Academy of PHYSICAL MEDICINE

Transcript

Treating the Runner: Revisited With Colin Papworth

Cast List

Steven Bruce	S
Colin Papworth	C
Dave Hutchins	D

S: Well good evening, and welcome once again to the Academy of Physical Medicine. Really, really good to have you join us this evening. My guest this evening is Colin Papworth a podiatrist with over 20 years experience, both in the NHS and private practice. And if you watched our last broadcast with Colin, you would know extremely well. We talked about a whole host of things including running with custard in your shoes at one point, but we talked gait analysis and gait malfunctions. We talked about over-striding, over-pronation. A whole mess of things.

This evening, back by popular demand, we're going to be talking about some additional gait analysis issues and we've got a real patient in the studio so we can actually go through his analytical process while we talk. You can see what he does, you can see the slow motion video, the things that he's looking at in that patient. And hopefully, you'll go away from tonight's broadcast with some key points that you can use in your own clinic, for analyzing your own patients and working out whether there is something simple that you can do for them or whether you need to refer on to an expert, such as Colin, a man

who described himself as a body mechanical podiatrist. A man with immense experience. Get your question coming in as we go along because there's no better time to learn than when we've got somebody like this in the studio.

Colin, great to have you with us. Thanks for coming by.

C: Okay, thanks for having me.

S: Did I do you justice there? It's probably 21 years of experience now, isn't it?

C: Yeah, somewhere around that.

S: You're getting on a bit, that's the thing.

When you were in last time I think we covered quite a lot. We were a little bit broad brushing what we talked about and I thought what we would try to get over this evening, in addition to seeing how you would analyze a patient, is perhaps a bit more on the typical problems that we might see as a result of different gait disfunctions, as it were. And also a quick look at various types of foot orthosis that you might use to counter those problems. And of course we will be looking at sort of foot orthoses that you're using in your own clinic.

So, where should we start with all of that, then?

C: Well I think the main thing we are looking for is the compensation pans. So someone's coming in, the injuries lead has been caused by an overload of certain structures and we've got to work out why that's happened. Generally the body is trying to keep moving forward, there gonna be a block somewhere in the system and the body's compensating or going round an issue somewhere. So we've got to try and understand. In my job, I see, a lot of people, is we're trying to sort of, backtrack a little bit and go to what's the initial problem. So not necessarily where the symptoms are but what's the function that's causing those problems to occur.

S: Can I backtrack a little bit further on that, because one of the key differences between you, a biomechanical podiatrist, and us, the chiropractor and osteopaths of the world, is that a lot of people will come to us not with a problem that they perceive to be due to their gait. I imagine that happens with you as well, you're well known, you're quite famous for being a man who treats runners, aren't you?

S: So when someone comes to us, when should we be thinking, let's have a look at the gait, this could be a problem attributable to their gait?

C: Anything that's related to any type of movement, so if the pain's more problematic after they've been functioning, so that's a little bit issue with that. Or if symptom's moving around a little bit, as well. So if it started off

somewhere and the body often compensates so that settles down and then another problem occurs somewhere else.

So symptoms that are moving around or things that are, I suppose, settling down but then they come back again. So once training increases again, then you get the same sort of symptoms reoccurring. So that would indicate there's some sort of movement dysfunction going on that we need to address.

S: How far up the body would you be looking in terms of problems that might be related to gait?

C: Well often I'll get referrals in from osteopaths, chiropractors, physios again, for everything really. So we could be looking sort of neck/shoulder problems, all the way down. Mostly it is lower limb and sort of through the back but often people will say, 'well it goes to a shoulder' and we may find that responds to treatment as well. Because we are treating the whole of the body, not just an ankle or foot.

S: A lot of people, when they come for gait analysis, I think people are already psyched up to expect that their going to be given a prescription orthotic or some form of insole for their shoe. But it's quite a step for those other people who aren't thinking that way, isn't it? Someone comes in with shoulder problems, for you to suddenly say, 'well I want to sell you a device to go into your shoe'.

C: Yeah,

S: Do you find that hard to convey? To say to convince the patient is the wrong thing, isn't it?

C: Yeah,

S: Because that sounds like you're just trying to sell something, but to make that connection for them?

C: Well what we're trying to do is look at how they're moving. So what we'll do, we'll go through the assessment, find out where the problem is, look at how they're moving, which will often show them where the problem is occurring, why the problem is occurring. Because we show them on the video that process. And then often I will go through a process of saying, "well this is all the options available, so we've got to change this part of the function and we can do this either by looking at their running form, as such, their posture, we can look at specifics or the strengths in areas or we can sort of help that process along by using orthosis. So it's not always my first choice, although sometimes actually it will be, but tend to try and use that whole reamer and so with most people you've got that sort toolbox of treatments to use and it may be one thing that's used in there, it may be a combination.

If we're looking at changing function, we can either do it through posture induced strengths and then change of specific movement patterns but we may need something to help that process along, as well. So we could use the orthosis as a short term intervention, or it could be something that's a longer term intervention as well.

S: Now I can't remember if I asked you this last time we did one of these broadcast, but I do remember a lecture from a podiatrist years and years ago, actually I think it was a physiotherapist who did all the case analysis, and like many of his colleagues, he was heavily into the rehab of glute medias and so his instant response if someone was overpronating was to exercise the hell out of the glute medias. Is that a route you would take or do worry that you'd then simply overusing, over-straining a muscle?

C: Well that was the danger in fact. You got to look at, is that muscle particularly weak or is it just fatigued and it's overworking? The strengthening work is going to be really important with that but we've got to look at if the body's getting into the right position to get those muscles working, as well. So I see a lot of people who do a lot of glute work and then we do the gait analysis, we don't actually see any extension. So unless we're actually moving forward over that foot, then the glutes are not going to be getting into position where they can ever help here anyway. And if we are trying to control the pronation, we've got to understand why the pronation is occurring. It could be the factor in their running, they're over striding, which means you've got to overpronnate or mostly get past the foot that you've hit the ground in front of you. So if we control the overstride, and put more emphasis into the extension phase of the running, then the pronation isn't an issue and the glutes will automatically start working again.

S: What you've said so far is something you'd expect the average chiro or osteo or physiotherapist would be able to do without your podiatric knowledge.

C: Well I think if you understand how people are moving, that's the first thing, you've got to understand I suppose what is normal gait, whatever that is to a certain degree, but what's the way that person is moving and then if there are any restrictions. So we're looking at sagittal pain restrictions. So often running is a flexion extension so if you've not got that big toe joint moving properly, the ankle moving, if the knee's not fully extended or the hip's not fully extending is it going to at push stage then there are things that need to be addressed and need to be looking at. And that's gonna depend on people's confidence and actually moving that along a little bit.

S: Is this still controversial 'cause the sagittal plane blockade, isn't that root theory or something?

C: It's not root theory

S: Or is it now widely accepted?

C: Much more widely accepted. It's the root theory that's sort of dismissed now.

S: The difference being?

C: Root theory is about trying to attain/subtain the joint neutral. So your assessment or around about with the subtalar the joint CTU that not pronated or supinated during that sort of mid stance phase. But we know that feet very rarely, if at all, function in that position. So it was all sort of designed as way to make orthesis so then custom orthesis would be designed to hold the foot in that subtalar neutral, which is why they're all very rigid and often over corrective.

S: Right. But even those who subscribe to Dananberg's philosophy, still when they're looking the various forefoot/rearfoot angles of the foot, they'll still put the foot into subtalar neutral before they actually measure those angles, right?

C: Before the assessment? There's probably less measuring going on in that position, but yeah, some people still want to have that sort of subtalar benchmark. I don't personally do, I just tend to allow the foot to sit in the position that it's comfortable in, which often will be around about subtalar neutral, but I don't necessarily put the foot in subtalar neutral to assess. I want to see how the foot is behaving more natural, I suppose, in it's sort of more neutral/natural position.

S: I bet there's a whole lot of people really happy to hear you say that, because first of all, it's a pain in the ass trying to find subtalar neutral,

C: Yeah,

S: And also, all of us, I think, we all accept that no two bodies are the same. So why is subtalar neutral important for people, when actually, body's function differently so it's nice to hear you say that. But we'll see in a little while how you go about doing what you do with the real foot hopefully.

C: Yeah, a lot of people are moving away from that. There are still some podiatrists who will do it and it's still taught in some areas but yeah, I think we've got to move on a little bit and look a lot more functioning at what's going on.

S: You did say just a moment ago, you mentioned that the root theory was all about setting somebody up for orthosis. Actually Dananberg has got his own brand of orthosis out there as well, doesn't he? Off the shelf,

C: Through the Vasyli, yeah

S: Through Vasyli? Presumably, there is some reliable research behind those to explain why you can take an off the shelf orthotic and hope to have an effect?

C: Yeah, well Dananberg's, it's all about trying to get a big toe joint working and we can well look on the patient and we can sort of explain that mechanism and reestablishing them, is this mechanism going to that push off phase, it's propulsion? So his orthosis, the Vasyli brand, there is basically just a cutout underneath that foot's metatarsal head just to allow the first ray to sit a little bit more plantaflexed.

S: Is that standard or,

C: That's the Dananberg Vasyli orthotic/orthosis,

S: What does that first ray cutout look like?

C: Um

S: I think there's one there,

C: Well the Dananberg one is slightly different but basically what you'll see is a little hole or a depression underneath where the first metatarsal head would sit.

S: Okay, so will you hold that up so the camera can see what we're,

C: So it's that cutout, instead of it being a full area, basically you cut an area out.

S: This one is the other foot, but there is a cutout in the hard plastic shell, is that not the same?

C: Well that would almost be a first ray, so that word said, the first metatarsal would sit a little bit. This would almost be the first metatarsal head,

S: Yeah,

C: Into that position here, but it's when you have a cut, metatarsal head.

S: Yep.

C: And into that position here. Whereas when you have a cut-out, this would often be for if you have almost a fixed plantar flex position.

S: Yes.

C: And you need to create a little bit of space for that first metatarsal to sit in.

C: So it's one way of doing it. It's often you get one, the pre-made. When we're doing custom made ones we can actually modify the whole first ray position, which I think gives you a much more stable device.

The issue potentially with a first ray cut-out is you then have a very short sort of platform for the orthotic to sit on.

S: Right. Okay.

C: So you need to be aware of, if you are doing that in here, that we're not creating a little bit instability through the front. So, what we tend to do is when we're taking the impression, is actually slightly plantar flex the first ray ... when we're taking the impression, which would then almost create this anyway.

S: So when you do orthotics, or orthoses, whichever you choose to say, are you using a foam box to do the impressions for them?

C: Yes.

S: Right. And you reckon that's the best way?

C: Yeah.

S: Right.

C: Personally. But I know, again, lots of people use plaster of Paris still and will want to try and capture that position. But I think in a foam box you've got a lot more control over where the foot is. You get an immediate feedback about where that foot is sitting, so whether it is slightly pronated or supinated, or whatever ...

S: Yeah.

C: ... you can see that straight away. If you are trying to accommodate a forefoot to rearfoot position, again that will ... it comes up straight away. Whereas you won't necessarily get that with a plaster of Paris cast.

S: My concern always about plaster of Paris or foam boxes is that, effectively, you're deciding what the foot looks like 'cause you can push the rays, you can push the toes wherever you want them, you can have the foot at whatever you like ...

C: Yep.

S: ... and then snap your plaster on or take the impression from the mold. Isn't that a concern? Don't you just end up with a picture of the foot how you wanted it, rather than how it actually behaves?

C: When you get to that point, you know what you want the foot to do. So ... and a lot of the issues, again, with orthosis is, they're called prescribed but often they're not, they're just, sort of, put under the arch support, or wherever underneath that. So we've gotta give the orthotic a job to do, basically, to change this element of function that we think's causing the problem.

So, we will certainly manipulate the foot in a certain way to get it into a position where we think it's gonna function, and then the orthosis is gonna hold it in that position. So we can do that during the casting process, when we're taking the impression, and then we can add extra things in during that CAD design, basically, 'cause a lot of it's now on a CAD system, when we design the orthosis further.

So it's very much removed from the subtalar neutral type route orthosis. Now it's much more of a build on what we're trying to do to change the foot and function, if that makes sense. Or ... but, yeah.

S: Yeah. I think so.

I suspect that a lot of people are gonna think, well actually that's quite a complicated thing to achieve in our own non-podiatric clinic rooms. So then obviously one of the things we might get from this is just what can we do in our own treatment rooms and what do we need someone more expert to deal with.

Can I just digress for a second, though, because one of the things that we're all terribly concerned about these days is communication and consent with our patients. And obviously there are lots of issues, particularly with osteopathy and chiropractic over that, but actually, it'd be interesting to hear your process for getting consent from your patients to go through this procedure.

What sort of caveats do you give your patients? How much do you tell them about, you know, what might your orthotic do, what adverse effects it might have, what outcomes should they expect? Do you have a set procedure that you go through with them?

C: It sorta goes through when you do the assessment, 'cause, you'll talk to them about it. Especially if you're doing video analysis, you'll talk about the process of why the problem is occurring, which will sorta lead you into the treatments around what we're gonna do. And then we'll say, well this could be the knock-on effect, this is the effect we're gonna have. So this is potentially gonna make that big toe joint ache a little bit more, it's gonna get the calf muscles working a little bit. But it's almost though ... and then you almost sort of preempt them what's gonna happen as well. So, not giving the patient the worst case scenario, but say these are all the problems,

potentially, that are going to occur, but we sort of mitigate them by saying, but this is what we'd expect, and we can do this in place, so ...

S: Yeah.

C: I suppose it's a treatment which evolves a little bit over time, as well. So when we put the orthotic in when they come in to have that fitted, we'll sort of see how they walk on it, we'll make sure it's comfortable, and then say what we're gonna expect to happen, and then we'll see them back in for a view somewhere between two and six weeks, something like that, depending on what other treatments were going alongside of that.

C: So we're almost, I say, it's a bit of an evolving process as they go through it. There are some surprises, no doubt about that, but, you know, we're always sort of open to a phone call, getting people to come in and say “Look, if you're not quite sure, just take it out, give me a call, and we'll see what's happening”. And it could be that it is just a wearing-in process or it could be, actually, we need to change it slightly, as well. So with this type of orthosis, here, we can modify them after that point ...

S: Yeah.

C: ... so they're not fixed in stone.

S: How often do you have to modify orthoses after the patient's started out with them?

C: It does happen occasionally, but, yeah, most of the time we're getting it right now with quite a few years of experience. Hopefully ...

S: Yeah.

C: ... that becomes less, but there are some surprises out there. You're not quite sure how people are gonna respond.

Well, I say that, some people you put them in and it's just like that body goes “Ah, brilliant. Thank you very much, this is what I've been crying out for”, and sometimes bodies will just resist that a little bit.

So mainly it is we've maybe overprescribed it slightly 'cause we think we can get away with a little bit more than the body's happy with at that time. So we can take a little bit out, and maybe things settle down, and then we can add in again a little bit later on.

S: Okay. And with the ones that we've got in front of us here, we've got a whole range of different additions and modifications of these particular orthotic blanks.

S: Do you wanna give us a quick idea of what those might be used ...

C: What they're used for?

S: ...to achieve mechanically and what problems they might be used to resolve.

C: Okay. Yep.

I mean, this is, if people are looking at getting into using orthoses, there are various, sort of, pre-made, and these are blank shells with modifications, so these are quite an easy system to use.

S: Yeah.

C: And they're nice and compact, nice and small, and fairly easy to add extra bits in here if you need to. So, this is almost quite a nice place to start for a lot of people, going, rather than the full custom design straight away, which you need to really talk about the labs and things.

S: Yes.

C: So a whole variety of these things. So easy to do. As you talked about here, if we've got a slightly plantar flex first ray, then we're getting a little bit of functional hallux limitus, which we'll explain when we see the patient a little bit, then that's hopefully gonna allow that first ray to plantar flex and help, so ...

S: And what's that particular modification called? If we can just have a quick ... so I can make sure we can see ...

C: Either a first metatarsal head cut-out or a functional hallux limitus sort of modification. Different labs and different companies will call it slightly different things.

S: Right.

C: So, but yeah, that type in here. Something here where we may be having a little bit of, I say, plantar plate issue or just a capsulitis…

S: You're gonna need to hold that vertically or nobody can see the cut-out, yeah.

C: Also an overload through the second and third metatarsal head, so again, it's just somewhere for that ...

S: Yeah.

C: ... take a little bit of pressure off. So an overloading type device underneath here.

S: And that would be, sort of, a metatarsalgia problem that would bring someone in?

C: More of almost like a direct ... capsulitis, we call it, so a direct pressure.

S: Yeah.

C: So a metatarsalgia would probably be a little bit more of irritation through the metatarsals, where you may not want to drop it down 'cause that's obviously gonna increase the dorsiflexion plantar flexion. So in that metatarsalgia, we may need to use something a little bit where we lift the metatarsals ...

S: Yeah.

C: ... so, to give us, sort of, to take out the movement. We wouldn't be wanting to drop the metatarsal heads down.

S: Yeah.

C: With a stress fracture type or a metatarsal irritation. But this is what we'd use if we've here a direct pressure over a joint.

S: Yeah.

So, now that you've got the foot in your hand, if someone's getting metatarsalgia, what's gonna be causing that problem?

C: It usually is combination of the functional hallux limitus. So, we're stopping the foot from going straight ...

S: Yeah.

C: ... and what will be happening is they're getting a little bit of torsion. So the forefoot's down and the foot will be sort of rotating above it, and that will be that one of the metatarsals, usually second, two and four, tend to be the most problematic. Two because it's usually longer and four because it's at this point here where we're getting that sort of medial and natural columns moving.

S: Yes.

C: So that tends to be the irritation where we get a lot of issue between third and fourth metatarsal space or on the fourth metatarsal. But there's always gonna be a torsion.

S: Yeah.

C: There's always gonna be a rotation element, and usually as you push through the foot, we'll see that happening. So late into that propulsion phase, we'll often see a late, what we call an abductory twist, or some people will call it heel whip, where we've got that rotation going on.

S: Okay.

C: And that will be ... so again, if that's the position here, often we can then use that first metatarsal cut-out to allow that to rotate through.

S: So it's all coming back to the hallux again?

C: Yeah. I think this is the most important joint of the body.

S: Yeah.

C: If this isn't working properly, then the foot find it very difficult to get the ankle moving, and the knee, and the hip, and extending. We can't move forward over that foot if we're not getting extension through the first metatarsal head.

S: Yeah. Okay.

C: Yep.

S: Alright, so what else have we got in amongst that little array there. We've actually got over there ... there's a neuroma post as well, isn't there? Neuroma…

C: Yep, this type of ... yeah, so again, if we've got that very specific sort of problem and we want to just separate two metatarsals. So again, that would then sort of just fit in between here, and again just open up. So if we're getting a little bit of neuroma type pain or some bursa intermetatarsal, you'll be feeling through the metatarsal and it just feels really painful ...

S: Yeah.

C: ... or the classic sort of squeeze test.

S: Is there, I mean, given, you know, when we look at that, that's actually quite a narrow pad there, isn't it?

C: Yep.

S: Is it quite hard to gate that that's gonna go into the right place in the shoe? Because there's bound to be a little bit of movement.

C: There is, absolutely.

S: Or will the foot naturally find the right position?

C: I would tend to go for something a little bit wider.

S: Yeah.

C: So, which just spreads the weight. So again, if you're lifting two, three, and four, so often that pad would be in the middle.

S: Yeah.

C: So if we can lift second, third, fourth metatarsal head, we know we're gonna hit it. Whereas if you do that, you've gotta be quite specific. So, yeah, give yourself a larger margin for error, basically.

S: Right.

C: So as long as this is sitting onto the metatarsal and not onto the metatarsal head, then that'll be fine. It's usually onto the edge of the orthosis.

S: Right.

C: And it should sit, let's say, onto the actual shaft of the metatarsal, not onto the metatarsal head. That's much more comfortable.

S: Some of the feedback I've had in the past is that neuroma pads and metatarsal pads are not necessarily that effective for dealing with Morton's neuroma. Is that ... do you find them to be useful?

C: Yeah, absolutely. Really, really useful. 'cause if we ever get in that mess, and if the foot is sitting a little bit laterally into that push phase and we're getting some compression, and we may be getting a little bit of drop through those metatarsals just to open those up ...

S: Yeah.

C: ... immediately, it just takes pressure off there.

S: Yeah.

C: Even if you're still moving a little bit lateral through that push phase, if those metatarsals are physically apart ...

S: Yep.

C: ... you're not gonna trap.

S: Yeah.

C: So as long as it's in the right place, and it's not too far forward, and it's on some type of support ... it doesn't, again, necessarily have to be custom made, but just so that arch isn't dropping and rotating in. It's gotta work, basically.

Depending on how big the neuroma is, that's the issue. And we've seen some huge ones where it almost fills the whole metatarsal space. It doesn't matter then what we do with an orthosis we've still got a great big lump in between the metatarsals.

S: And the answer is what then? Just excise it?

C: Yep.

S: Is that something you do?

C: We do in the clinic. I don't personally go down that route. I've gone down to more biomechanics sports route rather than surgical route, but no, it's a reasonably straightforward surgical procedure. A little incision and basically take them out. Quite straightforward, but yeah, it's straightforward.

S: Okay.

C: And if some people come in and you sort of feel it and often you can feel them sort of clicking and moving around, and at that point there, you think actually let's just go and get the surgeon in there we'll get that removed. Sometimes…

S: I think it was when we had Professor Bill Ribbans in here who's a pediatric surgeon ... orthopedic surgeon, specializing in the foot. He showed us some pretty horrendous slides of just how big a Morton's Neuroma can be and then how much space they can take up.

C: Yeah. Yeah.

S: And so ... yeah. And again since we're still on the subject of these orthotics here, what about heel spurs? Because again, I'm not convinced that heel spurs are the problem that some people would say they are, and yet people do holes in the heel in their orthotics to try and cushion them, and things like that. What about you? All those little horseshoe things that we can see.

C: Yeah. Couple of options here to do it. Again it's offloading that pressure. If the patient is standing or something and is really uncomfortable, then it's gonna be more comfortable if there is a little bit of ... put a cushion in.

S: Yeah.

C: So we can do a pad, or again on something like that you can actually just add a heel pad in the bottom.

S: Yep.

C: But the heel spur itself, you know, whether it's actually causing the problem or not, the issue tends to be the traction of the Plantar Fascia, so is the foot loose and it's been stretched. It's the pull. So it tends to be the pull that's the issue, but then obviously if you're standing on it, it's uncomfortable.

S: Mm-hmm.

C: So I tend to use something that has the support as the main ... it's got to be the important thing, and then extra cushioning if we need it. But often the problem with putting too much softness in here, is actually you're often lifting the heel and actually creating more instability. So people that have gone for gel heel pads, they may feel a little bit more comfortable, but actually we're creating more instability.

S: And then what happens?

C: And then you'll be increasing the traction, the pull of the Plantar Fascia.

S: Right, so then we've got more of a Plantar Fasciitis ...

C: More of a problem.

S: ... and maybe less of pain underneath the ...

C: Yeah. So it may feel a little bit more comfortable to start with, but actually you'll create more of a problem longterm. So sometimes what we've gotta say to these patients is actually we've gotta firm the whole thing up. And it's surprising how much more comfortable it feels even though sometimes they're a little bit hesitant about it, but actually when the foot's in it and the Plantar Fascia isn't pulling ... we've taken out the traction, it actually feels a little bit more comfortable.

S: So how do you go ... you said that you were gonna firm the whole thing up. What do you actually mean by that?

C: By rather than going for something soft and squishy, where the foot's moving around, to go for something that actually has a little bit more arch support, so it could be even a medium density or high density EVA, or even onto a plastic shell itself.

S: Right.

C: So it's controlling how much support you need to do what you need the foot to do, basically.

S: Sounds slightly counter intuitive doesn't it?

C: Yeah.

S: If you've got a tight Plantar Fascia, to actually inject an additional distance, if you like, by putting in a higher arch.

C: Yeah.

S: Would seem to stretch the Plantar Fascia even further.

C: Again, it comes back to the functional aspect. Often what's happening is the foot ... and the windlass mechanism working properly, so as you load the foot you're getting an initial stretch through the Plantar Fascia, and then as you move into that push phase, instead of the arch reforming, it's actually elongating again.

S: Yeah.

C: Because the Plantar Fascia isn't sort of tightening and shortening that distance as we go into the push phase, so as the heel comes up we get a secondary drop. Now that may not be too much. So what we need the orthesis to do is to concentrate on that secondary drop and actually reestablish the windlass mechanism.

S: Right.

C: So the foot becomes then short and stable because all the veins become close packed, rather than in an open elongated position.

S: Okay.

C: So it does sound a little bit ... yeah we need to ... but often again we just wanting to be working with a patient and actually mobilizing the feet ... getting some flexibility. So we're trying to build tolerance through that Plantar Fascia. But short term we may need to ensure that it's working properly.

S: Right.

C: So again it goes back to function.

S: Okay.

C: Improved function.

S: We did do this last time you were in, I think, but could you just remind everyone what the windlass mechanism actually is, because I don't know if there is anybody out there who's not familiar with it, but ...

C: Yes. Well, so it's the Plantar Fascia which starts from the toes, comes over the metatarsal heads, and attaches right onto the medial calcaneal tubercle. And its job, as we've just said here, is to sort of guide the foot as we hit the floor. We've got that initial pronation, and as we move over the foot and we get an extension through the metatarsals the windlass ... the Plantar Fascia will tighten, which is that windlass mechanism over the metatarsals heads. And because it's attached onto the medial calcaneal tubercle, the heel will invert. So it's almost what causes the foot to resupinate. So it goes from the pronate position through that midstance phase, and as we move into propulsion, and the windlass mechanism kicks in, the heel will invert. So it's that ... I suppose, how the foot goes form the mobile adaptor when we hit the floor, into that more stable ... stabilizing, and lever into that push phase. And it's all around the windlass mechanism.

S: Interesting. The ... I've always called it Jack's Test. I'm not sure if it really is called Jack's Test. When you ask the patient to stand on their toes and watch for the heel movement.

C: Heel inversion, yeah.

S: Theoretically then, that should happen regardless of whether the muscle function is correct because the windlass mechanism should cause it anyway.

C: It should do, yeah.

S: Right.

C: And it's one of those, yeah tests to do the Jack's test. Yeah. Or we can to do the hubscher mechanism, which we'll have a look at as well.

S: Right. Okay.

C: Where we'll actually try and lift the big toe and see whether the arch lifts and the heel inverts.

S: Right.

C: So there's two ways of doing it, either coming up onto the toes or trying to lift the toe.

S: Okay. I've got some questions for you.

C: Okay.

S: You've done ... you've answered this to a certain extent. Can we give patients exercises to do and fix the body rather than giving them expensive orthotics? I think there's two questions there. Do orthotics have to be expensive? And ...

C: Okay.

S: ... can we do the exercises instead?

C: Yes. We do. And people come in to see me and from a running point of view or from another, we'll give them the option, say this is what you need to do. So absolutely. There's no reason why not. If the patient wants to put the work in, and we give them the right rehab, and we understand the reason why that problem is occurring, so we've got to address the function ...

S: Yeah.

C: ... so like we said before, it's not sometimes just strengthen up glutes or doing lots of single leg squatting. But actually how does that change the way the patient's moving? So are we getting extension into that push off phase? Which means we may be looking at sort of body rotation and releasing off through the body, so we're getting that sort of opposite heel, shoulder, and pelvis sort of rotation going on, reestablishing that mechanism.

S: Okay.

C: So yeah, it could be. And people come to me and say, I want Fascia, I don't want Fascia, I have done but I will need to look at my running gait or my posture and so we'll work on that. Absolutely.

Orthesis don't have to be expensive. They can be. There is an ... basically it's an element of you'll get what you pay for to a certain extent. As in a basic sort of arch support off Amazon for 20 pounds isn't gonna do the same as I suppose a couple hundred pound custom orthesis that ... now 3D sort of printed, and you know, the rest of it.

S: Yeah.

C: But all intents purposes, on one beam ... one thing about it, is the longevity of it. The more expensive one should last much longer. So if you know you're gonna be in the orthesis potentially long term, or it's gonna be a long term thing, at some points it's cost effective to buy a more expensive one.

S: Yeah.

C: And also what it can do as well. So some people come in ... I mean they're actually, "We just need a little bit of soft arch support. We don't need any more than that." So that's what we'll sort of suggest that they take. Some people we're gonna have to really get quite complex on what we're trying to

do. And if they buy into that and they want it, then unfortunately we've got to spend the money and actually get something that's gonna work.

S: Yeah.

C: Because again it can be sort of ... I suppose not good efficiency to put something in that's gonna do half the job. Because we've seen many people that come in and say, "Yeah, I've had gel insole orthesis, they don't work." But actually what they've got is something that doesn't work. Whereas, actually, a small tweak on it when we can get to work and get it to move.

S: Do you subscribe to the view that, actually, tiny little corrections can have a dramatic effect with orthotics?

C: Yeah.

S: Because there is a tendency to think, "Well, I've got to put four degree varus posts in, or put in massive corrections at the front of the foot with the metatarsal plans and so on before I'm going to see any effect," when actually, just a tiny little thing can perhaps overcome a major problem.

C: Yeah, absolutely. So, what we would try and do, as little as you need to do to make the change, but again, it comes back to function. What's the issue that's causing the problem, and let's use the orthesis to address that. If it is just getting that first rey to see it plantar flexing, and get the halux to extend, then that's where we don't need a huge amount to rearfoot control, because the issues are carrying into that push phase. Or we could be ... we just need to control a little bit of strain in the victryi joint, pernation, as we go through that sort of early mid-stance phase.

And understanding how the foot works, so, is it rear foot control that we need? So is it a lot of calculate aversion which means we will need rear foot posting, or is it actually just got an unstable, more mobile arch that actually much prefer. And what we don't want to do with that orthesis actually, massively sort of invert it through a lot of rear foot control. So again, it's about fine tuning what you need from the device to, in relation with the patient's foot.

S: Couple of questions from Robin. Robin's, his first one is um, will the first met drop help to take load off a slipped sesamoidea injury when it recovers. If not, any suggestion?

C: Yeah, so a classic one for that. So, just during the first metatarsal head cut out will immediately relieve a lot of pressure. Um, you may need to support the arch in behind there. Cause we don't want the foot to fall into the hole, which can be an issue with the first met cut out. So, depending on your first reflexibilty, um we'll have an indication on that. So we may need to just build that arch support in behind there. But, yeah, first metatarsal head and what

we are saying, we call the two to five bar, almost lifting the second to fifth metatarsal is a fantastic way of just reducing pressure off the third sesamoideas.

S: Is that what's also called a reverse mortums as well?

C: Uh, yeah, could be.

S: Yeah. The two to five bar, not the-

C: Yeah. It depends on its base. It could be all the down to if you've got something along that sort of line you could thicken it up. Or, you could actually come back on to the shelf, so which would angle it in slightly…

S: Yeah. The other question from Robin is, is that the purpose of the orthotics? Is the idea of the orthotic to change the function of the foot, or is it to correct a problem? Or to support, stabilize the foot, sorry.

C: It's to change the function. I always use them to change function. Which, will potentially stabilize the foot. Or, it could do any number of things. But, from my point of view, it's the function that's causing the problem. So, we've got to address the function.

To, for a long term solution, basically. So, the orthesis has to support that change in function. So, we will give people exercises, stretches, teach people how to walk again, which is often we see people are walking really badly, they've got into bad habits almost by body compensation. So, we've got to address that. So, the orthesis will be part of that process. It will allow them to make those changes, but yeah. Orthesis have got to be about function.

S: Okay. Now, we're gonna talk, have a look at our runner in a second. But, so, just before then there's a couple of questions that came in actually even before we started the broadcast. Um, the first one from Anna, asks, um, about patients who often ask if running is ill advised? Because, it can damage the hips and knees. And, she doesn't really know what distance is safe for her, to run as a rule of thumb. So, what's your guidance? Since you deal with an awful lot of runners.

C: Well a pace, you've got to start, and pace sort of gradually. There's no point getting in too deep. So, the couch to 5k program that are out there are the moment. There are loads of them out there sort of online. Brilliant place to start, because it's a walk/run sort of session that builds you up either 6, 10, 12 weeks. However long you want to stay there. So, that's a really good way to start off, is there. I think if you follow days, for very gradual build up of increase in the amount of time that you are running and, you're in the best position basically. You won't do any better than that.

S: And, what, be guided by pain? If it hurts, stop, or back off or....

C: A little bit, yeah. Just for, so back it off a little week. So, if you feel like, actually this was aggressive and a little bit more than I'm happy with, things are tightening up, a few aches, just, you'll have to go back a couple of weeks, and then start again. Or have the weeks sort of rest and recovery, and then start again. But always sort of go back to a three weeks, wherever you are in that program and then build up. So, it's good practice. You've got to build in recovery weeks, whenever, whoever it is that's running. They can't just keep going. So even the elite athletes will have down time.

S: Okay, now I've got just one more question from Tenneth here. Who asks, what gates or abnormalities are likely to produce chronic calf muscle tension? Also, achilles tendonitis and pelvic imbalance? Or, piriformis type problems? (laughter)

Ha ha .Yes, I've run through all the problems that could arise from gate imperfections.

C: Have we got another hour? The main issue we see with a lot of calf muscle tension and, I don't know how whether we'll see it with the runner, is an unstable metatarsal joint going through that push phase. So, if the windlass mechanism is kicking in, and the foot isn't stable, then the calf muscle particularly slias is really working hard at that. Late, mid start in reposive phase of gait. And, it's hanging on there a little bit. It's not essentially loading, so it's always working in that concentric phase, and that contraction phase, and unable, it will just tighten and tighten and tighten, til it get to the point where, yeah, either spasms or tears. So, the thing you tend to look for from a gate malice point of view, from a side view is that early heel lift, and often the knees still in that flex position. So, we need to heel down as long as possible, with an extending knee over the top of it. Over and extending hip, that sort of makes sense. So, it's basically the calf muscle is not going through that centric phase, is always in contraction. So, that's the issue and will just continue to tighten.

S: Okay, what do you think about piriformis then?

C: Piriformis tends to be, again, that sort of late, sort of lateral sort of twist. So if we're moving over the foot, then we're getting into some extension point of view, and then there's that sort of rotation up to that point. So, ITB, we'll have to go into that. So, all those lateral structures, again, are just working a little bit too hard. Or, the other issue with that is potentially not pushing through the foot, but actually using the hip flexes to pull the leg through a little bit. And, whether piriformis, again, is, or ought to be allowed to do that essentric leading, because we're not getting the pelvis rotation. So, it's, again, it's always working through that short phase. It's being allowed to stretch out.

S: Quite. Shall we have a go at our runner?

C: Okay. Yep.

S: Right. Okay, I'll let you move across to our clinic room, our treatment's in.

C: Okay.

S: Now, um, it's very kind of Dave Hutchins to come in and be our runner for the evening. Dave is a 54 year old runner. He runs, has run marathons, in two hours and thirty seven minutes. Amazing. He's run the 10k in 34 minutes. Although he did initially start life hoping to be a professional darts player. He's a slightly different physique from them, I'm told. Come let's have a look at Colin finds with Dave.

C: Okay, so the first thing we'll sort of. Stand just this way so you can sort of see from the foot. Well, I'll sort of put the foot into, not a subtainal neutral, but just taking a litte bit of the soft tissue tension out of the foot. So, there's a little bit of pressure between the fourth and fifth, and third metatarsal heads. And just allowing the foot to sit in its natural, sort of neutral position through there. Um, and then we're often sort of having a look down the forefoot to rearfoot, having a look down that alignment. Is this first rey sitting plantarflexed or is it dorsiflexed? So, it's the alignment across the metatarsal heads.

And, if we look off toward the two to five, and then we can see whether the first rey is able to plantflex and dorsiflex. Ideally, we're looking for sort of equal movement between the two. So, we want dorsiflexion, and we want plantarflexion. Dorsifliexion, to allow the foot to pronate through that mid starts phase. And plantarflexion, so we can get this one's mechanism kicking in.

And it goes in relation with that. So, we need hallux extension. So, again, we need the hallux to be able to extend as we go into that push phase. So, any boney changes as we go into the top of that joint. So if you've got bone in the exestasus, on the dorsum. If we got an IP joint hyperextension, as we can see here. This will all show you that this joint isn't particularly working as well as it probably could do.

S: Just run by through that bit again. You said that the IP interphangeal joint is hyperextending. So that, we're looking at that little bend there, in the middle of the toe?

C: Yeah, and it sort of comes over as opposed to that one. Which, it does a little bit, but not the same extent. But on the left side here, we definitely get the..

S: Which is a compensation for the hallux itself not...

C: Absolutely. So, in, so even though we've got a good range of movement, in a non-weight bearing position, what we need to check is this in a standing

position. To see whether, again the, the function of the hallux limitus. So, just go through this sort of winlass mechanism again. This joint here, it's a hinge gliding joint. So, we'll have a certain amount of hinge movement. And then, the glide. So, we can see that first rey has to plantar flex to allow the hallux to continue that movement.

So, all these joints here. So, two parts - we have the hinge part, which there isn't very much here with Dave, but the glide aspect is a large amount of it. And this is a windlass mechanism, that first rey has to plantar flex without the hallux to extend. We're going back to why often we need that sort of first metatarsal head cutout. We're creating space for that first rey to be able to plantar flex into. So, there's two ways we can do it. One, we can drop down. Or, we can lift the arch in behind it. So, if we lift that up, again, we're going to get first rey plantar flextion. And this is whay I said about the mobility of this first rey. If it's really unstable, and we just put a hole underneath it, potentially the whole foot is just going to fall into the hole. So, having that little bit of arch support, actually can be essential with creating that first metatarsal head. But, it's about reestablishing that first rey plantar flexion to allow the hallux to extend.

S: What's a normal, or the correct, or the recommended range of motion for that, um, for hallux.

C: For hallux extention? Somewhere around about 4 to 5 degrees I think is minimum. If someone is running, and they're running quickly, we're going to need a little bit more than that.

S: His metatarsal is running down there. So we've got nearly 90 degrees of motion there.

C: Yeah yeah.

S: Um, so you've probably got, if you were standing, you might have 45 degrees off a flat floor. Is that what mean? Cause that would seem like a hell of a lot of range of motion to me.

C: Yeah. Well, you've got to. That is actually, cause that's on the floor, yeah, and it's the leg moving over it? So, having that 90 degrees here, if we're looking at run again, that sort of big extension phase, then yeah, maybe, we may need this a little bit.

S: Okay.

C: Um, and if we haven't got as much here, again, we've got to possibly do a lot of mobilization through the mid-foot and through the Talus. So, we can get a few extra degrees here. So, if you have got somebody that has got a little bit of a hallux limitus, and..

S: Just go around to the side of it. Just so are trying to get.. I know it's not your normal examination position, but I'm gonna make sure that the cameras can catch as much as possible.

C: So, if we've got a, yes, so if we have got a bit of hallux limitus here, then, to make sure we have got sort of good first rey mobilization and also the Talus is gliding back into, this is really important that whole of that medial column can go back up into the Talus. Up into the ankle mortis. So, we have any restrictions, through the tailor glide, through the metatarsal area and into all the little individual joints, where if there is any restriction, it will affect, dramatically, how much this hallux can extend. And it's surprising how much more you can get, but really worth checking all of that. So if someone's getting pain in here, and it could be we're actually getting some blocking through the talus, which means that can't dorsi flex and actually the whole thing is just jamming up.

S: What's going to cause that? What's going to block up the subtalar joint there?

C: Through the talus gliding. Often, again, if that foot is sort of sitting in that very pronated position. So as it continually pronates, it almost sort of pulls it out. Also, very common after ankle sprain. So we have a big sort of inversion again that will often pull the talus out. Should drop back in, sometimes doesn't. So again, stays a little bit anterior. So that's often when people come in two or three months after an ankle sprain and it's still causing a problem.

S: Okay.

C: Because often again, so the talus is often not gliding back in. As we've got ankle joint dorsiflexion, we need to feel which is happening here ... we feel the talus actually gliding back in through the ankle mortise.

S: I imagine that like most experts in any orthopedic field, you would say that half or more of the problem here or the analysis is the case history.

C: Yes.

S: Now, we haven't gone into Dave's case history and actually Dave, you're a pretty accomplished runner, obviously you still do a hell of a lot of running, but you've had knee problems as a result of ...

D: A left knee problem. All my other injuries have always been in my right leg.

S: Yep.

D: Which has been some plantars, some achille's, a little bit in my knee. But my left knee had bone marrow inflammation through over use and then it complicated by falling over and rapping it into a tree in the middle of a race.

S: Which is never going to help.

D: So that ..

S: With that over use though, I mean we were talking about over use injuries, could that simply be a reflection of a gaiting imperfection which is causing those symptoms of the knee? And of course it's very easy to say it's an over use injury but actually you're used to running very, very long distances.

D: Yeah. I was in the middle of ... I was just coming back from an injury in my right leg and I got talked into marathon training. So I was upping my mileage very quickly. I decided to do a very hilly 20 mile race at training pace and I already realized that my glutes, my quads were tired and fatigued. And I was halfway through the race, about to go down a big hill, I knew I wasn't lifting my legs very properly. I tripped over a tree root and landed in a tree. So, I knew I was ... I shouldn't have really have run.

S: But interestingly, I know from talking to Dave earlier on, as well, and we were interrupting your analysis of the patient here, but Dave's been to running shops where he's been told that he over-pronates and then again, at a separate running shop where he was told no, you're not over-pronating. And he questioned that and he said, "Oh well, maybe you are." So what's your opinion of running shop gait analysis? Cameras can't see you face but I think ...

C: Yeah. Without being to rude about… Again it's often when we do the analysis where we would look at the difference. Just looking at how much pronation is going on through the foot of the runner is just nowhere near enough. We've got to look at the whole body impact on that. And a lot ...

S: But suppose, and I've made this point before, when you go to a running shop, they can't do much about anything other than over pronation really, can they? Because shoes are designed to either provide a little bit of support or a lot of support to stop that.

C: Or sometimes going the other way with it but, yeah. The problem is, historically I think, the running shops have used that over pronation to try and sell shoes, as in the more the foot rolls in the more of a problem is. We know that isn't the case now and often we're seeing problems on ... if we've got two feet, one that's more pronated one isn't, we're often seeing problems on the non or left pronated side. So it could be that was traditionally an over pronation is actually normal pronation and it's actually less pronation, which is a problem. So again, it's got also relate to what's going on. If someone's got an injury, there's sometimes ... you need a little bit more of a thorough analysis than going into a running shop. There'll be some good running shops out there and they'll have a good look and see what's going on. But I think if you're just going to people that are just purely looking

at the rear foot and then selling shoes on the basis of that foot's rolling into far of the initial contact phase, then that's not a good place to go.

It's much more important about how the foot's leaving the floor than what's happening when we hit the floor. And we know when we do the analysis, when we look at the side view that overstride contact position is much more important to look at than necessarily even what's initially happening when the foot just hits the floor. It doesn't matter.

S: Anyway, I interrupted you. So I'll let you carry on with your analysis of Dave's case.

C: Yeah. Coming back to what I was saying about with the knee issue on here, if we have this, which we'll look at ... We've got some dysfunction around this first metatarsal head. So how is this impacting the foot? If we're not able to move through that properly, have we got that foot that rolls through a little bit later. So we are all taking that knee out of position? Could be one instance with that. Classic for new pavement runners is an overstride, so again we can look from the video analysis and see. Are we over striding because we can't get extension because this joint is locking, so we've actually got to overreach a little bit? So rather than that stride being out behind us, it may be we're just overreaching a little bit. So doing your analysis on here and relating it back, what we said about history is really important. When you're doing your analysis, your assessment, you're starting to try and build that picture about actually what the things we need to look at.

So often when you get onto the gait analysis side of things, you've almost got a pre idea about what you want to look at. So rather than sort of just generally looking at somebody, you're trying to put it together, you're going with a premeditated idea, not from that.

And just the other thing that's sort of quite nice to show on here, if you can see on this foot here is a ... what we call a forefoot equinus, so Dave hasn't particularly got too much, but it does if we just allow that to drop down ... So we've got the heel position and the forefoot sort of just angles off it slightly. And again, this will potentially, if I force one in there a little bit here ... To get the heel and the forefoot, if this was the natural angle through here, we've almost got to pronate the foot. You can see that, to allow it to occur.

There are certain things which will almost cause pronation as a compensation. One is this sort of plantar flex for first rey position and then the forefoot equinus. So if you're seeing that, we know we've got to have some compensatory pronation just to get the foot flat down on the floor. The pronation for those feet isn't necessarily an issue, actually, it's really, really important but it's what's happening when we're getting past that. So it's the foot recovering, is it going through that supination? Is it stabilizing as we go into that push-off phase? So that's the important thing. So those two issues

really. You're looking at forefoot to rear foot alignment, both through a sagittal plane and also down on this side, the sagittal plane down here, and also that frontal plane movement of that forefoot to rear foot is the first rey sitting plantar flexed or dorsi flexed and that forefoot equinus will both start to see a compensatory pronation.

Okay, so a brief look at the ... Do you want to come and stand down on the floor…

S: So it does sound as though Dave should have give up running to me, but ...

C: No. There's always something we can do with people here. That's it. Just standing there. This is testing for the hubscher score, which is a functional hallux limited. We know we've got that good range of movement through the first MTP joints through the hallux. So we just get the patient just standing nice and relaxed on the feet, just looking straight ahead, not doing what you're doing, and if we can just grab the big toe and see whether it works. So now it's pretty much locked on the floor, so the foot has pronated even though the arch is still staying fairly high, it's enough pronation to stop this first rey from being able to plantar flex further to allow that hallux to extend. If you look on the right foot, we don't get the same extent going on here.

So when you're doing this test, you sometimes get one or two goes at doing it. After that the patient's starting to help you out. If you're seeing any extension ... the tendon extension, tendons helping you out as well, then it probably shows you're not getting a true representation of what's going on and if you lift up this toe and it stays hanging in the air as well, is a good indication that the patients helped you out. We want to see a nice relaxed foot position through here and, basically, you're not going to get too many chances because once you've done that a few times, it'll just start to lift. How much pressure you put under it's important as well because, if you really force that, you can get the foot to move, but that's not what we're after really, it's getting that initial life underneath here, whereas on that side we can see ... We've got a little bit of asymmetry going on. Definitely more pronation, so even though the arch is staying fairly high, and if you just turn round to the ... so your feet are back to the camera there, Dave. Then we can see through the rear foot, here.

There's very little rear-foot pronation going on. We've almost got the heel, the leg and everything aligned through here. So going into that classic, is it rear-foot pronation or is it mid-foot pronation?

S: Can we get Dave to turn to his left, about 10 degrees. Just a little bit more to the camera. Yeah, thank you. That's probably a better angle for the camera to see that.

Colin: So you can see that through. We're not really getting a lot of calcaner inversion through the leg, so everything sort of quite nicely aligned.

So they're ... looking at this foot, the arch is staying fairly high. We've still got a nice angle through here. There's not a lot going on through the heel but we know this foot's pronating because that big toe won't move. The only reason why the big toe won't move is because that first raise can't plantar flex further. So just turn round again, Dave. Face the front here.

Often we'll see this sort of foot. The pronation won't necessarily be in the foot, but will go up the leg. So we're still getting a subtalar joint movement but it's not going distally, it's actually going proximally back up the body. This again leads to ... Sometimes, where we're having that sort of issue with knee problems, is because we've got a lot more rotation going on.

What we can do, just as a simple orthosis ... What we want with orthoses ... If you are looking at using either pre made ... Just want to stand on there for me, Dave. Pre made or custom made, a good test to see whether this is effective. You want to make sure this big toe joint's working. We can do a simple test, so stand on the orthoses and now immediately, we haven't done anything else except just put the orthoses in and we can see. Now we've got that first raise able to plantar flex because that hallux is extending. We can see we're getting a little bit of arch lift. We're even getting a little bit of rear foot inversion going on and that side's going to be fine on there.

S: How is that encouraging the plantar flexion?

C: Just basically because we're lifting the arch. We're not allowing the arch to drop quite as much.

We're just creating that first rey's just sitting slightly more plantar flexed than it was previously.

S: So actually, a simple arch support off the shelf, in a case like this, it could be the answer.

C: It could be enough. That's all we need. We know that mid-foot's… we haven't gone into why it's happening. There could be lots of other bits going on here but we know that arch is just dropping a little bit, which is not allowing that first raise to plantar flex further. So just giving it that little bit of lift then allows that first raise plantar flexion to occur. Sometimes it can be really that simple. Then we'd obviously check the walking things and going over that, but ... And we're not over correct on that side as well, so that's okay.

It gives you a nice little test. Doing these and also a single leg stance, just stability. This Hubscher score, mechanism on here, gives you a good indication of how well that's working. If that wasn't working, we put the orthoses in there and actually it didn't work or if somebody comes in with

orthosis and actually it's too support, can be an issue. If we're blocking that first ray, or we've got too much various post and medial posting on the orthosis, it could stop that first ray from plantar flexing. It's quite a nice little test, nice and quite straightforward, and again the patient almost sort of can see what's going on. If you said, "Look, the problem is here we're not allowing that big toe joint to bend. We're rotating through the knee. Just stand on this a minute, oh look, that toe moves", it makes you feel a little bit more confident and also the patient is almost going to just feel that actually, yeah this is going to do something.

S: You've mentioned the Hubscher mechanism there a couple of times, the mechanism being the actual plantar flexion of the metatarsal, together with the extension of the toe.

C: Well, the Hubscher is actually, it's a scoring type device. Just step off that again. Just down again, Dave, if you want to. It's on like a zero to three, so if that big toe doesn't move here we can score it zero, and if the hallux moves and nothing else moves, it's a one. If the hallux moves and the arch moves, it's a two. And if the hallux moves, the arch moves, and the heel inverts, it's scored a three. This would be a zero and then a three, but once we're on the orthosis, that will go to a two and still stays at a three. Again, it's just a way of sort of in your notes just sort of gauging what's going on.

S: Good, thank you.

C: Okay, so yeah, straightforward, just have a look at the feet when we're standing here, we're got a little bit of blocking, there's not a lot going on with traditional pronation, but we know there's going to be something going on so now we need to have a look at him running.

S: Okay, so we'll let Dave put his shoes on.

C: Yeah.

S: But while we were talking there, you also mentioned single leg stance but you didn't go into any greater detail on that. What do you mean by the single leg stance? What would you have done with him?

C: Basically just to stand on that one leg.

S: To see what? Whether he's stable, or?

C: To see whether he's stable overall, and also to see where the foot's moving as well. It would give a good indication about whether the heel is rolling in, whether we're having that tailor navicular joint pronation, or whether we're actually getting that arch to drop a little bit further.

S: Would you try that with orthotics as well, just to see if they improve things?

C: Doing that, yeah. So, we're getting a lot of wobble, lot of movement without them, and then stand on it and again we've got to see an improvement. Again, it makes you feel that actually the orthosis do something, and also again the patient feels a lot more stable straight away. They've got a little bit more confidence it's going to work. To do that, and so we can do that single leg stance, we can start doing some dips from there as well, or squats, all the usual things, look at whether that pelvis is easier to maintain in that position. If the arch is dropping, and actually we've got that big internal rotation, we're always going to struggle a little bit with trying to get strict glute strength.

S: Yes.

C: Just holding that certain position, people often say, "Actually my posture feels much better." They say, "I feel a lot taller", which they will be a little bit, and actually we're tending to get that little bit of anterior rotation, posterior rotation through the pelvis, and often they just feel better straight away. All those things are a good indication that the orthosis is actually going to do something positive for them, but if they stand on it and actually they're just really struggling and it doesn't feel comfortable, then you think, "Actually, let's go and get something else", or, "I'm not quite sure what we're doing here. It's not going to work."

But there's almost no point giving the patient, allowing them to continue with that orthosis if it doesn't feel comfortable, if it's not improving their big toe, if they don't feel more stable on it. At that point, we can either say, "Yeah, it's not right", or, "We need to look at something else." You're not wasting their time, they're not wasting their money, and actually they've got confidence in you that you can do something.

S: Right. So where do we go now?

C: Okay, over to the treadmill. The first thing I generally do with people if we get them on the treadmill is one, ask have you actually run on a treadmill before? Really important. If they're not used to running on a treadmill, sometimes it's just not worth going onto that. That's going to indicate about actually have you got, I suppose, a bigger carpark or somewhere where they can do it. If this is the first time that someone's been on a treadmill, you're not going to get a good representation of how they're running, but if people are running on a treadmill, they're quite comfortable with it, then sort of fine, we'll do that. Get an idea of the sort of running speed that they want to run at as well before you set it off, that's going to be really important.

S: Do you not let them find the comfortable speed?

Colin: We do, but yeah, give them an idea about where we're going to go with it, because people say, "How fast do you want me to run?" Where actually we want them running at a reasonable ten pace style run, we don't want them

running too slowly because they're going to be running properly, and we don't want them absolutely eyeballs out, because again we're not going to get a good representation. They need to be putting a little bit of effort on, and they don't need to be on here for a long period of time as well, just to get warmed up, just to get used to it, and then because of the video most, depending on what sort you're using, but if you're on someone's phone, it could five, ten seconds is enough, because we'll just loop that back and forward. They don't need to be on here a huge amount of time.

S: Do you always film them? You always film people on the treadmill?

C: No, often we'll go outside. Yeah, unfortunately…

S: I mean, you always film?

C: Yeah, with runners, pretty much so. Very rarely, but you've got to look at how people are running.

S: Do you use clever Dartfish type technology, or are you just using a standard iPhone, iPad to?

C: We're using a camera that will do up to 420 frames a second I think, recording on that, and I'll run it through Canavia.

S: To put that in perspective for most people, most films are at 15 frames a second, so that's seriously high speed.

C: Yeah, 30, 50. Yeah, just to get a good indication of what's happening. With runners, we can do 240, you're starting to lose a little bit of detail, but yeah, 420 will give you a good indication. Anything higher if you can afford it, yeah. There's a lot of good cameras out there now at not silly money. It's much more accessible.

S: For the benefit of the audience, we have actually filmed Dave earlier on, on the treadmill, but you're going to talk us through how you would set this all in motion, literally. Then we'll look at the video that we took earlier.

C: Yeah, then the video. Okay, ready to go with this?

S: Yeah.

C: We'll just start off, and just get this treadmill up and running. We'll discuss where we need to be. Just into the run there, and then we'll build up the speed. To get an idea about how comfortable they're looking as well, it looks like he's getting into his stride a little bit. Is that comfortable for you?

D: Yeah.

C: You're going a little bit faster, that will be about right there.

D: It's quite slow, but it's ...

C: Quite slow, so we'll get moving a little bit. Also again, just a good indication about how their form changes. It's looking relaxed underneath it, not sort of struggling on the treadmill, and we're getting a nice position through here. Okay, comfortable position here. We'll just give him a couple of minutes just to sort of get comfortable on that. Recording, I would tend to do side view and the rear view as well, so if you've got room in the clinic to do that, side view I think is really important.

S: Would you do both sides, or is that not so important?

C: Sometimes it is, depending on what you're looking at. If you've got room, again, one of the clinics I've got we can get the treadmill so we can do both sides. One of the rooms, we actually can only see it from one side anyway. Okay, we'll slow that down.

S: I don't think I've ever run that fast on anything, but then I'm a different build, obviously.

Colin: … There's a lot of video out on the internet about Kipchoge, who's just done the World Marathon, and they had a treadmill set up which was the speed that he ran for the whole thing and they were getting people on it. It was something like 13 miles an hour, I think, is the average speed that he ran for the whole of that two hours, which puts it in perspective. Seeing normal people on it, and some of them are, within a few seconds like, "Argh."

S: So come on, Dave, get a grip. You need to speed up a little.

C: That was about 10 miles an hour on there we got to, so yeah, another 3 miles an hour would be where Kipchoge was for two hours.

D: Okay.

S: We'll look at the video now?

C: Yeah, we can have a look at that.

S: Let's see if we can pull the video up on our own video monitor, and you'll have to talk the audience through what you're seeing.

C: Okay.

S: Obviously we've slowed it down quite a lot.

C: Yeah, well this was recorded off a phone camera, so we're getting real good detail on here, and you can get ... even if you've got a patient's camera, a phone, you can sort of just record and own it, and sort of play it through. So we tend to a full body shot to start with, just getting an overall impression of what's going on.

S: And we're hoping that full body shot's gonna come up?

C: Yeah.

S: I think ... There we go. We've got the rear shot first of all.

C: Yeah, there we go. Back on again. That's it. The full body from the back, and this is sort of quite useful, because we're gonna look at shoulder position, make sure the shoulders are nice and level, which they are here. Pelvis, as well. Ideally, if people are coming in, if they've got different colored shorts and top, it makes this so much easier.

S: I didn't think to tell him. Sorry.

C: So, it's obviously ... I know. Just noticed, now we've looked at it. Or again, if you've got people in and they're either in a sort of bare tops or sort of crop tops, again, you can get a good indication about what's going on through the back. We're looking to see really whether foot's on the floor, are we getting that Trendelenburg drop, so is the opposite side pelvis sort of dropping? Here, we're looking fairly level. Maybe a little bit more of a drop on that left side. Difficult with his sort of colored top underneath there.

I tend to start at the top and work my way down. Then we're looking at foot and knee together, so we can see the knees are getting into that a little bit more valgus position through that contact phase. I'd say the left one is potentially just becoming a little bit more abducted or valgus in the right side, during that loading phase, just here to ... coming up on that left side, you can see that knee coming in a little bit, which isn't really relating to a lot of rear fit pronation. I would say this foot is sort of absolutely fine in the shoe, which is the most neutral shoe, and we don't need anymore support than this, because this is a nice comfortable level of pronation through here.

S: Is it my imagination, but the right foot seems to invert sharply just before it hits the ground?

C: Or is hitting the floor. Yeah, it's just finding the floor a little bit and it's just sort of coming across slightly, as well. This potentially is gonna be a bit more of a hip issue, so a little bit more, potentially, a little external rotation through the hip, which we haven't really gone into too much there.

S: But it does sound as though we're gonna be able to charge Dave quite a lot for treatment.

C: Absolutely, yeah.

S: There's all sorts of things we can fix.

C: Definitely. There's lots of things we can find from doing this. And arm swing, again, sort of coming back nice. There's no sort of arms flailing around, so we're not really moving through the arms. Okay. Can we have the close up on the feet? This is your running shot, sort of general view here. Again, on this it looks like we're in the right sort of shoe. If any running shops say this is an over pronating foot, I would say it definitely isn't, and they're just trying to upsell into a little bit more supportive shoe. A lot of-

S: They always say that, simply because you can see the foot everything as it hits the floor-

C: Everything, yeah.

S: ... which, of course, it's gonna have to.

C: It's got to, yeah. If anything, that right foot, potentially, with you're saying there's Achilles problems, calf problems on that right side. Potentially, there isn't enough pronation going on. That pronation will be the bit that's sort of allowing that foot to stretch and just to load. So, that left foot, absolutely fine. That is not an over pronating fit at all. So yeah, quite comfortable in this sort of neutral shoe. But this is why, just looking at this now, we've got no idea about why this is going on, really. We have no idea about the contact position, where the body position is, so you've got to be doing full body shots on the video analysis. Really, really important.

Okay. And the side view. This is where we're gonna get most of our information from. Again, just because there's space, if we can get the get in the shot, that's gonna be better, as well. We're looking at overall posture. This is almost a little bit of debate, whether we need this sort of forward lean or not. There's an element of, we need to be nice and upright to allow the extension to occur, but we've almost gotta be forward leaning slightly, just to move forward. So what I tend to get people to do to find that right position is, if you stand both feet together, sort of just slightly flex through the knee, just lean forward until you're about to fall over, is probably about the right position for most people when you're running here. Also, what we don't want-

S: Is that gonna vary depending on the speed of the runner-

C: Yeah, the speed of the runner. Yeah.

S: ... because surely it's gonna be quite a lot further forward for someone like Dave.

C: Yeah, if you're moving forward a little bit. Yeah. So, good upright posture. He's good. Again, looking at arm swing, so we're almost looking to find that little bit of gap between ... in front of the elbow you need to see daylight between there and the rest of the body, so we want to see the arms coming back behind. Really, really important.

S: Seems to be quite a lot of cross body swing there. On the right arm, I can't tell with the left. Is that okay?

C: Yes, there is an element of that going on in there as well. Again, arms sort of forward and back's gonna be better. If we're getting a little bit of rotation going on through the hands, it will tend to pull the feet forward a little bit, as well, which we'll come onto. The important part of the arm swing is the drive behind, because the feet and the legs are gonna follow what's going on with the arms. So if the arms aren't coming back behind and the hands are all across in front of you, then that's gonna be the main emphasis of your running position. So if people tend to sit back a little bit, they'll lean so they're almost sitting down running position, they'll lean forward slightly, but everything then comes through the hips and through the quads that we're pulling the body forward.

The more upright we are and the more of the drive of the elbows back behind, the more we're gonna get the legs and the feet to come out behind. So we're changing the emphasis from a push sort of activated running style, rather than that sort of sitting back and sort of pulling forward. So a good posture on here. Again, can't quite see what's happening. We should have had a t-shirt tucked in shorts so we can see if we get any anterior drop through the pelvis. Going into the contact position here, the left foot is almost a little bit of an over striding heel strike and the right foot is a little bit closer under the body, under the knee, into that flat foot position. So you definitely get that little bit of assymetry between that push phase again. Any over stride or heel strike, we're gonna have to have more rotation through the limb to get past that foot.

Whereas, the right foot is sort of hitting a little bit closer to underneath the knee. With most runners, unless they're fully sprinting, we're never gonna get that contact position close underneath the body, but the foot needs to come forward and then start pulling back so we're activating the hamstrings almost while the foot is still in the air, so we hit the floor when the muscles are starting to work to generate that power, so we generate power as quickly as possible through that push phase. We're looking at the extension then through the knee. How straight is the leg as the toe leaves the floor is what we talked about last year a little bit here. Ideally, you want that leg straightening, definitely extending. We don't want any flexion of the knee while the foot's still on the floor. I think Dave's just about doing that here, very-

S: You don't want any ...

C: Any flexion of the knee while the toe's still on the floor, if that makes sense. We wanna see the leg fully extending or extending as far as it's going to, and then toe off, which is what's happening underneath here. And then that heel lift behind, as well. I would say for most people, good runners, we want that tibia to be coming through that mid stance way through that swing phase, horizontal.

S: Which it is.

C: Which it is doing, yeah. And again, you can almost see where the heel's crossing through the middle of the calf. Again, that needs to be in that sort of slightly higher position. Again, we don't wanna the opposite side swing phase foot sort of crossing at the ankle, because again, that's gonna create an overstride position.

S: Okay. If this were your patient, what would you be doing with him?

C: Trying to address that overstride slightly on that left side, so what-

S: This is ... Sorry, I'm interrupting you, I know. I apologize. To me, this is going slightly beyond what many of us would think of as gait analysis. Now we're into running coaching, are we not?

C: We're into running rehab. Whether we're quite getting into coaching. I'll do a lot of rehab. One of the clinics at home we do have coaches in there, so I have often people come in with some discomfort, I'll get them to that point of not, and then hand them onto the coach. I suppose coaching as in we're gonna discuss about running technique, but not coaching as in taking that on further with regards to that, with performance improvement at all. Here, we've gotta look at why that overstride's occurring a little bit and pull that back in a little bit. Now whether we can do that just by showing Dave a video and going, "This is what's happening. Let's tighten up that arm swing a little bit. Let's make sure that posture is nice and upright."

We'll potentially do some hamstring testing to make sure that they're working equal, so both hamstring's working correctly. We'll do some basic sort of sit to stand, some hamstring [inaudible 00:08:28], some step ups, although we're working the hamstring through that centric load. Usually, with this type of thing here, we can almost control that, I would have thought, by some conscious thought. So Dave being aware of what he's doing and making sure we're getting that full extension, and if we're extending properly through that push phase, the heel's coming up nice behind, again, that may just control that, all that.

S: Just remind me again why you might see overstride in a runner? What might be making him do that?

C: Usually because we're getting some functional block through the big-

S: So once again, it's that hallux problem again.

C: So it's that chicken and egg a little bit, yeah. We haven't got that extension, we can't extend properly for whatever reason, we've still gotta keep that stride length the same, so we're gonna go into a slight overstride. But if we don't, we've gotta bring that overstride back a little bit, which means we've got to put the extension in. So it's one of those, how's it work? But it usually is a postural problem that causing that, and often with people that have quite poor bone form, you'll hear the difference. So one side will often be a little bit noisier, so again, the treadmill, listen is really, really important, and if we do have that little bit of slap coming down on one side, again, look at what's happening through the body. Are they dropping onto that a little bit here? Is that arm crossing in front of them?

Again, you've got to address all those issues, often before we'll start using the orthoses, or if using orthoses because they can't control that movement ... I mean, Dave's foot was fairly stable, but it could be we've got a really unstable foot and no matter what we do posturally, it's just gonna drop through that mid stance phase and it's gonna block the joint, and actually, we made may need an orthoses in there in the short term, potentially, with something pre-made, or we may think, actually it's gonna be a long-term issue, we need something custom made because we can use software/material, it's gonna last much longer.

S: Yeah, well actually that's one of the questions that's come in, is that do you see orthoses as something that people are just going to have to live with forever, or can they actually correct a problem? One of the specific areas can you actually correct a dropped arch? Will it reform at the height it should be?

C: I suppose there are two parts though isn't it? Traditionally it was orthoses were put in forever, and they were acting almost as splinting or scaffolding for a foot that's not working. We know we can get that foot working better. Now whether we're gonna reform back where it was, wherever that was, because I don't know where it was, if that's the first time I've seen the patient, and almost that's irrelevant. If we know that fit's working better and the symptoms are reducing, and the patient's running. Or running much happier, and much more comfortably and they're improving again, then that's sort of job done.

We don't need to go back to where we were. We've almost got to work with what we've got, and go forward from that position, if that sort of makes sense. Don't compare one to the other, 'cause often we all get assymetry as well. Arch heights will be different, so again it's the function of the arch that's the important thing, rather than the height of it and sort of how it's moving is important.

S: Dave, can I get you come and join us for a minute, 'cause obviously you've been the subject of this analysis this evening. I've actually got one question, which is directed at you.

D: Okay.

S: I don't know who asked the question, but they asked, were you aware of this big toe problem beforehand? Have you ever had that explained to you, that-

D: No, but I could relate to what was being said about how one foot striking differently on that treadmill, and I'm aware of that generally when I warm up currently, probably because of my injury. During my warm up process I tend to correct that. So you were dead right what you said, and I am aware of that and I can feel it when each foot strikes the floor.

C: But then able to make those changes yourself.

D: Yeah, because I'm quite tight.

S: So everything Colin said there chimes with what you've experienced-

D: Yes, exactly.

S: ... in your own running?

D: Yes.

S: Makes sense. Yeah.

C: So in this instance what that person said about what orthoses, I wouldn't be looking at using orthoses with Dave, we'd be looking at trying to control that by awareness of it. Maybe using some specific drills and things to help with that warm up to help that process along a little bit.

S: So you're not bothered about trying to correct that hallux limitus?

C: It would correct itself if we had the other bits and pieces, because it's there in that standing position. But you can see he's moving over it quite nicely, there's no sort of real layered rotation or anything going on with that foot. But it probably is just making him just restrict that movement a little bit.

S: Yeah.

D: But it's sort of marginal, but over a period of a lot of training it's gonna have an impact.

S: You had a chat to Dave before we came on air, and I wasn't listening to that. But I mean are there other problems that you get, hip problems, ITB

problems? Obviously you mentioned a knee problem, which is probably trauma rather than anything to do with your foot. Are there other things which might be connected you think to your gait?

D: I don't think so. I've been running since 1987, 88 and I have 25 years without a single injury. It was my first injury, which was my Achilles problem, was purely a slip in the shower and I rubbed my Achilles against a hard edge. I'd started chasing the injury by probably over compensating on that leg. I generally been able to correct myself because I generally do rehab as I should, and this left leg problem and my knees been harder to get over because it's been over a year. I don't always have the confidence, I'm only been back running about three or four weeks. Only up to 20 miles a week now, and sometimes I just lack that competence to go for it, which is when I'm into my flow and I'm warmed up, and I can just take it out my mind. Forget about it and run, I just run more naturally.

S: So what would you advise this patient in these circumstances then? 'Cause this is useful stuff for us in terms of counseling as it were.

C: Yeah absolutely, this is really important, and we see this quite a lot with people. They almost just hold back a little bit. So they're almost sort of running a little bit tentatively and a little bit scared thinking is this gonna happen again? Or am I waiting for it to happen? When it does its just like, ah it's all happened again, I knew it was gonna happen sort of thing. So people often in that sort of downward spiral, sort of negativity a little bit. So often what I'm saying to people is actually try and do, get back into a little bit more interval running, and actually run a little bit quicker. 'Cause it'll naturally put you back into a little bit better form. Forget about it almost, so if you're doing a little bit of interval time work, or some hill work you're concentrating more on that rather than what's going on in the injury.

The impact on the bodys a lot less as well, which is sort of really useful. So you're not getting that repetitive overload, which is sort of going on. You're using that body through those short bursts, as again recovery can be a little bit quicker. It also means people can often run a little bit further, 'cause often they're coming back and they're going oh program said I got to do 10 minutes running, is it worth getting all your stuff on? But you can do 10 minutes running in over 30 minutes. So by doing that, sort of right I'm going to do 10 minutes of really good running, but I'm going to do 20 minutes of either walking or warm up and all the rest of it.

So it just means you can get the patient sort of moving a lot more and a lot more efficiently by using that type of interval time work, and hill work. But yeah this is a big problem of people just running a little bit scared to start with and you've got to say it's fine, you're okay. The injuries gone, if it's been this amount of time there is none of that initial injury, it's just tension holding

within tissue and you've just got to get moving on it again. It's very important.

S: So we had one question that came in Dave is, have you had much formal running coaching? Proper training as opposed to being a member of a club and just going out and doing it?

D: Not formal coaching no. It's generally been belonging to clubs and up until I moved up here I didn't even follow a program I just went out and ran as I felt. All my best times come from that. My injuries have come perhaps a little bit more around a structured program, been a bit more consistent. I don't think it has any rhyme or reason to what suits yourself.

C: Absolutely, and I think what people if you're used to listening to your body, you'll know, you'll think actually I'm feeling a little bit tired so I'm not going to have any ... Whereas if the program says, right I've got to go and do a 10 mile run today, you'll do a 10 mile run even if your body says, actually I'd rather do a five mile easy.

D: Yeah.

C: So yeah, really important to listen to your body and to have structure built into that. So if you are following a program, you know if you miss a couple of days, it's not the end of the world basically. All the people you see they have their best times, if they're getting little niggle injuries' sort of four weeks into a build up of a big race, part of them is going actually this is brilliant. Because it's forcing them to have a rest at that point, but they think actually I've got to get another run in, I've got to do another run. You know most people they've done the hard work by then, they can easy get away with giving them a couple of easy weeks that far out.

S: Another question here again it's for you Dave, you can sit, take it easy Colin. Do the things that Colin do they make sense to you? Do they sound helpful? Because the person who's asked this question says I have a patient with a similar problem, so they're interested to know if you think that shorter faster runs would help?

D: They certainly do, the only thing I didn't understand was any this stuff there.

S: Yeah, don't worry about it.

D: But really into going out and doing the 10 minute run, doing the 10 run and doing the speed work as it were, yeah it's actually what I was doing last night. It's just easier to get a little bit of a break. You do another rep, as you get tired you ease off or you go home. You don't get bored, and you're not forced into doing 10 miles, it's good.

C: Definitely. That's really important as well, keeping that sort of variety into running as well is so important. Running injuries are just repetitive overloads and if we can get some variety in there then people are going to respond so much better. So yeah, changing that around a little bit. People often are doing the same three times a week, they're doing the same five mile, same re rounds, they're the people that cause the problems. So yeah, mixing up, getting some variety into there.

S: So we've got some stuff which isn't about Dave.

D: Ah great.

S: First few questions I can deal with very quickly is could you say the name of the test again, and Hubscher score? We'll put that up for you. I've always said Hubscher, H-U-B-S-C-H-E-R so you look up Hubscher test or Hubscher score on Google couldn't you?

C: Yeah.

S: But we'll put that up in the transcript at the end of this. We've got a question here about youngsters and do you Colin have any ideas on how to help a 10 year old youngster who's a bit on the heavy side, lacks ligaments and very severely hen toed? Heel pain only after exercise, I'm dealing with heel pain and over pronation and hip rotator glutes, help I feel he may need more specialist help.

C: Yeah, potentially with all of that going on, yeah. I suppose ligaments laxity is a real issue, especially in that age when there's a massive amount of growth going on. As I said whether it's a girl or a boy, the girls particularly at that age can be really unstable underneath that point. If they're running with a club or trying to do bits and pieces they're often pushing too hard. So if you look at all the guidelines on what they should be running, they're often well overdoing it. Especially with the hard run.

S: We're going to have some comments now about woman of a lot older than that being unstable as well. Then I'll get complaints for making that comment.

C: Yeah, not my department that one, but yeah. So but again, heel pain again it's the severs or whether it's sort of planter heel pain underneath that. So footwear's really important as well. So, a lot of kids will go out and be running in fashion trainers, so if they're keen on doing it then get in the decent shoes gonna make a massive difference as well. They can be a little bit expensive. But again it's often just too much, if they're doing stuff at school and they're running with a club, and they're maybe doing something else as well. But often children they're normally sort of pushed a little bit too much. A lot of kids that age they'll be doing sort of five K park runs, but if you look at

sort of UKA sort of guidelines then they should be doing nowhere near that at those sorts of ages. So it's a long way for little bodies to run.

S: What are the guidelines then for somebody whose say 10.

C: I was gonna say that, or I would have said it. But I think for a 10 year old it even be something like two K. Sort of maximum in one go. Yeah I think so.

S: Okay. Another question about 10 years old, I don't think it's the same question. It says, what's the best way to support a 10 year old who's suffering with foot pain. He says what's the best way to support a 10-year-old who's suffering with foot pain. This question has been told the in plates are growing. She's missing her athletics training. She should she be using orthotics; she's yet to have the child's running style assessed.

C: Again, if it's a service type problem, it doesn't tend to cause any long term problems. I always sort of tend to work with the child and the parent to say, if they can cope with it, and it's alright and they're happy with it, then there's no reason they shouldn't be running on it. If it's causing an issue, they're not sleeping at night or their limping again afterwards, you might actually maybe just need to reduce this back a little bit.

Orthosis can really help at this sort of age, even if it's premade can be really really useful. Again, if that foot is just really flattening out and it's not able to re-stabilize into that push phase, we're just going to lower the muscle tension so that could help. There even a like a little heel lift, but fairly firm one; not gel heel lifts, that can help. Again, it's just looking at trainers, sometimes school shoes can be the issue, girls' school shoes are particularly rubbish and flat, very floppy.

So, sometimes, it's away from running where the issue is. If they're walking around all day in sort of rubbishy shoes, again that can be an issue. Again, boys a lot of time are in football style trainers. Again, if they've got a little bit of an unstable foot, with that big cut-out down the inside of the shoe, they tend to just drop off of that and they tend to very curved, those shoes as well. So look outside of what's going on is necessary, it may not be a running issue.

S: Is there any danger of giving a young child orthotics that you can weaken the foot in the way that we say, "Don't wear knee braces, don't wear neck braces", things like that, because you'll actually detract from the strength of the supporting muscles.

C: I don't think so, again, you're looking at offloading structures in the short term so again, they've got an issue that's caused by something taking more loads than it's happy with so kind of just reduce that load a little bit. So again we're not looking at huge amounts of correction and it tends to be either,

what I tend to do with children is either refoot or just that first bit of the arch, so again, it's not a huge matter.

And what I would say about children's running style, they do tend to run much better than adults. That's when we get old and we've sat down for hours and hours and everything's tightened up.

S: Well you showed us that lovely video of your daughter in the last-

C: Yeah, very happy little runner. Not often everyday in the workshops we see the children run a little bit quicker and they'll just pick the heels up a little bit and they'll have a beautiful sort of length in their stride and it's really only once we get a little bit older when we start that.

S: That's, the child we mentioned earlier on with the laced ligaments, I think it's the same one. It's a boy and he's quite tall and has size six shoes so that's quite large for a fourteen year old.

C: Big growth plates so again a lot of growth plate issues potentially on that.

S: You just mentioned heel lifts and somebody has said that curious to know at which point when people have one leg longer or shorter than the other one, at which point do you then consider that heel lift as important. Or is it?

C: Well if it's contributing to the problem so if that's the main issue, so if everything else is okay, so often what we'll see is the normal ways on the longer leg will have more pronation going on to try and shorten the leg a little bit.

On the short side you'll have an increased arch position so we'll often twist and fill a little bit laterally. So if that's their running style, we need to address it, and often we've got to address the leg length difference. So if the leg length difference is the primary problem then that's gotta be addressed either with a raise or a built in to the orthosis prescription as well.

So we'll do it, I know it somewhat can be a little bit trial and error, don't tend to measure. So it's about looking, eyeballing, see what's going on, having a look at them moving. Are we getting an equal drop? So often where there's a leg length difference we'll get a much bigger trend down look on one side than the other and ... while it is quite trial and error, we go to it with some sort level of assessment. But again you're not quite sure how the body's going to respond to that. And again, I would always try and work with osteopaths, chiropractors, physio, because I wouldn't be wanting to do too much. So it could be a straightforward tight ... but if it's a true leg length then absolutely. Then heel raises often can be the only thing they need and relatively easy to fit in shoes.

S: But you said not the gel type.

C: No it's got to be firm.

S: Cool, cool. Vinyl.

C: Yeah, also the hard high density TVA.

S: Yeah. Jason has asked us a question. He says he thinks that sometime not that long ago there was a government statement which said that running does not necessarily cause arthritis of the hip or knee. Do you or does anyone else in the audience know the incidence of hip or knee arthritis in runners compared to the general population? And what's your thoughts on that statement as well?

C: So I'll just bring to mind that actually it's less than runners. I think with one sort of footwear and what we have counseled to look at running gait, then it can be mitigated differently. It's the overstride that is the issue with knee pain. If you're hitting the ground heavily in front of you and it sounds really heavy that knees got to twist and rotate and, again, we are not getting the extension through into the push off phase. So a lot of knee problems we will see because of the over stride. So we will bring that contact position in a little bit. But that does have the effect of putting all the pressure back through the ankle and the calf muscle, so you have to be careful of solving the knee problem and then causing an Achilles issue.

S: There is always an issue with this isn't there? One might say that arthritis is less common in runners but that doesn't mean that you should push somebody that isn't a runner into running to try and avoid arthritis. Because there would be sort of an association on this based on the fact that they've liked running. His body is probably attuned to running.

C: I think people shouldn't be put off from running because they think they are going to get knee arthritis. There could be lots of other things, risks that could go on. And you will see runners with arthritis and you will see other people without any problems.

S: I've got one very open question here. It just says "Fibromatosis? Orthotics?" Would you like to comment on either of those two words?

C: I assume they mean we've got a lump in the plantar fascia, which is irritated. Again, they can irritate ... the orthosis can irritate it. You can put a little, I don’t know if we’ve got any underneath here, but you can do little cut outs actually within the shell itself to accommodate it. Again, if the foot is being held properly and you go through that push phase and the windlass mechanism is working, the arch will tend to lift a little bit. So again, it may feel a bit uncomfortable when you stand but as you start moving on it the arch will actually move away from the orthosis because that natural supportive mechanism is working. So I wouldn't necessarily put off by putting the orthosis in because the type of orthosis is going to change function.

Again, like I said quite a few times, that will potentially lift it up. But it can be accommodated if we need to or a little soft pad underneath it.

S: Is there a prescribed amount of time to wear orthotics for day collapsed arches? I think they just mean is there a prescribed amount of time you need to wear orthotics during the day for, in this case, collapsed arches?

I've always thought that if you need orthotics you should wear them all the time. Take them off in bed.

C: Definitely. They need to be under the feet as much as possible, especially walking around. If you are just puttering around the house or something different, but actually when you are up being functional then, absolutely, they've got to be in there pretty much all the time.

S: Another one for David. "Have you seen an osteopath or a chiropractor to check for abberant pelvic mechanics?"

D: If only I knew what that was.

S: Have you seen an osteopath or chiropractor? Let's start with that one, because they might be looking at what your pelvis is doing.

D: Yes.

S: Good. And? They prescribed orthotics did they?

D: No I've always been pretty level if that's the correct ... I've never had a problem. I think I've had my back crunched in once because one side might have dipped.

S: And I think the point of the question is, as you were saying, there is a crossover between what we all do, isn't there? And sometimes you might just need something to free off something higher up while you look at what's going on in the foot mechanics and knee mechanics and so on. In between the two you end up with the right answer.

Well let's continue. The final question, "do you recommend orthotics if someone has, not just because they are doing forefoot running, but if there is a gait problem, do you prescribe orthotics in forefoot runners or is there no point?"

C: Very little point. Yeah ... so it's a short answer to that. We would do the video analysis and see what's going on. Again, it's got to relate to what the problem that they are having. If it's forefoot running and they are getting metatarsal pain then we need to get some pressure off that area a little bit and we need to encourage a little bit more of a mid or heel contact. But we wouldn't

necessarily use orthotics to do that. Forefoot runners, generally not ... It would be ... there are so many things you can do with shoes.

S: Is there a possibility though, that a forefoot runner is getting a problem not just because of what's going on when they are running but actually when they are walking, when they are presumably not forefoot striking anymore and that there may be a problem building up during normal daily walking which is probably going to take a lot longer out of their day then just the runs that they are doing. You would look at that?

C: So often we will prescribe orthosis for not running, just for every day. So that could be an issue that they are doing a fairly manual job and are on their feet a lot of the time, then they go run on their forefoot and that is the bit that is tipping them over. So yeah, potentially we could have orthosis in everyday shoes but not actually running shoes and we will control that with footwear.

S: Brilliant. Colin that is taking us right up our scheduled time. That has been brilliant. It has been a great run through gait analysis and the problems and solutions that we might come up with. Thank you so much for coming down again and taking all that time out despite blowing your tire in the car this morning.

C: Yeah. I got here.

S: And thanks for giving us all your expertise and Dave, thanks to you for coming in as well.

D: Pleasure.

St: It's been great to have a real patient in to look at…

C: Yeah it's been good.

S: Hope you've enjoyed this evening's CPD and I hope we see you again in the near future. Thank you very much and good night.