Academy of PHYSICAL MEDICINE

Transcript

Diabetic Neuropathy
With Barry Jacobs

APM - This evening we are going to be talking about diabetic neuropathy. And my guest is Barry Jacobs. Now, I've got history with Barry Jacobs. He says that makes me sound like this is an episode of East Enders. But, we go right back to our first broadcast, 'cause Barry was our first ever guest on this, and some of you will have been with us for that. It wasn't the resounding success that we hoped it would be, and we've come on a long way since then. We were talking on that occasion about red flags, Barry's particular approach to those. We've had him back since. We had him at Wembley, where we were talking about cardiovascular issues, because Barry has a very strong, keen interest in cardiovascular matters. And, as you know, we're getting back tonight, this evening, to talk about diabetes. Cardiovascular related, of course. Barry is a well established, well renowned Osteopath. He's a graduate of the British School of Osteopathy, now the University College of Osteopaths. He has lectured there, he's lectured at the College of Osteopaths. He has taught physiotherapists, conventional medics, all sorts of people about his areas of interest, in particular cardiovascular matters, and so on. And, it's a real pleasure to have Barry back with us in the studio this evening. Barry.

BJ - Thank you.

- Great to have you on board again. We're not gonna do the business this time with the football and the scarves, you will be pleased to know. So, Barry, I didn't mention much about your interest in diabetes there, but I was reading recently NHS statistics, which says that something like 25% of diabetes goes undiagnosed.

- Yes,

- So, that means a lot of it's gonna come through our doors without anybody else having spotted it, so, you obviously think there's a role for we physical therapists in dealing with diabetes.

- I think there's an enormous role for us. It's not necessarily about the patient with diabetes, specifically. And, I want to be clear, I'm not here pretending that I have specialist endocrinological knowledge. I'm not an endocrinologist, I'm not a diabetologist, but I do have a background in teaching clinical medicine, specifically supporting the teaching of primary care neurology. And, it's because of my particular focus on sensory testing, and I have a long background in that, which started of, again, supporting neurology teaching, that I then eventually migrated into this area. Because, as you quite say, diabetes is on epic proportions now, epic proportions. It's considered to be one of the modern day epidemics. And it's getting worse all the time. And, you're quite right, a vast proportion of people, some will say it's up to 25% of people, will be considered as either undiagnosed diabetes sufferers, or even pre-diabetic. And, again, the numbers are not absolutely clear. In America, as with the UK, it's probably approaching 10% of the population, if not more. And, over there that means about 30 million people. And that's not including those who have actually had a defined diagnosis.

- So, where's our role? Do we have a role with people who have already been diagnosed with diabetes, or only in recognizing it and shooing them off to see their GP at the first opportunity?

- I think there's going to be two roles. Inevitably, and as with everything that comes through our door, we are trained as primary care diagnosticians, in as much as we can do in unsupported context. Inevitably, we don't have that much opportunity to offer the patient immediacy of assessment in the way that they are in a hospital. So, it's a bigger deal for us to actually have blood testing done, and so on. Although, having said that, if you do think a patient is going into an acute state of diabetic, they won't go into diabetic coma, hopefully, in your surgery, but they may actually develop constitutional symptoms, fatigue, et cetera, weight reduction, that sort of thing. You can always do a dipstick test. You only have to buy some urinalysis bottles. So, yes, obviously, we are very good at detecting when things aren't normal. We're used to seeing normal, and when things have changed, we take a very deep history, I hope, an informed history. We create and synthesize important diagnostic hypotheses about our patients. It's important to be able to act, if not to even do the test, certainly to make an informed referral. That's the most, that's, sorry, I beg pardon.

- No no, I was just gonna ask you about the dipstick test, because if you go to a GP for a diabetes test, they'll say you've gotta fast for 24 hours, or we can't get this right. So, how accurate is dipsticking?

- Um, obviously the most, the current standard is much more complex than that, and patients will have their HbA1c tested, obviously. And they will prefer, but the thing is, if the readings are through the roof, the dipstick testing can be very useful. And, in fact, a number of diabetes, previously undiagnosed diabetes cases will actually be picked up just on routine screening for something else.

- Right.

- So, it's always worth doing. We always say, no one thing is pathognomonic. Most certainly, you don't try to exclude stuff. So, you don't say to the patient, I've checked you for

your sugars, I've checked you for your ketones, nothing there, you're not diabetic. We would never do anything as silly as that. But, of course, we're trying to incriminate, and at the very least to implicate, just by doing a simple dipstick test. And they are very, very sensitive. But, whether or not the patient's actually showing any of those signs yet, can't be said. But, it's always an easy thing to do.

- I wonder how many in the profession actually do go down that route, or even think down that route, because there's a tendency, I think that, you know, we go down the structural route, and we, I won't say we forget about those other conditions, but, do you think that we let these things slide after we've graduated?

- Well, let me tell you about a story that starts in Linington. And, I was doing some teaching there to some extended scope physiotherapists, as it happens. And the extended scope physiotherapists are taking on, or have been taking on increasing diagnostic role in the NHS. And they serve to form a middle triaging platform between the GP and the specialist services in the Nash. Now, we would take 'em down there to actually try and give them some education about abdomen and abdominopelvic examination. The problem was, and I was with my very esteemed and beloved partner, Lawrence Butler, and we had a third member of our crew, the late and great David Louis, who himself had actually been an abdominal surgeon. We used to leave all the abdominal stuff to him. Lawrence is very capable in the abdomen, but as far as urogenital stuff was concerned, we let David get on with that. And he loved talking about his scoping people, and the whole thing. Anyway, unfortunately David became very ill, and we had to keep the show going, we had to get down there. And, we thought things were going well. And we broke out the urinalysis bottles. We showed them all the dipstick testing paraphernalia. And, the usual thing was to say, alright, wee in a bottle, we're going to, and then, alright I'll do it, I'm gonna puncture myself with a blood lancet, we'll put a minuscule amount of blood in the urine. You can't see it, but we're gonna show you how sensitive these dipsticks are. And they all did it. Wonderful, the whole load of physiotherapists all queuing up to learn how to be diagnostic, and right at the end they said, why are we doing this? We could've got a doctor. And that was quite depressing, actually. Because that's what we were there for, to try and make them diagnostic.

- Yeah.

- So, my view is, in answer to your question, Osteopaths may not always be bothered, but they certainly know how to be bothered. They would know why they were doing it. They would have the education to find that they can make an informed, again, speculative at least, but nonetheless informed hypothesis in terms of diagnosis, and that you decide, this is what I wanna find out. So you don't do dipstick testing as a screening mechanism. You do it because you actually have a question that needs answering.

- Yeah. And I'm always keen not to exclude our chiropractic colleagues who are watching as well, 'cause I don't know what's in their training, but I'm sure they're qualified to the same level to to ask those same questions.

- I did take it upon myself, not necessarily welcomed, but I did take it upon myself to visit the chiropractic college, actually, a few years ago in Bournemouth. Quite near Linington, as it happens. And, I'm pretty sure that they have a very similar standard of education, and would have the same experience. And, as it happens, I think there's now some cooperation going on between people from the, what was the BSO, and as you say now is the University College, and the Chiropractic School. So, there's obviously a lot of overlap there. I didn't realize there were chiropractors tuning in.

- There are physios and there are sports therapists as well, so you can be equally rude about all of us, or, ah.

- I do not discriminate.

-Somebody's actually asked, where do we get dipsticks from? Are they just available over the pharmacy counter?

- Yes, well what I'll say is, have a look online. Amazon's a very good source. We've just had to buy a few more. The more tests they have on them the better, of course. It doesn't make that much difference to price. If you want to buy test-specific dipsticks, for ketone for example, you can. Better used first thing in the morning, apparently. But, um, I would go for the whole lot, bilirubin, everything. There's even a new test on there, actually. Not ascorbic acid, what's in lemons?

- Citric acid.

- Citric acid! New test of citric acid.

- That comment's from the team behind the computers over there

- I'm very grateful to you, thank you very much, they're very, very helpful. And quite handsome and attractive, as well, as a matter of fact. But, um, they've got a new test for citric acid

- Last time we get Barry back.

- And, uh, I know, I don't get invited to a lot of parties. And I thought, what the devil is this for. And, it turns out citric acid is one of the things, if in high concentration, will actually confound all the other tests. So, that's what it's for. It's not for any sort of condition, which was a relief, 'cause I thought I should have heard about it. But, you can get them on Amazon. The one thing I would do, is be careful for those that are close to expiring. So, have a good look, make sure that they state what the expiry is. 'Cause you can buy them cheaply, and they run out a couple of months later.

- What's the normal expiry on a new box, a couple of years?

- Should be a year an a half, something like that, something like that at least.

- Right, okay, so where are we going with that? We're talking about what we do in clinic with the would-be diabetic.

- Entirely. I think the thing is, as well as somebody who might actually show up as being diabetic, and, again, it's not gonna be all that common, it'll be once in a blue moon, really. But, you know, always worth looking out for particular symptoms, so on, of people who are getting type 2 diabetes, rather than type ones. You know, people who actually are over weight, who maybe eat inappropriately, et cetera, et cetera, don't exercise. We know that type 2 diabetes is actually potentially reversible. So, it means it can go both ways, a dynamic equilibrium. And, therefore, there are people we should be looking out for. Now, having said that, those that have been diagnosed as diabetic, are an important group because, as we said before, we know that it's approaching 10% of the population. Of those, and this is both type one and type two, 50%, some 50% will start to develop the neuropathy. And, some literature I saw from Diabetes UK recently said you must test, you must keep looking at your feet, because it's the sort of thing that can happen at any moment without you realizing.

- Isn't there a, there's an NHS standard isn't there? Aren't they supposed to be tested every six months for peripheral neuropathy if the GPs have got time to do it?

- Well, I'm glad you asked me that, Steven. As it happens, and I should have provided a reference for a paper that I was going to quote from, actually, but, it's thought that up to 32% of patients are not actually tested at all, will deny ever having been tested for neuropathy, which is a scandalous thing to suggest. But apparently that's what the figures imply

- Yeah, I mean, we probably don't need to run through the consequences of that neuropathy if it goes undiagnosed, but maybe just a run through. Ya can't feel what's going on in your foot, so,

- Right, so, a person with so-called loss of protective sensation, which is something I will want to dwell on a little bit later, the idea is loss of protective sensation. And, in other words, protective sensation implies that you don't have sufficient sensitivity in the feet to be able to know that you're vulnerable to damage. Now, the problem with diabetes of course, and where there's neuropathy, is that one could stand on a tiny shard of glass, on a small stone, and potentially not be able to feel it. That trauma, microscopic as it is, will do damage. And, especially in people with diabetes, because of course they have nerve damage, which will affect their autonomic supply, their vascular supply, they are more prone to, again, the sequelae, to trauma. So, they'll develop infection, infection leads to ulcer, a significant proportion, possibly 15% of people who've got neuropathy will get an ulcer. And, if that's then unchecked, and leads to amputation, the five-year survival rate is actually worse than for prostate or breast cancer. So, obviously, the consequences of early detection of neuropathy are critical.

- Any idea why it's 50% that get neuropathy? I mean, you'd have thought, if you have diabetes, surely the affect on the nervous system should be similar across the whole--

- Well, that's a good question. Um, part of the problem, at least, alludes to people with type 2 diabetes. And that will be, again, for all the reasons we've described. The main one, of course, being obesity. Obesity is absolutely overwhelming. And some recent research, very interesting actually, showed that when people actually have bariatric surgery, in other words they have something done to the stomach, or at least some, not even bariatric, but even, actually, removing, having bypass or removing part of the stomach, making it smaller, um, again, to combat obesity, to allow people to lose weight, some peculiar, magical endocrine process then happens. And their diabetes improves. So, even if they haven't actually gone in, there's an immediate change. How permanent it is, is another matter, and there are suggestions that eventually things reach equilibrium again. We don't know.

- What's the mechanism for the neurological damage?

- Ah, now that's another good one. Um, nobody really knows. But, there are plenty of theories. It's presumably microvascular. It always comes down to, as Osteopaths like to think, and I suspect the chiropractors as well, and our physiotherapy colleagues, about circulation. We know that fluid mechanics are critical. So, if you're not draining properly, but, again, I think I'm massively oversimplifying it, there's a lot of chemistry involved. But nobody's completely certain.

- Right. So, I assume your slide here that we've got, you've said amputation every 30 seconds across the world due to diabetes.

- It's a shocking, shocking statistic, it's quite right.

- Any idea what it is in the UK?

- Uh, probably about the same. No, I beg your pardon, not about the same, I was gonna say the same frequency of patients. I don't know what the rate of amputation is. I could quote a particular figure, but it might be wrong. But, again, one must remember that diabetes is largely uncontrolled in large parts of the world where people don't have access to medicine. But it's still a much higher figure in the UK than it should be. Certainly, in the US, the burden just of ulcer on the federal economy there, was something like 13 billion dollars per annum. So it gives you an idea, it's pretty hefty. I wouldn't like to quote the figure.

- So, actually we have a role to play in saving the NHS some money, quite above anything else.

- You'd of thought so.

- You'd like to think. Apropos of nothing at all, apparently Tracy Lomax was in your year of 1986 and says hello.

- Hello Tracy.

- But we've also had a question by somebody who hasn't given their name, who says that they look at the feet all the time, and what are they supposed to be looking for, what are the obvious signs?

- Uh, have we paid this person?

-Not yet.

- Okay, good question, and we'll get on to that in a minute, actually. Let's see, I'll just make you aware of some other issues. We know some of the risk factors, I've mentioned some of them. Smoking, high blood pressure, obviously abnormal blood lipids. The important thing is that I've written here on my slide, others, such as diabetic neuropathy and foot deformity can be detected early and mitigated. So, we will be coming on to exactly what you do. But, regular assessment, here we go, systemic and regular foot care, systematic and regular foot care has been shown to reduce the risk of chronic ulceration and amputation in the lower limb by 50%. So, I think, of all practitioners, obviously other than podiatrists, we are seeing people undressed a great deal. We nearly always get people to show us their feet. Yes, there's a lot we can do, and I will move on to that. And these quotes that I'm actually reading out now, they are from a very useful paper, and I think we'll probably make that reference.

- We will, we'll make the presentation available to people afterwards, once we put the edited version up. You mentioned lipids. Lipids are often associated with cholesterol. So, is there a role for statins in controlling diabetes?

- Uh, wouldn't you like to think so?

- Well, personally I wouldn't, actually.

- Well, they're so virtually ubiquitous now. There is some evidence that they have actually been useful. I think people are now on them so much, they certainly don't necessarily improve mortality, but they improve quality of life, so frequency of stroke, last time I looked. But I don't wish to be held to that, 'cause I can't remember. So, yes, they're virtually, as I think, now, they're one of the best instruments of change that can be launched at diabetes. But, then again, you must remember, everybody's floundering around, and there's no great consistency, there's just a little bit of consensus in certain causes, which I will come on to in a moment.

- Another question for you, though, about circulation. How do you distinguish between age-related circulation problems and diabetes? And, we've got our special guest in this evening to act as a model. We may be able to explore that. I'll probably get hit after his program, but uh, but how are you, how do we--

-I think the feet are in a special suitcase with foam around them, but I'll, we'll get them out afterwards. That's a really good question as well. And remember, it's the same as we always say, history, history, history. Put it this way, a person may have age-related vascular compromise, but again, if they have diabetes, hopefully you're going to understand that from the off, and it won't help, but I will talk a little bit about that a bit more when I show you a particular test, one that we're revisiting from Wembley, actually.

- Right

- It's quite important. And, sorry, and the other thing is, does it really matter? If it's clinically relevant, it's something you're gonna have to refer anyway.

- Right. The question I was going to ask, and this is off the topic of what we necessarily can do in our own clinic. Have you ever had anybody in your clinic, or elsewhere, with a diabetic emergency? Not in a coma, but, uh--

- Not with a diabetic emergency, but I've had quite a few cases where the person probably did have neuropathy that needed to be assessed. Most of the time, the people we see in practice, and let's face it, unless you're in the NHS, people are self-funding, they tend to be, because they've got a little bit more money, and hopefully they may even have time, they tend to look after themselves a little bit more. But, certainly, as far as I know, I've never had, I've had, years and years ago, I think I did have a person who became a little bit faint because they went into a hypo, 'cause they were a bit stressed about having treatment. And that was solved with a bit of orange juice.

- Which is where I wanted to go with that. You know, diabetes is all around us, and people could go into a hypoglycemic state at any point. It could happen, just coincidentally, in our clinic, and I wanted to bring up what do you do about it.

- Well, whatever you do, for heavens sakes, give them the orange juice first, or a sweet to suck. Because if you give them their insulin first, and it goes the wrong way, they'll go into a, they're going to come and you can't get them out,

- As you know--

- you have to call an ambulance.

- We teach first aid, as well, and the one thing we say is you never, ever give insulin to a diabetic. If they wanna give it to themselves, that's fine, but if you give it to a hypoglycemic, you'll kill them.

- Entirely. I'm glad I passed that test.

- Yeah, thank you, yeah. I'm just reinforcing what you said, sorry. But I can recommend the Academy's first aid courses, of course. Anyway, sorry, where were we?

- Well, we were talking, actually, about the approach. We were asked about what we do to assess a foot, and we're gonna come on to that in great detail in a moment. But, I though I'd just show you, and I wonder if Justin would be able to just show this slide, thank you. This is the Michigan Screening Instrument. Now, this, excuse me, is a device that was set up to explore the possibility of diabetic neuropathy. And you will be able to see on the screen, there a number of different questions that are asked.

- Can I interrupt you for a second about it? If people are watching this on their iPhones, or even on their iPads, they probably won't be able to read that. But, just to reassure them, we will be posting a copy on the website tomorrow, even though the video

won't be available. So, you'll be able to download these reference documents, even in advance of being able to see the video.

- Well, I can't see the damn thing myself, actually, 'cause the print's too small. But, they will be, a lot of questions I'll talk about again, in a bit more detail. But, just the idea of showing you that this is a kind of standardized bit of a questionnaire. And, a route through practical examination, which, again, stands up for itself, has been used quite widely, has been used a lot in research, and, people easily think of this as a very standardized approach. I think we can do better, and as Osteopaths, because we are, again, so deeply educated in clinical medicine, I think we can have a, probably a refined go at that. But, it's a very good, basic approach. Again, I'm not speaking as an endocrinologist here. And, it would probably be inappropriate for me to even imply I'm doing so. But, I think there are circumstances that we find ourselves in, to which these won't necessarily be applicable always. Many of the questions here will be relating to people who've had previous ulcer. And, I should stress that previous ulcer is probably considered to be one of the most important predisposing factors to having another one. Which is a bit of a coarse guideline, if you think about it.

- And we're talking about ulcers where, on the feet?

- On the feet, yes, exactly.

- Or calves, or?

- No, no, these are always going to be, predominantly it's gonna be feet. The problem with neuropathy is that, because it's all about the supply lines, it tends to affect the longest nerves first.

- Right

- So, the places that it's initially considered to be presenting at it's earliest stages will be in the tips of the toes, hallux predominantly, so, tip of the big toe, and then looking at the other, looking at the feet, and so on. So, you know, this is really quite a wide questionnaire. We will find ourselves at the very, very tip of primary care. People come to us not saying, I have a diabetic foot. They won't come to us and say, I think I've got a diabetic foot, or do you think you could check my foot, I've got, but they might incidentally tell you they've been getting a bit of pins and needles. Or, they might be telling you that they've got some funny sensations at night, they don't know how to explain it. Or, they've got pain. Now, most of the time those things are gonna get reported, but as we saw, up to a third of patients, or approaching a third of patients, won't have reported it, or won't have--

- Could this be one of the first signs or symptoms that they get?

- Yes, and it often is, in a large proportion of people. This is very important, I was gonna, again, this is something I was going to talk about, after talking about this, but, the problem with diabetic neuropathy, is it does tend to affect the small fibers first. That's really important, I'll be dwelling on that in just a moment. So, this really only talks about large fiber neuropathy. And large fiber neuropathy is considered

to be a gold standard, or diagnosis of it. But, I'm gonna come back to that in a second. If I just say what some of the main, and we'll flash this one up as well, please, Justin. The main things in the history that you can ask about, is autonomic change. So, people developing signs of increased sweating, or about pain, because, again, these are both small fiber neuropathies. They may get pins and needles, they may get burning sensations, and you'll see a myriad of cures on the internet, all the time, you know, cure this with that, or whatever. And the best thing, really, are things that contain, products that are derived from chilies, actually, which act as a sort of distraction. The old capsaicin-type things.

- So, deep heat, deep heat--

- Yeah, anything, rubbing it, you know, all of these things that we do to try and distract people from their pain. But, at the moment, it's a very difficult thing to address.

- Are you saying this is a good thing, because if you're rubbing it, you're helping the circulation?

- Well, no, what I'm saying is, any form of distraction is what people do. You know, when it's night you rub something, if you're in pain. And people will often have nasty, small fiber neuropathy, which doesn't necessarily mean that they've got loss of sensation. It means they're feeling extra sensation, they might be hyperesthetic, that sort of thing. So, you ask about sensation. That means not only about pain, and about altered peculiar symptoms, but also about whether they can feel their feet. And I can guarantee that most people won't even know that they've got loss of sensation. I saw a patient today, he's type two, he is significantly overweight, and I said to him, do you know anything about diabetic neuropathy? And he said, diabetic what? So I though, yeah, alright, fair enough. We don't like to talk to people in Latin or Greek. So, I said, about diabetic nerve damage? And he said, diabetic what? And, unfortunately this is the case. It's astonishing how few people, even after all the emphasis there is on education, people don't really appreciate what a serious issue it is. If you say to somebody, you know you can lose your feet? They say, oh really? Oh yes, I've heard that. And it's shocking. So, ask about their sensation. For heaven sakes, explain it to them. In a minute you'll have a go at it, anyway. Then you ask about power. You know, do they feel weak? And, ask about the circulation, getting cold feet maybe, getting blue feet. Maybe getting changes in the state of the nail, hair loss, that sort of thing. But, you'll be having a look at that anyway.

- Hair loss.

- Hair loss, again, typical peripheral vascular-type scenarios, that again, may also be neurogenic. And then, eventually, you need to keep a look out for foot deformity, which I haven't mentioned here, but, again, will come up a moment.

- I'm getting a bollocking from our producer, 'cause we keep looking at the computer, and that's not good TV, so we've got to either look at each other, or look at the cameras, I'm afraid.

- Okay, fine. I think people would probably prefer to see the slides then the--

- Well, I was gonna ask you, actually, is stress a factor in diabetes? You think?

- Um, I don't know.

- Okay, I only ask because apparently lots of people are telling us stories about you lecturing them, and some of them seem to be shaking just to remember the pressure. I think you were what was known as a bit of an old bastard when you were lecturing--

- Yeah, I wasn't old then.

-Anyway, someone's just opened some more gin, apparently, to help them get over the shock. So, strike that one about stress from the record.

- Well, I think it plays a role in the person who is actually managing their insulin. But I don't know if there's any real, confirmed evidence about stress inducing it.

- But, the serious question here actually is, isn't, shouldn't this be more about teaching patients to examine their own feet, rather than us doing it?

- That's exactly what it's about, that's exactly the point. It's trying to bring examination into the home. And patients are advised to run through a brief assessment of their own feet, in the home, everyday. So, they're supposed to check their skin, look between the toes, check the state of the nail.

- Again, is this someone who's been told they are diabetic, or someone who you think is an at-risk patient, so just do it anyway?

- Well, all patients, the guideline is, at least in America, anyone whose got type one diagnosis should be checked for neuropathy five years after the diagnosis. Type two, straightaway. So, I would imagine that examining the feet everyday is critical. And, using creams, and avoiding anything that could actually aggravate the feet, because you just never know when neuropathy's going to occur.

- Right. Why the difference in timeline?

- Uh, dunno. Also don't know.

- It's a long time, isn't it?

- Probably because, and I suspect because the type ones are younger, but I don't know what the actual answer is. And, as we often know in medicine, most of the time we don't know anything about anything. But we like to pretend we do.

- Is it, could it be simply because if they're type one, you're replacing insulin, so actually the body doesn't know anything's going wrong?

- Uh, it's a lovely idea.

- Okay Thank you, I think I've been put in my place for that one.

- I'm sure somebody else will be able to come up with the answer.

- Okay. What have we got here? Are the symptoms of diabetic neuropathy always bilateral?

- No, absolutely not. And that's an absolute misnomer. I think people were always taught that about neuropathy, and there's lots of things that create porphyric neuropathy, not just metabolic causes. As we know, poisoning can do it, chemotherapy, those sort of things. But, like everything else, it can easily be asymmetrical. And, it can be varied even on the same foot, you don't know. And it can change. So, of course as people, excuse me, get better control of their diabetes, at least if they're a diabetic type two, they can even potentially reverse it, as well. Whether the neuropathy is reversible is, again, still disputed, but some people think it can.

- Okay, that's encouraging, at least.

- It is encouraging, it's very encouraging. But, the work hasn't yet been done. And there's tons of research done on diabetes all the time.

- I don't know what the, I ought to know this, and I apologize, I don't know what the chiropractic clinical standards are, but there's an Osteopathic practice standard which says we have to be aware of our role in promoting public health.

- Oh, for sure.

- Which has been criticized for some people recently for different reasons. Actually, this is an important part of it, isn't it? This is telling people something which is not our normal--

- Well, let's see, maybe it should be. If we think it's not normal, we might as well save that for the practice nurses and everyone else who do all the sort of regular thing, and the podiatrists. You know, unfortunately, we are burdened by knowledge. And, I heard a nasty rumor that seems to, in fact, last year, was it even 2016, we're now allied health professionals, according to the NHS. So, yes, when I started 32 years ago, qualified, I wasn't even a complementary practitioner, which is, again, according to some of my student, probably would say that was compatible with their experience as well. We were alternative. Now, I'm about as alternative as Radio 4. And, we then got promoted to being complementary, which was a bit less patronizing. And now, we're allied, and we have all sorts of obligations now. I don't think we're necessarily going to be sued for missing a neuropathy, 'cause it's a pretty difficult thing to pick up, but I think it's a very nice idea if you can. So, let's try and think positively.

- Yeah, that's interesting, an interesting bit of research there, to see which part of the NHS is actually allying with us, because--

- NHS South. NHS England.

- I have to admit, in so many places they've run out of money, so they're actually not using our services at all.

- That's right, they're slashing them, that's absolutely true.

- Do you wanna go on and demonstrate some of your stuff, or do you want to move on to--

- Let me just have a quick, brief phase of just upsetting the producer. Because I want to just draw everyone's attention to this article here. And, Justin, if we can just flash this up, thank you very much. This is again from the Journal of Family Practice, it's American, but I like this, it's quite authoritative. And it brings up material produced by various authors, and they are international. Again, some of them are from Manchester, which is virtually the center of the world for exploring diabetic neuropathy. Anyway, let me move on. This is the three minute--

- This is Manchester, UK, not the one--

- Oh not that one, not on the Eastern seaboard, we'll not have that. Practice recommendations say, screen for lower extremity complications at every visit, for all patients, whether suspected, confirmed diagnosis of diabetes. Now, again, this is predominantly aimed at virtually everybody. Some of these people on here are endocrinologists, and that's Professor Bolton, David Armstrong, he's a podiatrist, he was given an MD in the UK 'cause he's done so much work, even though he's American, he's probably the biggest name in neuropathy at the moment, and he's out of Arizona. So, this is really for everybody, podiatrists, family physicians, as they call them over there, GPs here, practice nurses everywhere. Why wouldn't you?

- Again, I just want to say for people watching, that they could look this up for themselves, the Journal of Family Practice.

- Yes, they can, yeah, Journal of Family Practice.

- But we have put this into two separate documents which will be posted on the website after we finish here. One of which is the article from the magazine. And the other part is the series of tables, the tests that people can do.

- Precisely.

- So, again, presumably this is something you can hand out to patients.

- Well they call this, well, no, some of it you can, um, the education, it does come up on this in a moment, but this is supposedly the three-minute exam. And, I have to say, I probably take a bit longer doing this, I think. Again, we come up with the same sort of questions. You know, is there a previous history of ulceration? You'll be surprised just how frequent it is, and how long it's taken people to heal from it. If they've had prior vascular surgical intervention, this is what is angioplasty, stent, or bypass surgery. And that's referring to absolutely everything, not just for the leg. Foot wound requiring more than three weeks to heal, there it is. Smoking or nicotine use. And, if they're diabetic And, obviously if it's controlled. Then, does the patient have all the standard questions we've talked about. Burning, or whether they have leg or foot pain, whether they've got changes in skin color.

Again, we can reconcile this to anatomy, all of them, loss of power, et cetera. And, has the patient established regular podiatry care? Now, fortunately my patient, the one to whom I was referring earlier, does see a podiatrist. And I suspect they do do regular testing for him, so he doesn't need to worry about it, so, but he should still be doing a routine assessment.

- One of our viewers has sent in an observation that type 1 diabetics in the UK are checked annually by their diabetes team. They're also told to seek help quickly for any foot problems.

- Oh yes, they are.

- Well, can we not question that? Because I'm sure they're meant to be, I just wonder whether that does still happen, because I'm sure there was a bit of a scandal in the press not long ago, saying the NHS wasn't meeting it's targets in scanning diabetics.

- No, these recommendations are correct, though.

- Yeah.

- I'm not saying they're not.

- Sorry, I wasn't either, just.

- But I would agree with you. In fact, a friend of a friend has actually produced a TV documentary for the BBC exactly about this, about six months ago. And, I put her in touch with some of the people on there to explore that. So, yes, and that is exactly the point. So, yes, UK people are recommended to have a test at least every year, if not every six months. And, so much of the time it doesn't happen, apparently. And, even if it does, that's the very minimum that should be done. And, again, there is no consensus, but there is no reason not to do it. I quote, again, Diabetes UK, who say, really, you should be checking all the time, because you can develop a neuropathy at any moment, without realization.

- How long does it take to develop?

- Don't know. That's the problem. It can happen, only 50% of people, but it can happen the next day, it can happen years later, it may never happen.

- Okay.

- We just don't have that better prediction.

- Do you remember Sandy Milkarney?

- Of course I do!

- Well, Sandy, also in your year at what is now the UCO, is apparently enjoying the sun in Cypress at the moment, but is nevertheless watching us this evening, and she has

asked, do electrical muscle stims help with diabetic neuropathy? I think she said nephropathy before, but neuropathy.

- Neuropathy. I think we're speaking about something like TENS, or--

- Well, muscle stim's slightly different than TENS, it's a similar sort of thing, isn't it, but it's designed to fire the muscles to increase--

- Are we talking, oh okay, so we're talking about something like interferential, that might do it.

- Yes

- Because you start to get muscle twitching with that. To be honest with you, it's all cutaneous electrical stimulation, whatever you do. It's just that TENS comes in a small box, and an interferential is a big thing with four leads on it. People do say that it helps symptomatically. I don't think there's any evidence that it improves the neuropathic state anatomically or pathologically. Having said that, that doesn't mean anyone's actually done a great deal of work on it. You may find something on it, but as far as I'm aware, it's not gonna be a useful cure. Because, frankly, if it was, it's very, it's probably very cheap and NHS would pounce on it, 'cause it would save a fortune.

- I suppose the question arises, because muscle stim, unlike TENS or interferential, actually is designed to fire the muscle, so it could potentially increase circulation, improve circulation.

- I'm not aware that any work has been done. I don't think anyone has been specific about it.

- Well, we had a, we did one of these broadcasts with Tim Watson from--

- Oh, yes, yeah, yeah. University of Hertfordshire, and we specifically looked at muscle stim, and I don't recall he mentioning it having any roll in diabetes. But, well look it--

- If he doesn't know, nobody knows.

- Yeah Anyway, back to he Journal of Family Practice.

- Right, okay. Now, here's something I am going to show you in a moment, actually, because they talk about the neurologic exam. The neurological exam has traditionally been undertaken using the so-called gold standard test. And, the gold standard test is one of assessment of light touch, or the acuity of light touch. You may remember earlier on, I talked about loss of protective sensation. And, here's an interesting thing I want people to really have a thought about. We are discussing the notion of protective sensation, and you know that protective sensation, effectively, is predominantly about preventing there being any sort of incident from insult, from injury. And, what is it that actually protects us from insult or injury? What sense actually stops us?

- Pain.

- It's always pain. And, in fact, I think later on we've got a slide on here, I don't know if Justin can bring it up. Actually, it's a book cover that says The Gift of Pain. Excellent.

- Well, he can't unless you put it on the screen, I don't think so.

- Am I getting a thumb, or do I need to scroll down?

- You need to put on the screen.

- I need to scroll down, okay, I'll do that. I realize that. Here it is. Okay, now this is a seminal work, and this was actually written by, originally, by people who were dealing with Hansen's disease. Hansen's disease is the modern, and politically correct term for leprosy. And, this should all be on the tip of everybody's, no, not on the tip of everybody's tongue, I hope not, but certainly on the tip of everyone's metaphorical tongue. Because we've just had Easter, and what film always gets shown at Easter? Ben Hur, fantastic leprosy scenes in that, which all get made better again. Leprosy is a key cause of peripheral neuropathy. And, in fact, there are some horrific stories, I heard the original author speaking about it, actually.

- It's not the most common cause in the UK, though, is it?

- Not in the UK, but the point I was getting out, the key point I was going to bring up, and the author was talking about one bit, 'cause it's very common in the south of the United States, in places like Louisiana.

- Right.

- So, I think that would wipe a smile off a person's face, 'cause yes, it's still quite prevalent in the developed world.

- Yeah.

- You don't have to be living in a cave in biblical times. It's still very prevalent. He talked about a little girl who was found by her parents, with leprosy, who was found painting, finger painting. And, with her own blood, because she just used to bite of the tip of her finger, just to paint. So, pain, it really is a gift. It does warn us about potential injury. So, there's this idea about pain, we should really say the sense of no sensation. But, then turned into pain in the central nervous system, of being an important protective mechanism. Light touch, on the other hand, I will go back here, light touch really isn't the most protective of devices. We habituate very quickly to long hair, we habituate to clothing, and so on. So, we get used to it. You don't get used to pain. But, the gold standard test was of light touch, and the device that was always used, and we'll show this one as well, please, if you can.

- Just before we go to that, can I just ask why? Is it presumed that light touch disappears first, and therefore it's a good warning sign?

- Well, there you are. This is a Semmes Weinstein monofilament, and you can see it's a wand with a bit of, effectively, nylon filament on the end. And, it's calibrated. This is 10

milligrams, it's calibrated to bend at 10 milligrams of pressure, and that was considered to be the thing. If you can't feel that, then there must be danger. Now, this is a very important point. It doesn't necessarily mean it was the first thing to go. That wasn't the point. The point, there, is that if you can't feel that, you are in danger. And that's an important issue that I think that we just need to ruminate on for a second. In other words, if you can't feel light touch, if you have no sense of being stimulated with that filament, you've lost your light touch, you must be in danger. So, effectively there's already a sort of contradiction there, isn't there? Because you're thinking, well, surely that's not gonna be the thing that warns me if I've stepped on something. On a tack, or on a small stone or something like that. But, because it was fashionable to use these, and they were invented, I think, way, I mean, way back in the 50s, late 40s, 50s, something like that, in America. And everybody thought, what a great thing, we can calibrate it. They had the idea that they were actually standardizing the test. The trouble, of course, with standardization of anything like that, is you can't standardize the instrument. Because everybody's different, even the same patient is different on different days. But, that became the test. So, effectively, it's actually a very crude test. And, it's actually, I'm gonna show another slide here, just for a moment. And this is a pretty standardized form of assessment. You use the monofilament in a number of different places to try to demonstrate loss of sensation. And, if they lose a certain number of these points, then there's a problem, they've lost protective sensation.

- You've got nine blobs on that foot there, I think, one on the dorsum, and about eight on the sole.

- Yeah, probably something like that. However, I'm not saying for a second that that hasn't been demonstrated. It is absolutely right to say that if a person can't feel the monofilament, they are at risk. Now, again, that needs a bit of sorting out, because if you can't feel light touch, you really are, then, in danger of getting an ulcer. And the only thing that's worse than not being able to feel light touch, in the history, is the preexistence of an ulcer. So, great, we can absolutely demonstrate that if a person can't feel light touch, they are in danger. But, as you've quite rightly suggested, Steven, it doesn't mean it's the first thing to go. And, I can talk about that in a little bit. But what I think I'll do, is I'm going to just go back again, and talk about this neurologic exam. The neurologic exam has now, actually, instead of using the monofilament, has recently switched over to the Ipswich Touch Test. And this was invented, of course, in the UK by Professor Gerry Rayman. And, they found the following test, I will if I can ask you just to take up your position on the table for me please, they found that the following test works as well as a monofilament. So, I'm just going to go over and try and demonstrate this, thank you very much.

- Lets' move across.

- There's usually a round of applause when you do this on the TV. And some music, you know, Blankety Blank, that sort of thing.

- Right, hello Will, thanks for volunteering. I think we have met before, though, haven't we?

- I think so.

- In a shared off, in a field off Tibberty somewhere, I think, or was it Gloucester bus carriage? I can't remember. Anyway, so here's the Ipswich Toes test, or Ipswich Touch Test. So, I'm going to first of all touch your toes in a moment. Will, I want you to pretend you're not looking, and when I touch your toes, tell me that you can feel them. And it has to be light as a feather. So, if I touch you in a moment, just get ready. Say yes if you can feel it.

- Yes.

- Thank you.

- Yes. Yes. Yes.

- Okay.

- Yes.

- Last one.

- Yes.

- Okay, great, passed with flying colors, thank you very much. And that was the Ipswich Touch Test, there, and, interestingly enough, if you can feel five or six, then you're okay. If you don't feel two or more, it needs to be reported. Now, the critical thing here, is that that is now considered very widely to be as good as a monofilament. And, remember what we said about the monofilament. The monofilament is a calibrated device and this just emphasizes just how idiosyncratic sensory testing can be.

- When you say it's widely regarded to be as good, does that mean there's been research which shows that it is as good?

- That's why it's in that journal.

- Yeah, okay.

- I think, I have a feeling that, if NICE haven't taken it up, and I think they might have done, it will be. So, there's been a load of research on it. It's been a big success.

- It will be cheaper than buying filaments, won't it?

- Oh, yes. And Andrew Bolton, who's one of the authors on that article there, actually talked about it. It's cheaper than buying monofilaments which have to be replaced every so often, not cheap. And, secondly, you've always got the equipment with you. So, I'll come back to this in a moment, if I may. We can then just go through some further slides.

- Yeah, of course.

- Let's have a look. So, thanks very much, Will, I'll be coming right back.

- We actually have an observation just now from someone who remains nameless, who says that, regarding peripheral neuropathy, they seem to remember that at the BSO Barry did a great impression of someone with tertiary syphilis. At least they assume it was an impression, they said.

-Well, I'm still here, all these years later.

-We won't ask you to replicate that this evening.

- All I'll say is thank heavens for antibiotics. Yes, they're probably thinking about tabes dorsalis, actually, not entirely the same thing.

- Can I just ask one other question before we go on? Somebody, quite some minutes back, asked, is isolated femoral nerve neuropathy common?

- Oh, that's a very interesting question, actually. Mononeuropathies do occur in diabetes, but people don't talk about it very much at all, but they used to appear a lot in the old literature. I think the trouble is neuropathy, peripheral neuropathy, has now eclipsed it.

- Right.

- Though, yes, it was a thing. And probably is still a thing. And, femoral amyotrophy, it's called, that's right, and they would get conspicuous wasting, and so on. Quite right, and if you could look up lipidicus, as well, that would be good to do--

- I can see the people who transcribe these things to put them on our website, we're gonna have real fun with the words this evening, aren't they? Lipidicus--

- Forget it. I think that's probably from Bedknobs and Broomsticks, anyway. Um, if I can just press on. So, the rest talks about range of movement of the joint. But, I want to just talk a little bit more now about that monofilament test. And I'm gonna move on a little bit. I'm gonna find the, now, this is the key slide that I want to show. So, we're talking about protective sensation, and yes, there is absolute agreement that failure to feel the monofilament, or to feel two or more touches with the toes test, or the Touch Test, I should say, is considered to be indicative of a high-risk patient who's lost protective sensation. So, statistically we would say it's a very specific test. Very specific. If you can't feel those, you know the patient's in danger. The problem, of course, with it, is that it doesn't mean it's terribly sensitive. And, this diagram, I hope will help to show why, and, as you'll see, the fibers that actually detect light touch, they're the A-alpha and the betas, are large, myelinated fibers. So, they are more difficult, apparently, metabolically to attack. They're certainly protected by myelin, by a nice insulation there. But, as we move down, and move to the right of the diagram, you'll see that the smaller fibers are the thinly myelinated, the A-delta, and the C fibers, in particular, are the ones that actually perceive pain--

- And they're less well protected.

- And temperature, and they're the most, therefore should be the most vulnerable, you would've though.

- Yeah.

- And, I think we were speaking before about this. I actually looked at, when I started getting interested in this, about 15 years ago, maybe a bit less, I found, funny enough, from Manchester, I think it was a nearly 10,000 patient cohort study that was looking at this. It was a cross-sectional study, at the very least, I don't think it was longitudinal, and it was looking at all the different methodologies of testing, and they were, of course, using monofilament and they were using, I think, probably, either the Michigan Instrument, or they were using something similar. And, I thought to myself, well I can't believe it. 'Cause once again they've said monofilament, absolutely fantastic, if you do monofilament, and everybody's equipped with their monofilaments, now with their fingers, and you can predict neuropathy with that. Or, at least you know that you can show that the patient's at high risk, 'cause they've lost protective sensation. But when I had a sift through the stats, they had actually included pin prick. Now, they used a crude test of pin prick, as they put it, but actually pin prick came out better. And I was absolutely astonished and gratified. And I thought, I knew it. So--

- Well that seems to follow from what you just showed us with that slide, doesn't it?

- Well, you know, physiology, as Pete Mangin used to say, and Pete Mangin was the cardiology lecturer at the BSO many years ago, in my syphilis phase, um, used to say, no one ever let a fact get in the way of a good idea. So, old habits die hard, they still die hard. So, I did go out to Manchester to have a word with them about it. And, they were very nice, because effectively I was going up there with what probably was great temerity, not having been introduced. And, they said, yeah, you're quite right. And they started a number of other studies, none of which actually, unfortunately, finished because they lacked funding. But, I'm pleased to say that there is, well, as far as I know, a new study started with using pin prick, and with a device, a particular technique for the device, again, a cross-sectional study, using lots of other tests as well. So, we'll find out. But, this is the important thing. So, increasingly after this idea was mooted, sometime, mysteriously, pin pricks started to show up in the recommendations. Because the, interestingly enough, the professor, again, that I mentioned before who was A, mentioned in the Family Practice article, and also was overseeing some of this work, he's also, actually, one of the main advisors in America.

- Right.

- So, pin prick appeared. It's considered one of the five important tests. There are other tests we can do, as well.

- Well, indeed. And, Jason has asked about vibration. He says the vibration sensor is supposedly the first to go, and is that not an important test for this as well?

- Isn't that interesting? Now, vibration is one of the first things to go. And, people swear by vibration, so, what about it? Well, the problem is, why would it go if, again, it's carried by large fibers? That wouldn't make sense. You'd think small fibers, we've demonstrated small fibers are important. And, increasingly now, as of last year, 2017, the American Diabetes Association has even actually published, and actually finally said that testing for small fiber neuropathy is critical. They use the words critical. Early detection, and that can be done with temperature and with pin prick. And, as a matter of fact, you can use a, potentially, you can use a tuning fork for that, as well, because it's cold. But, why does vibration go early? The probability is, and here we can go back to a question that somebody asked before, how do you tell the difference between one thing and another when it comes to circulation? The large fibers, they're actually very extravagant in the use of microcirculation. And, as people get older, you will find, and you should try it tomorrow in your practices, that a lot of elderly or older people, certainly of retirement age and so on, lose vibration anyway. So, yes, it's fantastic, very sensitive, but not as specific.

- Right.

- So, and, unfortunately the tuning fork for vibration is the other gold standard test. But, as a matter of fact, I'm currently going through Andrew Marr's, The Making of Modern Britain. And, he said that the gold standard was the one thing that nearly wrecked the British economy after the First World War. So, bear that in mind, gold standards aren't always great.

- Indeed. Um, another question. What other conditions mimic diabetic neuropathy?

- Um, you don't need to have a condition mimicking diabetic neuropathy. There are lots of things that cause peripheral neuropathy. Chemotherapy, for example. Certain types of chemical poisoning, lead and stuff like that. We don't see that very much anymore. Um, B12 deficiency, we all know about. So, I would just brush up on things that cause neuropathy. If it's diabetic neuropathy, you're gonna know because they're gonna be diabetic, probably. If not, it's the most common, probably nowadays is the most common--

- But, in any case, if you find that there is a peripheral neuropathy, then your first course of action is to send them away for further investigation, so it doesn't matter what the cause is.

- Exactly, so. It needs to be said. Or, at least if that neuropathy has reached a stage where you think it's putting them in danger. And the point being, maybe that protection is lost earlier if the patient can't feel pin prick, or temperature, rather than just waiting until the large fibers have died off. Again, it's a bit late. And, I can't say that monofilament isn't still a, or the Touch Test, isn't still a major recommendation. Because at that stage, it's really late. It is important to identify large fiber neuropathy, but I think where the contradictions occur now is whether loss of protective sensation is exclusively that or not. Early detection is very important. If you can't feel pain, you could be in trouble. I think I've got an interesting question coming up.

-Just 'cause I'm smiling. People are very interested in your own personal history, Barry, I think there's too many people who know you from old. Somebody says, have you got back pain, 'cause you keep leaning to the left?

- Um, I haven't got back pain at the moment. But it has been Passover recently, and it is traditional to lean to the left like the Romans did, to show that we're free. So, maybe that's the reason. But, if I am leaning to the left--

- I can't remember that far back some days.

-No, thankfully nor can I, and I haven't been told off. So, if it's bothering you, I'll speak to something about my ADHD.

-Right. Where are we now?

- Okay, I was going to talk a little bit about these guys, actually. Now, these fellows won the Nobel Prize in 1944 for discovering the small fibers. And the thing was, there was a lot of interest, actually, in dermatomal testing around the turn of the century, last century, and leading up to this discovery. Because people suddenly realized that they could localize where nerve damage occurred. Now, I'm talking specifically about nerve root damage, here. And, in fact, I don't know if I've got it on here, much of, I've said here, much of the nerve roots information we found, was gleaned from the new discoveries that you could block them with anesthetics and so on. But, I think some people will recognize some of these texts. And, a lot of these books, actually, derive from a military background, as a matter of fact, in Britain. And, interestingly enough, you'll see some of the contributors here from the 1942 to 1943 edition, the first two are brigadiers. So, of course, it's always when conflicts occur. I'll try leaning to the right, actually, a little bit, for the moment. I felt a little bit of a break.

- It's making me feel a bit uncomfortable.

-Yes, I'm invading your personal space. I'm sorry Steven, and I'll take my hand off your knee, as well.

- Thought that was soft touch.

-The, every time there's a conflict in the world, there are obviously, inevitably, military casualties. And, therefore, people are subject to examination, and more anatomy is discovered. So, of course, during the Second World War, we discovered something about nerve function, we discovered something about implementing nerve function, and, of course, people got very taken with all this kind of thing. And, so, the main emphasis started to drive towards distribution, and not so much on the quantity of loss, the level of loss. And so, from that, we started, and, in fact, I've got a quote here from someone called Gowers. Gowers was the person, actually was a neurologist from the turn of the century, who actually identified Gowers' sign, which you see in, you know, the old idea, would people walk up their own legs when they've got muscular dystrophy, that sort of thing, you see kids doing it. And he said that he warned that the practical value of these tests may be less than anticipated, as interpretation of findings on the sensory

examination was difficult. In other words, it's very, very hard to get a quantitative assessment. Let's stick to just finding out which bit they've blown. And, in fact, he actually said that you shouldn't use something too sharp, something that is slightly blunt, but actually feels painful. A quill is ideal. Well, we don't have any quills nowadays, so. Yeah, so, it's really all about accuracies. We've got, and acuity, so we've got two different ideas, actually, here, which I think are very important. And, in a moment I am gonna go back over and start trying to demonstrate how the technique can be refined. So, we've got people focusing on, we've got people focusing on the idea of region, rather than quantity of loss, or deficit. And, really, I think we can do a lot better. So, I want to talk to you a little bit about how a different technique has evolved. And this goes back, also, historically.

- Can I, just throw in a couple of questions before you--

- Yeah, feel free.

- I think we can reassure this viewer that you are gonna talk about foot deformities in a little while, aren't you?

- I will in a second, yeah.

- So we'll talk about those in a little while. But, the other one is, what exactly happens to the autonomics in the peripheral circulation?

- Well, again, they're small fiber. So, there may be changes in sweating, in normal autonomic vasocontrol, and that sort of thing.

- Will that be localized?

- Um, it starts off localized, obviously, because it starts off in a single fiber. Eventually, it may become very generalized. It can have significant influences. And, unfortunately, if the usual feedback is lost, if normal control is lost, if power is lost as well, which is obviously large fiber, the foot will then start to deform. And, you may have heard about Charcot's joints being painless. Well, not true. 15% of patients may actually get very painful joints. So, it's all tied in. But, there's no set process, except for the fact that the small fibers go first, generally.

- Okay.

- So let's, I'm just gonna see what else I've got on here. Right, so I want to talk a little bit more now about qualitative testing. And this is where, as Osteopaths, we can do something really special, I think, very useful for patients. So, if I may, I'm going to invite Will to join us again on the Blankety Blank examination table, please if you will.

- Alright.

- And, I'll make my way over there.

- Yeah, sure, let's do that.

- If we can, thank you very much. I think I said, no I didn't, okay, this one's it. Alright, so I will now take you back to the late 90s. And, I was talking, was invited to demonstrate a device to a panel of neurologists at the Royal Free. And the Royal Free was always a pretty spectacular place for studying neurology, as well. It was a center of excellence for neurosurgery. The medical director at that time, or just before, was a fellow called Peter Harvey, a very eminent neurologist who used to rail against boxing as a profession, as a sport. Very up against pugilism, hated it, because he thought it caused brain damage, and people didn't take much notice of him, unfortunately, because of all the reasons that sports usually continue. And, in fact, there's now suggestion that people getting a concussion under the age of 20, will have a significant increased probability of dementia in their 50s. Which is just something to think about.

- Will, did you every have concussion in your 20s?

-No, can't remember.

- I was actually concussed by a very close friend of mine when I was four, actually. We were playing clowns, and he actually threw me against the wall, a bit energetically, and I had a concussion. So, this is great for me, cause I can't, most of the time I can't remember what I've said. So, if I carry on, now, I'm going to do the traditional thing, here. I've got a device here with a sharp and blunt end to it. I'm going to actually not wound Will with it, I'm going to actually pretend it's sharp at one end. But, what we would normally do, and everybody, I think, is familiar with this technique, is we would do a sharp and blunt comparison. So, are you able to see all this? Can you see what I'm doing here? So, they would say to the patient, right, I'm going to touch you with either sharp or blunt, please don't look. Not dissimilar, in a sense, to the toes test or Touch Test. And, I'm gonna touch you with sharp, this is what sharp feels like. If I'm under-confident it's going to even be felt on the foot, I could even start on a hand and say, that's sharp, and that's blunt, and I want you to tell me which one it is. And so, if I, let's start up here, and you'll say, sharp. You can't feel it's sharp because I've broken the point off, deliberately. But, you'd say that's sharp, that's blunt, okay. So, I'm going to now say, well can you feel sharp or blunt in the leg? And I would touch, and the patient will say, that was sharp, that was sharp. What about that one? Oh, that's blunt. Oh, everything's in tact. Now, of course, what that's doing is actually comparing two modalities. It's comparing sharp and blunt, and the point being, that if you can't feel something that's sharp, if you can't feel something that's sharp, or distinguish it from something that's blunt, you must be really shot. It's gone completely. And, the real issue here, is that sharp sensation goes incrementally. It goes piecemeal, it goes bit by bit. So, you know, and they were saying to me at the time, you can't do that. And they actually took the device from me, and said look, this is how you test. What you need to do is test like for like. You need to test sharp against sharp, nevermind blunt. And they said, it's ridiculous. So, you're supposed to say sharp, and sharp, and of course, the second rule of examination is comparison. What question do we always ask the patient? Do they feel the same? We do that with everything. Do these feel the same? Does that feel the same? Does this feel the same? Sharp, and sharp, do they feel the same? Now, they would only actually test one place at a time. Do they feel the

same? Do they feel the same? Pretty good, better than doing sharp and blunt, 'cause at least the patient can say, actually that one didn't feel quite as much, or I didn't feel it. The problem we've got with it, however, is two fold. Number one, you may not always hit a receptor properly. And this, again, is a well-recognized issue. You might get something that feel, or you might get a bit of skin that's a little bit dry, or a little bit hardened, or something like that. So, effectively, you need to make sure you're getting a nice, nice standard deviation, you get a nice average response. So, effectively, if we do a few in the same area, you know you're A, going to definitely hit a few receptors, but another interesting thing happens. We then start to produce a neurogenic phenomenon called wind-up, or neurophysiological phenomenon called wind-up. And wind-up is a form of summation. And that means that as long as you tap more than once a second, can you believe there's actually research on this? This was something, when I put my proposal in at Manchester, inevitably, a different professor, he wrote back and said, well how quickly do you do it? And, there's been a lot of research on it, amazingly, and it saved me. More than once a second, and you start to promote wind-up. So--

- Which means what?

- Which means that the level of stimulation summates. The patient then starts to get a nice, average response.

- Right.

- Which is great, because then you can actually say, well that's normal for you, does that feel the same? And the patient will say, yes it does feel the same, like for that, and you can take it down here, similar areas, do they feel the same? And, as a matter of fact, you might even try applying a verbal analog scale to that. So, you could say to the patient, right, we have found a wrist that's pretty similar. If I touch you there, that's a five out of 10, Will. And, in fact, I think, do you mind volunteering with just one test with a live pin point?

- Not at all, no.

- Okay, alright, so I'm gonna test, we've got live ammunition now. So, I am expecting there to be a font of blood appearing here, on the ceiling probably, but um, I'm gonna touch you. So, that's quite sharp, it's five out of 10, Will, okay? Five out of 10. If I compare it to this one, over here, what would you give that out of 10?

- I'd say about 4 1/2 out of 10.

-4 1/2 out of 10, I think we can actually live with that. So, they're roughly the same, yeah. Four or five out of 10. Now, he could be hyperesthetic, or he could be hypoesthetic. But, we have found that, or at least there's reason to believe that if loss of sensation is incremental, instead of waiting for a great, dramatic change, we might actually start to be able to quantify it. Now, that's the subject of the study in Manchester. Doesn't necessarily mean it's right, but it's an idea, and it's something that needs testing.

- But in doing this, the first method you showed, I mean, if you're testing for peripheral neuropathy around the feet, as you were, you run the risk that it's symmetrical, and therefore it feels exactly the same--

- Well, not necessarily, because, of course, I've already established the normal here, and that's the real key point. The fact is, you make the patient their own control.

- Yes, and so, that second thing, saying if this is 5 out of ten, what's that? That seems to me a much better control.

- Yeah.

- It seems to be the control, yeah okay.

- Exactly. I mean, people do get peripheral neuropathy in the hands as well, but very, very, we were taught about glove and stocking, you very, unless it's really in bad stages, you very rarely see hands, compared to feet. Feet are the thing. They're further away. So, you can establish a control here, five out of 10. And the other beauty is, it doesn't matter if the patient feels different on a different day, or if it's a different clinician. You're always testing the patient against themselves. So, you can say, doesn't matter. I actually tested this years ago, we had a, our friends came over, and they've got a horde of sons, I've got a few sons. They're not really useful for anything whatsoever, except for testing, medical testing, exactly. So, I got them all doing this. They're all teenagers, so they obviously went hell for leather. And, they're all testing each other, saying, right, test that one, test that one. And then, they changed over and they said, oh, hang on a minute, he's much harder than he was, that's a seven now. And all we had to say was no, that's now the new five. And the relationship stayed the same, between those. It's very, very simple, but it does seem to work. And it's worth trying. And you don't just use it for peripheral neuropathy, it's just for testing pin prick perception. But, while I'm here, I might as well do another couple of things, here. Here's the old tuning fork. Now, this will be applied below the knee today, although I appreciate people may pay for something else. And, you know that the thing has to be 1-2-8 to get the proper vibration. Ahhh, so we can here that, so, that's a harmonic. Will would know even more about that than I would, because he's an accomplished musician and composer. So, Will, if I do that, what can you feel?

- Vibration.

- You can feel vibration. If I do this over here, what can you feel? And, I'm checking all

- Vibration.

- these bony landmarks, here, to see if he can actually feel the thing. But, remember, vibration, again, one of the major gold standards, as monofilament first, and of the other tests, we've got quite a few, vibration amongst them. Pin prick amongst them, temperature amongst them. So, if we're gonna include temperature, we might as well just say, what do you feel? Describe it.

- Tiny bit cold.

- Tiny bit cold, yeah, okay, a begrudging amount of cold. But, thank heaven, and it's not that cold. So, that's actually quite good, so, small fibers probably in tact, I would say. Nothing to worry about, there.

- You were saying earlier warmth was a better test.

- Well, warmth is a better test of C fibers. Again, 'cause of our Nobel Prize winners, C fibers are the smallest, most vulnerable. On a really nasty, no-susceptive test, probably will detect pain. The devices I've used probably do pick up C fibers. But, if I use something scalding hot, that would probably work. Um, obviously I wouldn't. Something nice and warm. Unfortunately Will's feet are warmer than my hands. So, that's not gonna work very well. A hot water bottle water, something, it's not critical. The other reason that we would actually want to palpate temperature, is actually to see if his feet are hot. So, not if he can feel our heat, that we're applying, but to see if his feet are actually showing signs of sweating, or even signs of heat consistent with infection. And there's quite a lot about that, as well, in the literature. So, heat can be useful. In fact, someone's devised a disposable product which you stick on the foot like a plaster, it's very popular in Germany, and this is supposed to detect sweating. And again, that's autonomic, and that, therefore, is small fiber neuropathy. And they've got quite a good argument for it, as well.

- In testing for that, presumably you're going to say, is this sweating unusual for you? 'Cause lots of people go through their lives with sweaty feet.

- Correct. And I don't know how, I haven't even seen the product, except on the internet. Yeah, but apparently it's supposed to be very good. I don't know how it works.

- In terms of assessing temperature, though, if there is an infection going on there, is this going to be such a glaring change in temperature, you're gonna think, wow, that's really unusual.

- Yeah, I mean, and what else will you see with infection? You might see the thing is red, painful, sensitive. Again, no one sign is pathognomonic. You do want to put things in context. You know, diagnosticians, you know, you don't just look at one thing. This is why, if anyone ever did see the thing on red flags that we did, I appreciate the second one was recorded becausethe signal went on the first attempt, um, you know, we don't need red flags so much as we do a detailed history, and understanding what the queues in the history mean for us. Uh, we synthesize our ideas based on the things that people tell us. And then, we use those queues to formulate more questions. If we have to wait for red flags, like a loss of protective sensation, as delineated by loss of light touch, we're being very specific, but very insensitive.

- A question for you, Barry. It was about, even though it's diabetic neuropathy, does soft tissue treatment to the area make any difference? Does it help with prevention of ulcers, or do anything useful for the patient? That could lead on to saying, well, could we recommend something maybe like this at home, as well?

- I'm very sorry to keep saying the same thing. Nobody knows. You might be right. Unfortunately there's very little money for research, and very little is ever looked at. And you'd have thought with a massive problem like the one we're dealing with, that might've been an idea, but who's been doing it? Don't know.

- So, common sense tells us that improving circulation is going to be good.

- You'd have thought so, you'd have thought so. And, certainly, offloading a foot, you know, taking the pressure off the parts that are potentially vulnerable, trying to keep people walking, exercise, are considered to be useful. So you would've absolutely thought that. But I can't definitively say it's the right thing to do, because no one's, there's no evidence base behind it, to my knowledge. If someone's finding it out now, great, tell us.

- Another anonymous question. How does comparing each side work, if they've bilateral loss. For example, B12 deficiency apparently causes symmetrical loss, so the sensation may be the same bilaterally, but there is a loss bilaterally.

- Well, I think you actually answered that question yourself, Steven, didn't you?

- You're the star of the show, Barry.

-Okay, again.

- That one came marked with a red flag on my screen, I had to ask that one.

- Oh, okay, so, fine. Um, I'm not entirely sure what the question actually is getting at, because if a person demonstrates bilateral loss, you would worry. But, I appreciate, I'm actually being, now, fought back with my own weapon. Because you're saying well, maybe they're just reduced. But, what I want to draw, again, to the audience's attention, is we used the upper extremity as our control.

- Yeah.

- And if we can't find a suitable area there, then we'll go up, we'll find something. A shoulder here is pretty good, nice thin skin, nice and sensitive. That's pretty analogous, though, to the foot, shoulder up here. You establish a normal here, and then compare it. So, if they've got bilateral loss, then you worry.

- And you would expect on your first assessment, if you say that's five, that's gonna be between four and six, or 4 /12--

- Yeah, something, You'd hope--

- It's gonna be reasonably similar.

- Again, we don't know. But if they come up with a two, in other words, the point being that they can still feel it. And the patient will say to you, I can feel it. If you do sharp and blunt, they'll be able to distinguish between them. So, if you're not getting a quantitative result by doing sharp and blunt, you need to get a qualitative one.

What, though, ramifications are of that, we're not sure yet. But, people talk about loss of sensation. In fact, the American Diabetes Association just talked about loss of pin prick. That's very crude, just like the Manchester test, but at least you know you're getting some sort of early warning.

- Alright, I've got another one for you, here. If there is advanced or chronic peripheral neuropathy, with no clinical history of diabetes, would there be grounds to try vitamin B12 supplements, and should there be any great symptomatic benefit?

- Um, huh, if the person takes B12, you're obviously trying to find out if they've got a B12 issue. I'd like to just point out that it takes an awful lot of B12 to try and get the system up and running, because if the person's got a pernicious anemia, and the problem is with metabolization , it may not work, and they need injections. So, there's probably no harm in it, as long as you don't go mad. But, um, there's been a lot in the press, last year, at least, about people causing toxicity with supplements and so on. So, frankly, I think, if you're worried about them, get their bloods done and have a look. That's the, you know, it's done on the Nash, it's done on a routine basis.

- You need to move one with your prognosis, don't you?

- I think I do. What I wanted to do now, was just very quickly to talk about circulation. I did do this before, so I don't want to be too boring and repetitive. But, remember the circulation is important. Part of the examination that you'll be able to see on the literature we've shown you, is to inspect the feet, look for signs of fungus, for maceration, for cracks, anything going on between the toes. Look at the skin quality. Um, that'll be five Guineas, his foot just cracked, there. Um, hair loss, sweating, change, deterioration in the skin, that sort of thing. And the pulses. Now, everybody remembers the posterior tibial, the medial malleolus pulse, here, or, the dorsalis pedis, second or third head, that sort of thing. So, checking the pulses is useful. But there's an even better quantitative test you can do, and that's the ABPI, the ankle to brachial pressure index. It's a purely systolic test. I'm just trying to find out how the devil this works. Right, okay. Um, I know how to do this blood pressure testing, 'cause I've watched it on YouTube. Right, so what I would do, is I'd take the systolic pressure in the arm, get a reading there, so I don't need a stethoscope, it's purely palpatory, brachial or radial artery. I would then write that down, I'm then gonna take the pulse here, find a nice pulse. That's quite a good one, Will, actually.

- Thank you.

- I'm gonna pump up, there, and I'm gonna bit rate the pulse, and that'll be my systolic reading for the foot. And that will come in, as it has. I haven't checked his arm, but I'm assuming, do you know what your blood pressure is off hand?

- It's about 130 over--

- It'll be something like that, 120, 130. What we do is, we take the arm, which is very important, we take the arm, and we divide it by the leg. I'm so, I always say that, we take the leg, and we divide it by the arm. I'm sorry, I beg your pardon. Now, it's supposed

to come out at about something like 1.1, 1.2. In other words, the leg should normally be above the arm. So, if we're getting 120, 130 in the arm, we'll get something like 130, 140 in the leg. That's normal, you want a ratio of about 1.1. Brilliant for testing for any sort of impediments to stenosis, whatever, so claudication, circulation. Now, someone asked previously about differentiating between, essentially to just ordinary vascular degenerative disease and diabetic disease. One of the things that is often said, and I wouldn't take it as a rule of thumb, but one of the things that's suggested, is that if that leg pressure goes up really high, you think, oh fantastic, they've got such a good ABPI, you know, dividing it by the arm, it's coming out at 1.8 or something, 1.6. No, it's not. Because probably what's happening is, you're finding it very difficult to compress a blood vessel that's calcified, and that really is a frank indicator of degenerative, of vascular disease. So, it's very good to find it, you know to find that it's actually reduced if you need to, you know, if somebody was in trouble, you need to refer them or get them the right management. But, be careful, if it's very high, it's also potentially quite an important finding.

- What's the normal range, then, would you say? 1.1 you said is ideal.

- 1.1, 1.2, something like that, something like that. 110% if you wanna do it the other way around, as I started doing.

- Yeah.

- Okay, alright. I think we've exhausted, oh, I've got this on the table as a prop because some of the recommendations suggest taking reflexes, as well. So, we might as well do that. Oh, that's a lovely one, there. Can I have another theatrical one there, please? Thank you very much, I'll do it again. There, that's all in tact. So, again, we're testing for power loss, that sort of thing. Right, thank you very much.

- Thank you, sir.

- Much obliged, thank you.

- Can you bring one of those red things with you please? So, Barry, why don't we go back to our chairs.

- Oh yes, alright.

- And, actually, just to take some of the limelight off you, we've had a number of people saying how well they knew Will at college, and they wanted to say hello to him, so don't want him to get too much of the glory, but it's not all about you today, Barry Now make this clear to every, Barry made it explicit to me when he came on, he didn't want this to be an advert for the Medi Pin. But, I just want, for my own benefit as much as anything else, for Barry to explain why the Medi Pin is such a useful instrument for testing. So, Barry, this Medi Pin, which I believe you devised yourself, why did you come up with that?

- I did. I was skint, and I decided I'd try and produce something that could actually make me a bit of money. And then I realized there actually was a need for it.

- Well, I expect actually your process, 'cause you thought this was a useful tool, which was--

- I absolutely though it was a useful tool, your honor, and, actually what happened was, I was teaching what we used to call Clinical Methods at the BSO. And we were doing a lot of sensory testing, and I realized that, it was actually when people were getting very frightened about HIV, interestingly enough. And, at that time, I don't know if I've actually got the picture here, I might have, as a matter of fact, I can't mind if I can show it to you, I don't know what I've done with the damn thing. People were using, no that's wrong, people were using devices like safety pins, they were using devices like broken tongue depressors, but mostly they were actually using a hat pin. And, if anyone's actually seen a real, there it is, if anyone's ever seen a neurological pin, and you can see it here on the left-hand side of this frame, that's actually a device that serves two functions. There's a red and a white one, and you'll see a lot of medical students walking around with them in their lapels. But, they used to be also used for testing sensation. And then they would go back in the lapel, and you'd move on to the next patient. So, obviously, when people started getting worried about infection control in hospitals, and this was one of the big things that were all free, it seems like it was a great idea to make something that was disposable.

- But, on the right of that picture is what I suspect is in most common use in clinics these days, which is, the name's escaped me.

- It's the Neuro-Tip.

- It's the Neuro-Tip.

- That's right, well, the Neuro-Tip is the one that's the most widely known in the UK. We're pretty well known in the US, actually, that's where we focus, because--

- So, how does your Medipin differ from the Neuro-Tip? Well, the Neuro-Tip is basically a blood lancet technology, with a rounded bit of wire instead of a point. So, it's sterile, but, or allegedly it's sterile, they stay it is sterile, but I think it's a bit of a pointless exercise,no pun intended. Because, of course the whole idea of pin prick sensory testing is you don't penetrate the skin, you touch it frequently. And of course, as soon as you touch the skin, and the skin is filthy, by definition, no matter how much you clean, no matter how hygienic you are, it's no longer sterile. So, the idea by Medipin was to try and A, produce something, because it's actually designed, the point is designed to be flattened, and so it's actually a pyramid. You may remember I said to you that blunt things hurt more than sharp things. If you use a hypodermic needle, very sharp, may penetrate the skin, in the hands of an expert may not even be very painful at all. But the Medipin is designed with a pyramidal point, very small thing, took us ages to get it right, the engineers poking each other all the time, until we got the right size ratio. And, it actually disturbs the skin a lot. So, it hurts more. And by definition, it's also a little bit, we hope, or aspire, to it being a bit safer. The other thing that happens is by surrounding it, and I don't know, you probably can't see it in close up, but--

- Yeah, can we have a zoomed in picture on this? Because, um, just stay where you are, Barry.

- I'm going to just stay like this.

- Yeah, and, Beth'll zoom in on that for us. So, it's a little red flag, which I know you're very fond of.

- Tell me when. Okay, alright, well I don't know how close I'm holding it, but basically the point sits in a sort of annular cup, a bit like a golf tee, I don't know if you can see this at all. But, effectively, by doing that, you produce or generate what's called a sensor surround field effect. And a sensor surround field effect is essentially a manifestation of another neurophysiological phenomenon called lateral inhibition. And when one looks at a window with a frame, the brain sees the bright component, and the frame is actually inhibited, is de-stimulated, so your brain's focus is on the window and not the frame, that is lateral inhibition. And the same thing happens with this. So, in other words, if you produce a highly acute point in the middle, it's feeling quite painful, and then you surround it with an area of dull stimulus, it actually further heightens the acuity of the point, or the perception of the point. So, there's a kind of illusion, so it feels much sharper than it really is.

- With this, too, are you not getting more consistent sensation? Because you can't push it in any further.

- Well, you can't, and the idea is it's consistent. But, I can honestly tell you that I've never actually tested it to see if it was true, but we think it is. The neurologists, they're all frith, also. They loved it, but actually--

- So, this is neurologist approved, this device?

- Oh, that I can say. That I can say. When I first devised it, I wrote to a large number of neurologists, all of them whom were the authors of the various textbooks that we used to recommend. And, unfortunately the only person who didn't write back to me with an endorsement was Sir Roger Bannister, who said please leave me alone, which you can understand. But it was, yeah, it's been looked at at Queen Square, and it's been looked at-

- It's too late now, isn't it?

- Yeah, and I couldn't catch him. Terrible, how corny is that? Another foot joke there.

-We have one question from Robin, who says, where can he get them?

- Good question, Robin. I think they're available on Amazon, and I think they're available, see you've got me advertising now, this is terrible.

- This is, seriously Barry, this is either a good piece of kit or it's not, and everything I've seen about it says it's a good piece of kit, all sorts of readings.

- You can get them from Amazon, and you can get them from Encore Medical while stocks last, apparently, 'cause we're having a dispute over the price. But, that's where they're available in the UK.

- And we'll see if we can get the inventor to give us a bit of discount now it's out. Barry, we're right at the end of our time, and we didn't even talk about foot deformities--

- Well--

- Do you wanna leave that, quickly?

- There we go, I did mention it a little bit, but if I can just find a few pictures here. Charcot's joints, I did talk about autonomic dysfunction, I did talk about the way in which the foot changes shape, soon as it does, rubbing, bad rubbing, increased proclivity to ulcer. 15% of them will be very painful. If you see a foot that's inflamed suddenly, and hot, get it referred.

- Yeah, okay. That is all we've got time for. Great having you in the studio again, Barry, I'm sure you'll get an excuse to get you back in in the not too distant future. You seem to be in great demand, not least by the people who were in college with you. Thank you very much.

- Thank you very much, indeed.

- And, of course, thanks to our guest Will, who can't be seen, but much remembered by people who were at college with him. And, maybe, Will, you'll come back in again. Very nice of him to come in so far, just to be with you, Barry.

- Absolutely to have his feet poked.