he's asked what's the difference?

Tim Watson
We did cover this last time, I wasn't trying to do the whole program on shockwave tonight, I was just trying to do some application stuff. Focused shockwave, I won't get the applicator, when it comes out in the applicator focused shockwave, as the name implies, gets more concentrated to a point in the tissue. What we were delivering there is sometimes called radial shockwave and the energy spreads out, like ultrasound spreads out and laser spreads out, from the applicator. Most people in therapy are using and have used radial shockwave, the spreading out one. For some strange reason and it's really weird, but the focused is potentially the more risky because your energy is coming to a concentrated point. But there is a study out there that says they tried radial shockwave on the head and the face and produced some pretty unwanted effects in terms of patient going dizzy, getting flashing lights in their eyes, facial pain afterwards, which didn't go away very fast. It only happened with the radial, it's completely weird and I cannot explain why. But because that is there and it's published, we're saying if you're treating the head or the face, and I wouldn't go out of the way to do it if I were you, if you're treating the head or the face don't use radial because it can, we know it can, produce some unwanted effects.

Steven Bruce
And can a single machine do both?

Tim Watson
There are machines out there where you change, basically you change the gun. So that handheld piece I was holding that did the duh-duh-duh thing, you change that and the same engine will either deliver focused or radial but effectively you're buying two hand pieces. And if you were future proofing then you might consider a unit which gave you the option of flipping one gun to another. So therefore even if you only bought one at this stage, you've got the option in the future should it turn out to be the best thing since sliced bread.

Steven Bruce
But at the moment radial is what we want?

Tim Watson
Radial is what I would use in the clinic at the moment.

Steven Bruce
Okay, so now we've got a couple of minutes to go back and, let me just click on to the last slide there. Don't worry, you will have copies of these.

Tim Watson
That's the worst slide actually. That's a terrible slide. Where did you get that from?

Steven Bruce
At least you haven't got your pigtails showing. Right so conditions then, you're going to rank these things. Justin asked about pelvic pain during the show. So what's your ranking of electrotherapies fro pelvic pain?

Tim Watson
Musculoskeletal or gyne?

Steven Bruce
Now he hasn't said, I'm presuming pelvic pain syndrome, so let's call it musculoskeletal.

Tim Watson
If you wanted straightforward, plain and simple pain relief, I'd go TENS. If you actually wanted to deal with the underlying problem, which of course nobody really understands, I'd probably use pulse shockwave or one of the radio frequencies we're trying out at the moment, works really well. But it's a shortwave light but it gets to the root of the problem. Your TENS will work, there's no doubt that TENS will work but it will simply reduce the amount of pain that that patient feels, it doesn't cure the underlying problem. And that's the problem with TENS.

Steven Bruce
okay. This one might be an easy one, Sherry says Achilles tendonitis, which we've kind of covereda minute ago, there's a lump on the Achilles, she's tried acupuncture, interferential ultrasound plus the usual exercises and soft tissue work and the patient is impatient.

Tim Watson
Right? Well guess what? That's a shockwave one. If you've got access to shockwave, the odds of shockwave working are better than the odds of those other things you tried. I would use it in conjunction with the massage, the exercise and stretching. I'm not usually in isolation. But of all the thing you could do with one of those lumpy Achilles, shockwave is probably going to top the ranking, but of course not everybody's got access to it, I appreciate that but that's why we're talking about it.

Steven Bruce
Robin has come up with a question actually based on some things we were discussing earlier, is there any danger of irritating or damaging the common peroneal nerve if you're a bit clumsy?

Tim Watson
Yep. You can damage the common peroneal nerve by putting a plaster on badly so it's pretty easy to damage, I've got a patient now who's got a damaged one from a plaster technician who got it wrong. Yes, you can, I wouldn't deliberately go out of my way to deliver a shockwave therapy, if that's what he's asking about or she's asking about, directly over a superficial nerve like that, it is asking for trouble. And there was, if I go back a slide, regenerating nerves gets a precaution, it says it's not a contraindication, it's not an absolute no-no, but just be careful. And that would actually go for a number of other things as well, but certainly on the shockwave, can you damage the common peroneal? Yeah.

Steven Bruce
Right, we're three minutes from the end of the show. Let's have audio sonic machines, low and high intensity infrasound therapy, such as Novafon, any thoughts?

Tim Watson
I've lots of thoughts, I'll probably get taken to court if I express them out loud. Interesting, but lacking evidence. That'll probably keep me out of court and gets the point across. I wouldn't junk them. I wouldn't say they're a waste of time, because I've got nothing to prove that they're a waste of time.

Steven Bruce
What's the theory behind them?

Tim Watson
Well, the theory is it's a sound wave, just like ultrasound, classically, we're using it around one megahertz, a million or 3 million cycles a second, people drop that frequency down to a few 1000 and it still works. So if you come down, instead of going above your hearing range come down below your hearing range. So technically, it's infrasound, with an f, infrasound, below your hearing range, it could just do the same kind of thing. I've no problem with the concept. I have no problem with the theory. I have no problem with the fact that there are machines around. Have I ever seen any published evidence of a clinical trial that says it works or works better or not as well as? No. I might have missed it, but I don't think- Well, I've got eight or nine or ten thousand papers on ultrasound, but I've never seen one on it.

Steven Bruce
I don't know who asked the question but it's a perfect opportunity for them to do some research.

Tim Watson
There you go, go and do the research, tell me the answer and I'll sit here and tell you the answer next time I'm on. Except I'm not doing another one, am I?

Steven Bruce
You'll be back next year, I'm sure. I can't believe that you haven't enjoyed this show, you haven't learned something on this evening's show. We always do when Tim is my guest. Tim, thanks so much. This is Professor Tim Watson, he is still the UK's leading authority, he probably wouldn't admit to that, but it's certainly my opinion, the leading authority on electrotherapy. I'd probably argue one of the world's leading authorities on electrotherapy, aren't you?

Tim Watson
It has been said.

Steven Bruce
And he's still active, he hasn't retired yet, and we'll get him back on this show in the future. Tim, thank you so much for coming to see us for the 5th or 6th time, whatever it is. The penultimate time!