

Ultrasound Diagnosis

With Chris Myers
17th April 2020

TRANSCRIPT

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Steven:

Tell us a bit about yourself, Chris. You're a rare breed, don't you? You're an osteopath and a physiotherapist.

Chris:

Yes, so I qualified as a physio probably over 20 years ago now. And I work mainly in private practice in London. I run some clinics called complete physio where we fully integrated musculoskeletal ultrasound into our everyday life. Most of my training was in the NHS which gave me a really good foundation and it was a really good environment to learn diagnostic ultrasound. The rest of the time I spend my time teaching diagnostic ultrasound through the training company SMUG that I run with Rob Laus. And I'm really excited to present to as many physios osteos and chiros as I can to try and let people see how ultrasound can change and facilitate your practice.

Steven:

Great. So what we said to everybody today is that we've got five case histories that you were going to run through and of course that'll depend on whether we have enough time to do it. So you want to set the ground before we get into the detail of the ultrasound itself?

Chris:

Yes, perfect. So I've tried to choose case that's actually very hard to do. There's a lot of case studies I wanted to present. But I tried to choose case studies where there's some learning points that people can take on board. Particularly looking at what information we can and information that we can't get from the clinical assessment. And before I start, you can see just a few points. We're not talking about therapeutic ultrasound. This is diagnostic ultrasound sounds. So this is looking underneath the skin. A question I get a lot of the time about diagnostic ultrasound is can you see trigger points? I know that you've done quite a bit this week on trigger points. You can't see trigger points on diagnostic ultrasound. And generally speaking, it's not very useful for spinal pathology. It is used for guiding injections in the spine and you can see facet joints. And you can see the sacroiliac joint nicely. But generally speaking and certainly in my hands, that's not how I use it. So it's for peripheral joints.

Steven:

Can I ask a quick question on that? And I promised I wouldn't interrupt you too much, but one of the things that came up yesterday was the, I was discussing this with James Booth after the broadcast, is that actually it's probably a misconception that we can feel SI joints moving. In your ultrasound are you able to detect movements at the SIJs?

Chris:

You can see movement. It varies a lot from person to person. But what you, what you will struggle with is to make an objective assessment using ultrasound. So saying how much it moves. That wouldn't be something that I, I would use it for and probably not something in the future I would use it for. I mean and from a palpation point of view, obviously there's quite a lot of controversy as to whether we can actually feel what we think we're feeling. And I think it's really important, and hopefully that will come across today, is that we have to keep questioning what we think we're feeling and what we think we're assessing, and I think the best practitioners are the ones that are constantly questioning what they do. We're never going to know the answers, that's for sure.

So how do I use ultrasound in my clinic? So I do, I see lots of peripheral joint problems. I still see spinal problems. I have my diagnostic ultrasound machine in the corner of my room. And for some patients I wheel that out and I use it. And the way I see diagnostic ultrasound is it's just a tool to try and gain more information. So it's just giving me more information to try and make a hypothesis of my diagnosis and therefore to try and implement the most effective treatment program for that patient. So in some patients I won't use it, but in a majority, certainly from that on that first session, I will use it from a diagnostic point of view. And I think what's really important about imaging is that the imaging is never taken away from the clinical context. And the problem is a lot of the time at the moment is that imaging is done at a different department or a different hospital or a different clinic than actually where the clinical examination has taken place. So what's great about ultrasound is that you've got a portable machine and you can carry out the ultrasound there and then in the same room by the same person that's doing the clinical assessment

Steven:

One of the things you explained last time though is that you need quite a lot of training to be able to interpret what you're seeing on ultrasound, don't you? And you need the right sort of machine as well to get the granularity that you need.

Chris:

Absolutely. You need a good machine. The machines are getting better and better and they are coming down in price. And it takes a long time. I always say it takes probably a year of scanning, a couple of days a week. So regular scanning but also practicing outside that to get to a basic level of competency. So it's definitely a long learning curve. But in my opinion, definitely one that's worth doing. And I'm very pleased that I did do it because it just gives me a lot more information. And what I also like about having the ultrasound in clinic is that I'm the person that's presenting the imaging findings to that patient and the language that we use and the words that we use to interpret those images and get that information across to the patient I think is the bit that is probably as important as the imaging itself.

Steven:

When you say that what do you mean in what way is the language important, the choice of words that you're using to describe the images.

Chris:

Yes, absolutely. So the one that we hear a lot of is people have been told they've got a tear in their tendon and we know that and there's lots of research out there showing that, you know, particularly if you're over the age of 50, in a shoulder you're just as likely to have a tear symptomatic versus asymptomatic. And we know that there's a spectrum of change in tendons. So you've got that very normal tendon at one end and then you've got that very torn tendon at the other end. And there is a spectrum of normal changes, particularly related to age, but also dependent on activity, particularly in sports people. There's a high level of or high prevalence of asymptomatic pathology. So we have to be aware of that. And as clinicians we're very aware of that. So if a patient comes into me and I see that they've got a tear, I may not even use the word tear.

I may just say that this is normal age related change and I think the term tear is something we've got to be very careful using. For example, if somebody comes in and they're 60 years old and they've got a partial thickness tear in their supraspinatus, that's pretty good going because all the studies show that most people over the age of 60, have got a tear and it's exactly the same as the argument with discs and facet degeneration. What's important is I still believe it's important to get that information, but it's how you present that information is what's going to be the decisive factor as to whether or not that imaging is useful in that clinical context.

Steven:

I guess from the point of view of people who don't have your skill and the machinery that you have at your disposal, that's very handy when someone does

come to the clinic and they say, I've been for a scan and they told me I've got a tear. If they've got the facts at their fingertips, they can say well actually people use that terminology but don't be worried about it. It's perfectly normal and it need not be the cause of your problem or even a problem at all.

Chris:

Absolutely, and I just think we're as clinicians, we're in such a strong position to present that information. If we're the ones that have done the imaging. We know we've got all the information in our hands at that point then, and it's what we do with that information to that specific patient, that's important. So sometimes if I see a tear I will use the term, there is a tear. This needs time to settle down and heal. Or I may say in some cases you've got a tear, but actually it's actually a very small tear. That's really good news. You've got lots of good tendon still remaining. So let's push on with these exercises. And it's that positive reinforcement that I think can be really powerful. And I think again, that's where imaging can be very, very useful. And we know that if we add imaging to a clinical assessment, patient satisfaction is very high.

And therefore if we can then present the information in a positive way or in a way that we feel is appropriate to get the right treatment modality for that patient or to do the right management. And I think we're in a pretty powerful position with a lot of information.

Steven:

Yes. I said earlier on though, one of the problems we have is for me, every time I've looked at an ultrasound image, all I see is static. You're going to explain to us what we can see in one of those.

Chris:

So lots of people say, it's all very, well, I've got absolutely no idea what you're looking at though. And you know, that's what everybody says that comes on our introduction course, but you soon start getting very used to to what you're looking at.

And, for me you know, I learned anatomy out of the books like most of us did. But actually when you start learning ultrasound, you totally start relearning anatomy and that's a really exciting part of it for me. So if we look at the image in front of us, and this is generally, if we just go through the different layers, if we start at the top, the first layer is going to be the skin, so you can see the first arrow. Just underneath that you can see the black stuff with the white lines going through it, that's your fat layer, and that varies an awful lot from person to person. And that's certainly one of the limitations with ultrasound is that if somebody's got a lot of fat, then the quality of the images are going to be poorer. If we keep going down We've got the deltoid muscle and then you've got the bursa and the bursa is generally really poorly understood. The bursa is just a potential space between two structures. So it's a very, very thin layer in most people. If you have a bursitis then that area becomes inflamed and that area will get that layer that you can see there will get thicker. Then you've got the tendon, in this case, the supraspinatus. This is a transverse section. We'll come onto that in a minute. Then

the black area, which is actually really dark gray is the hyaline cartilage, which is the cartilage arrow coming down. That's it. So that's your hyaline cartilage. So you can see that really nicely. So if somebody has arthritis, you'll see that that contour looks a lot more irregular and it looks thinner. And then bone is bright. Bone is like a mirror to an ultrasound machine. So all the sound waves bounce out at the end of the probe, they come back so you get a very bright line, which is bone. Anything underneath bone we can't see. So you can't see inside bones. So everything you think you see underneath that bright white line is just an artifact. So that's what you're looking at Steven.

Steven:

And I think as you said, I'd probably need a year before I started to recognise those structures on anything that wasn't, if you said to me that was a shoulder, I could probably say, well I can see different layers in that. Would you look at any parts of the body and say, well I recognise by the patterns I'm seeing here that that's his ligament or fat or skin.

Chris:

Yes. It just comes down to, as you say, pattern recognition really. And just what you end up with in your head is a library of images. And what's really important for learning diagnostic ultrasound is not to get too excited about pathology to start with. You need to get a library of this sort of normal anatomy. And bearing in mind what I've just said, it is a spectrum of change. And you start to very quickly realise, unless you're scanning a 16 year old, 17 year old, 18 year old, you know, you get into your 20s and 30s, you know, that's a good image I've shown you there. But often you will see thickening of the tendon, you'll see irregularity in the bone, et cetera, et cetera. So you've got to get that library of images that become your reference point essentially. But it's difficult because there is so much variation within normal anatomy. So much variation.

Steven:

Did you want to talk about this one then?

Chris:

So just to make it clear, it's quite different, MRI and ultrasound, and when we talk about sort of a transverse image or longitudinal sections, if we look at the first image there, what we can see that's the shoulder and the arrow is pointing at the long head of biceps and that's sitting within the bicipital groove. So the white area, if you like, is the long head of biceps, the round area and that's in cross-section. So that's literally like taking a wire, chopping it in half and looking at the end. Okay. Now around that biceps in this image is some black area and that's an effusion. So that is fluid around the long head of biceps. The interesting thing is probably around 80% of the time that fluid is actually nothing to do with the long head of biceps.

And this is where you have to well, I suppose, you just have to start interpreting the images carefully, is that most of the time that's just an intra-articular effusion and it's just tracking down the long head of biceps. If we go to the next one you can see the long head of biceps going from left to right where the yellow arrow

is, and that's the same tendon. So you can see that there's a little bit of fluid above the tendon, the black area in the middle. But you can see the tendon going from left to right and you can see the fibrillar arrangement of the tendon. So you get a really good detail of the tendons. You've got cross-section and longitudinal section and it's really important if you think there's a tear or something like that, just like x-rays, you need to prove your pathology in two images, sorry, in two planes. Just like with an X Ray, you have to have two planes to confirm that there is a fracture or something like that.

Steven:

With that top image there, Chris, is there a misconception, are you getting a misleading impression of depth from that? Because to me it looks as though you can see the stages. It looks as though it's from the white line, mid-point on the slide there, it looks like that's in the foreground, then you've got the long head of biceps, which looks a bit further back and then it looks as it's going further back. But actually that's a single,

Chris:

Yes. Single slice top to bottom. That's probably about three centimeters in total. So long head of biceps is one and a half centimeters down. An interesting study was done on the long head of biceps. And this is where your ultrasound not only proves your anatomy, but it massively improves your palpation. Out of a hundred people that tried to find the bicipital groove about 70% got the wrong thing. So what they thought they, you know, when we all do that and we go, well there's your biceps, it's probably not, it's probably the overlying fascia of the deltoid or the intramuscular tendons. So I think this is the thing that we have to be aware of and you're only aware of it when you start scanning is that we do make a lot of assumptions. And I think we always, I don't know, imaging quite often gets a negative press. Well, everybody's got a tear. But actually I think we need to have a look at our own clinical assessment and actually realise that we are often making massive assumptions as to what is actually going on.

Steven:

I've often thought that, but I've also wondered whether actually, whether it really matters because, you know, we might think we're feeling one thing when actually we're feeling another, but if in our treatment we're feeling change in whatever it is that we perceived to be damaged, then surely that's the end product, isn't it?

Chris:

The end product is definitely the most important thing. Absolutely. How you get there. We're all going to have our different methods but if I'm telling a, from my point of view, I just, I'm really not into this feeling stuff. I'm into palpating. I'm into assessing things and feeling with my hands, I'm a manual therapist. But at the same time when you add ultrasound, you start to realise that we are guessing.

Steven:

Yes. And of course that degree of specificity is really, really important. If you're going to refer somebody on for further analysis, investigation in a hospital and you've said it's one thing, and they say, well, it wasn't that at all. They're going. It's a little bit less credible from your point of view, isn't it.

Chris:

Exactly. But I think we have to know how far clinical assessment can take us and actually we don't need to try and be too clever with it. We don't have to give that structural diagnosis. If we know our clinical assessment and the shoulder is a great example, my first example today is shoulder, is that we don't, I have to say it's exactly this or exactly that. We just need to try and give as much information as we can, but actually, as you say, we could look a bit silly if we try and get too clever with it.

Steven:

You obviously wanted to tell us something about bone according to this slide here.

Chris:

So I think we've been through this so we go through it quickly, but just to recap, the bright areas, the bone, the articular cartilage.

If we get onto the tendon. I see lots of tendon problems. Most tendon problems don't need an MRI. An ultrasound scan shows the internal structure of a tendon five to 10 times better than it does as it is seen on an MRI. So I think one learning point from this is if you want to look at the rotator cuff tendon, if you want to look at your common extensor tendon, your golfer's elbow, your DeQuervain's, your patella tendon, your hamstring tendons, your Achilles tendon, generally speaking, ultrasound is going to give you a better image than MRI. The areas where it does get a little bit more tricky is around the hip, so proximal hamstring and lateral hip, and you could say anterior hip as well iliopsoas tendon. Although you can see it nicely on ultrasound and that's generally because the depth is obviously more.

But for most tendon problems, including the shoulder, ultrasound gives you the information that we need, we can see muscles really nicely. So if we move on to the next one this is a, on the left side you've got the longitudinal section and you can see the fibrillar arrangement of the collagen fibers really nicely. You can see muscle tears very nicely on ultrasound. Grade one muscle tears you're not going to necessarily see that well on ultrasound, but certainly anything where there's fluid accumulation, or there is actually a tear of the the collagen or the fibrillar arrangement and the fascicles, then you're going to see that nicely on ultrasound.

Fluid is our friend. It stands out nice and black and ultrasound is the only imaging modality that gives you information about this fluid. So is it compressible? Is it soft? Can you stick a needle in it and pull the fluid out? This is a calf tear, a big calf tear. So it gives us lots of information and certainly from my point of view, I do ultrasound guided injections and if I need to aspirate something, so if I want to take, you know, drain a Baker's cyst, drain the fluid out of this calf tear, then by

pressing it or what we call sonographic palpation it's going to give me information as to how solid this material is and how easy you'll be able to aspirate it.

Steven:

Does it distinguish between different types of fluid, lager, interstitial fluid or,

Chris:

Yes, I mean the example I think of there is, whether it's blood or not. So obviously on your ultrasound machine you have the color Doppler and I've got a case later on that I'll show you if we've got time where if there's flow, so if there's movement through the vessel, then you know that it's blood then. But Yes, you certainly can get quite a lot of information as to obviously which layer the fluid is in, as to what tissue it is. But Yes, it's really useful from that point of view to get information about these fluid collections.

And nerves, we see nerves brilliantly. I think it's certainly an area I'm getting more interested in is these subtle nerve entrapment. So I've got a case later on as well. And this is the median nerve. So if we look on the right hand side, first of all, we talk about this classic honeycomb appearance. And this is a large median nerve. So this was in a patient that I saw who had carpal tunnel syndrome. And often the nerves will get bigger, interestingly just before and after the entrapment site. So you end up with like an hourglass type shape and where the entrapment is often it is where it's a little bit thinner. Yes, you can see nerves really nicely and very, very small nerves.

And ligaments. Ligaments we see nicely as well. So these, this is a nice example of the ATFL which is a very small ligament, about one, one and a half millimeters thick in a normal patient. And you can see that going from the lateral malleolus to the talus there.

So, first example. So I see loads of shoulders, about 50% of my cases probably shoulders. And it just so happens that ultrasound is excellent for shoulders. So this was a patient, this was one of my first patients that came into my clinic when I first started scanning. And I just couldn't believe what came up. I mean, I can believe it a lot now. But anyway, 48 year old, so your sort of age Steven, very fit, very healthy, three times a week strength training. Yes, he had full range of movement, really good.

Full range of movement, full capsular movement passively and active. No issues whatsoever. But he was just a lot weaker in the gym and there were certain activities overhead that he couldn't do. Pain was an issue, but he could still train. So obviously the first thing I did was a clinical assessment. So I first of all, with a shoulder, I will carefully and passively assess the capsule of the joint. So there was no restriction at all of his passive range of movement. And there was no restriction at all of his active range of movement. There was no tenderness of the AC joint. We know that capsulitis, which he is in the bracket for and the acromioclavicular joint, they're clinical diagnosis, we don't need any imaging to diagnose those problems. So AC joint and capsular restrictions, adhesive capsulitis, are clinical assessment.

And it wasn't that. So if it wasn't that and I've cleared the neck, then it's probably got to be labral or something to do with the subacromial structures. Now I don't find labral tests very specific and sensitive, but certainly there was a chance he had a labral problem, but he didn't have any instability, et cetera, et cetera, could have had a SLAP tear potentially, which isn't uncommon in people who are active in the gym. So from my clinical assessment, I thought his rotator cuff was going to be fine. He had good strength, there wasn't massive deficits, pain wasn't a big issue but essentially if it wasn't the capsule and it wasn't the AC joint and I thought it was coming from the shoulder, then it's probably likely to be something to do with one of the subacromial structures.

But at no point, if we just move onto the next phase, did I expect to see this. So as I started to scan on the left hand side, on the top and on the bottom, bit similar to the picture we saw before. He had quite a lot of fluid around his long head of biceps, but the actual tendon looks normal. All this tells us at this point is that he's got some fluid in his glenohumeral joint. So he's got a glenohumeral joint effusion. Okay. Then if we go to the next image, you can see that there's, sorry if we go back one, you can see the arrow on the right that that is the greater tuberosity. That should be a lot smoother. Okay. So these two signs are what we call secondary signs of a rotator cuff tear.

It can be of other things as well. But if we go onto the next slide, what he had was a full thickness tear of supraspinatus, which I was surprised with. And obviously this is now, this is about 10 to 12 years ago when I first started scanning. And I was very surprised that I hadn't really even considered this in my clinical assessment cause he had full range of movement, and he had probably 80 to 90% strength. But what he was trying to do was push his body further and it was breaking down. So this is a full thickness tear of supraspinatus and you can see the black areas. If you look at the arrows at the top on the left and the bottom on the left, you can see there's a darker patch and that's essentially a hole in his supraspinatus. And from the schematic representation on the right, you can see what you're looking at.

I think the learning points from this for me was our clinical assessment is limited and we need to be aware of that, and you know, I do hear people still saying, Oh I could feel he had a rotator cuff tear or I could feel calcification or I felt a bursitis. One thing definitely to mention is you cannot feel that. You might get it right every now and then, but you're either going to miss things or you're going to pick things up differently. So you're not going to be able to palpate and feel what you're looking at there on the image.

Steven:

Had you not have ultrasound, how would this have gone differently for this patient?

Chris:

So this guy was referred by one of my other physios. He tried already a course of physio, which you're going to try. Absolutely. But he just said, I can't function at the level that I want to. So he came to see me because at the time he knew I'd just started to scan. So he actually went off and he had surgery and he was so relieved to get the right diagnosis and he was one of those guys that he wants to

work at 100%. So he went off, had surgery and he did brilliantly and he was so relieved to get the right diagnosis and he'd seen lots of other people and he'd been given like lots of people are given lots of information and he just wishes he'd had that information at the beginning. And that would have saved him about nine months of going around the houses. So, but what I will mention is, most of the time for these tears don't need surgery. Yes. But for that person that wants to operate at that level, he may require surgery.

Steven:

Right. What's the normal course for this? Then if you don't have surgery on a full thickness tear, are you going to expect it to repair in due course or just to be asymptomatic?

Chris:

Yes, exactly that. So I wouldn't expect that to repair. If I scan a month, a year down the line, it's not going to look any different structurally. Whether he's in pain or not I don't know. What we know is that about 80% even higher than that of people that have large tears in their cuff, full thickness tears don't have an operation. But it is important to remember that a full thickness tear is not a rupture. And this is where people go wrong sometimes. So for example, if this is the greater tuberosity and that is my supraspinatus footprint sitting into my tuberosity. If I get rid of the anterior edge of supraspinatus that is a full thickness tear, but I've still got the rest of the supraspinatus. So it's full thickness, but it's not full width. So the other analogy is, get a bit of paper and make a hole in it, you've got a full thickness tear, but you still got a lot of other tendon that you can get strong and that's how you can use this information to try and get people on board with rehabilitation as well.

Steven:

One of our viewers, Damien, has sent in an observation. He says his GP sends him off for a shoulder ultrasound at hospital and he was shown the thickening and roughness of the supraspinatus tendon and told that he was 37 he was getting old and he needed to stop lifting weights at the gym. He points out that he's hardly Charles Atlas, in his words, and nine years on, he doesn't have any symptoms and he hasn't stopped using the gym. He agrees that he'd rather control the messages his patient receives rather than risk than hearing something such as he had. It could be quite depressing.

Chris:

How often do we hear that story? And that is, you know, I hear that all the time. I see it all the time. We've got to have imaging in the hands of the physios and osteos whoever just get scanning. But you've got to get good at it. You've got to be good. If you're going to do it, you've got to get good at it.

Steven:

Jonathan's actually asked what you feel about how the special shoulder tests, and there must be 50 or 60 of the damn things, correlate with what you see on ultrasound as a rule. Are there more reliable tests than others in your experience?

Chris:

No, no. I mean, my clinical assessment for the shoulder has gone from probably 20 different tests, to probably about four. If I list them, Speed's test, I mean I need to be a bit black and white about this. I'm not you, you can do whatever you like, but Speed's test for long head of biceps pathology, not useful. I do the drop arm test, the lag signs, lag signs are pretty reliable, relatively, but it's very rare that these people walk in and they do that and it just floats back, you know? So Yes, the only tests I do, so let's start with that. I poke their AC joint, but most of the time, you know, it's their AC joint already because they've pointed at it. I very carefully assess the capsule passively, both zero and I'm really careful up here with the patient in supine.

And the only way you assess the capsule effectively is if they're not in pain. So they've got to be relaxed. If there's pain inhibition, you're not getting to that end of range, that passive end of range. And then I do three impingement tests. So I do the AC, capsular restriction and then I do a Hawkins and Kennedy, a Neer and then probably some sort of empty can. But the only information that's giving me is whether or not there's pain coming from the subacromial region. It gives you no information on whether it's the bursa or whether it's a partial tear or a full tear or anything like that. All you can say is there is pain coming from the subacromial region and that's it. There's no test to differentiate a bursitis and there is no reliable way of differentiating the different types of tears in the tendons.

Steven:

Many of these tests can only be interpreted if you put them all together as well, can't we, with their clinical history and so on.

Chris:

No, no, that's, that's really important. Any of those tests that we've talked about on their own any of the special tests have to be, and it's the pattern recognition that is actually going to be the thing that's going to give you the most information.

Steven:

Tony's asked what causes that irregularity in the head of the humerus that you showed earlier on outside of, you know, nasty things. And is it a persistent inflammation?

Chris:

Yes, so it's a really good question. So we talk about the footprint of the tendon. Okay. So you've got your greater tuberosity and you've got your tendon coming across and it's where the fibers attach in to the greater tuberosity. That's where you're going to get your cortical irregularity. So it's almost part of an enthesopathy type presentation. And, and that's generally why you get it. But what we know, and there's good research to support that, is if we see that, you're more likely to have a rotator cuff tear. So we use those as the signs increasing our suspicion, and they're very useful, as to saying if there's a rotator cuff tear. We put on a course with a guy called professor Jon Jacobson, absolute guru of

musculoskeletal ultrasound. And he went as far to say and hopefully I quote him right, is that if there is no cortical irregularity, it is extremely rare to have a tear. So it doesn't mean every tear has cortical irregularity, but if they don't have any cortical irregularities, unlikely to be a tear. It's essentially the same thing. But Yes. No.

Chris:

So again, this is this was a patient that was referred to me by the guys down at Putney Osteopaths who I know down there who are absolutely brilliant. And they're very quick to refer off for an opinion when things aren't going in the right way. And you know, if you're treating people more than three times and it's not going in the right direction, then I think it's a good stage, definitely to have a rethink. So 35 year old lady came to see me, no capsular restriction, no AC joint tenderness. So essentially my conclusion was quite similar to the one before. And a lot of the time these shoulders do present quite similarly. And they have the same sort of symptoms. So essentially, again, from this from my examination, I'd ruled out the capsule. It's not the AC joint.

Labrum, not sure. Ultrasound can only see one bit of the labrum, it can't see much else, so it's not great for labral pathology. That would be an MRI or MRA. So again, I concluded that, that it was something going on in the subacromial region. So what this turned out to be is, she had a whopping great chunk of calcification in her infraspinatus and you can see, so what you've got there is you've got the ball in the socket, so you've got the ball moving in the socket, which is the glenoid on the right hand side. And then you can see there's a lump of bone, but sitting within infraspinatus and as she went into lateral rotation, she got pain. Okay. So that's it.

That's it. Butting up against the glenoid. And she went, I get pain with that. I get pain with that. And I did this dynamically and it just all fell into place for her. The good news is we didn't have to do anything for this. This became asymptomatic. Mmm. What's quite interesting here about from an ultrasound point of view is when we move, if the video goes once more, when it gets down to the right hand side, do you see it move, see it move and bunch up. Yup. So ultrasound gives you information about the quality if you like, all the texture or quality of that bone. So is it soft, is it hard, is it movable, is it not? And again, it is the only imaging that gives you that. If it was an MRI, which I can tell you now is not great for looking at calcification, it would probably see that.

But ultrasound is by far the best way of looking at calcification. It shows it really nicely.

Steven:

What happened to make it asymptomatic?

Chris:

We did nothing. Well I could say this, people stopped rubbing it.

And I think, I think that's the other thing that, you know, I have, I've rubbed my whole life. I was about to say, but that's weird. So basically I think we have to think twice before we start pressing the painful area. They may well feel better

after, but that doesn't justify your treatment. We need treatment carry-over and I think that's something we have to, you're never going to know that from clinical assessment. So you have to be aware that there are things going on with patients that do and don't get better that that maybe we could be getting a bit more information about. That was a pretty cool case.

If that hadn't improved. Then there is a technique called barbotage lavage, which is with a needle where you can suck that out, which is very satisfying and prevents a lot of people having surgery and it's, it's actually a very effective modality, sorry, very effective injection technique.

Steven:

That bit of bone there that we were talking about, is that likely to be full width? As well as looks like full depth there.

Chris:

Yes. So width-wise this is a longitudinal section. So there's no information on any of these scans about the width of it, but it is quite long. Yes, that makes sense. Yes. Probably one and a half centimeters.

Steven:

Couple of observations coming in. Simon says he was recently at a conference at the Royal Society of Medicine and a physio speaker said that the evidence shows that only exercises help rotator cuff and only then over several weeks or months. He said this speaker said that manual therapy was no good. Your opinion on that?

Chris:

Hmm. Might be another lunchtime session. That one.

Steven:

I think you might be singing off the same sheet as Simon because he said he disagreed with that.

Chris:

Well let's start. So first of all, any tendinopathy, you do need to give it three months. This three month figure seems to be a figure that lots of studies have shown. For many it should be improving in three or four weeks and if it's improving you keep going. I don't personally... I suppose it's really hard to answer because what is the pathology that we're talking about? Because all of those studies have put all of these patients into one group. And for me, where we start to make a lot of success is when you start to sub-classify and subgroup these diagnoses. So for me there's no tendon, this sounds a bit cheesy, but there's no rotator cuff tendon that's exactly the same. You know, is it tendinopathy, is it a tear, is it calcification? I do think there is a role for manual therapy, but you're not going to approve it from a on a research basis that that's probably one of the issues with it. What I would say is I think we should always, I think there's a habit of there's a problem, we start rubbing it and we start moving something. And for me the most important part of this whole process is getting that initial diagnosis.

And then from that I think you can have, whether manual therapy is appropriate or not, it's going to be the next question really. There is a role. I agree with that.

Steven:

Okay. Let's move on a little bit because we, again, we're getting close to our limits of time, so,

Chris:

Yes. Okay. So in the last six months if we just make the screen. I just want to make you aware now, not at any point am I saying that we should stop using x-rays for looking for a break. But what I am saying is that, and this is shown very much in the research now, is that ultrasound is excellent of picking up fractures. Now, as I said earlier, you can't see inside the bone, but you can see the cortex, you can see the outside. So these are four cases in the last year where, and you can see two of them have had an x-ray, two of them haven't. And you can clearly see a greater tuberosity fracture on all four cases. So these are those patients that have had quite a big trauma but still getting quite a lot of pain.

And I think this is where, so the, the lessons from this are x-rays do not rule out fractures all the time. Mmm. And the ultrasound is actually very good for picking up fractures. Now, all four of these did well, we didn't do anything different, but they were concerned, they still had pain at three or four weeks after their fall. So we did their diagnosis, we told them what it was. This would show an MRI by the way, but they don't necessarily show on x-ray. And then it was just about patient education. It's normal that it still hurts. This is a stable fracture. The tuberosity isn't being completely pulled off and it's not in the wrong place, not displaced. And again, we didn't have to do too much with these patients, but it just started to frame their expectations differently. And I can tell you they all absolutely fine. I reviewed them at three months and they're pretty much back to full movement.

Steven:

What then is the explanation in the radiology departments at hospital for them not being sent for ultrasound? It's far less dangerous, hazardous than x-ray. So given that you've said in these circumstances, particularly is better than x-ray picking up the fractures. Why were they sent for x-ray?

Chris:

So we get lots of A&E consultants on our course. So you know, I speak to these guys about it and they all wish they had an ultrasound machine in A&E, but more importantly they all are very aware that you can have the ultrasound machine but somebody's got to go through and get that training.

Steven:

Yes. Which I would assume they would have in their radiography department somewhere. Somebody doing ultrasound.

Chris:

What, an ultrasound.

Steven:

Yes.

Chris:

Yes, they will. They have some beautiful machines sitting around the place. The problem is there generally speaking, even in the radiology training, there's not much musculoskeletal ultrasound taught. It's generally something that they do further down the line. But you will see it coming into A&E more and more.

Steven:

Chris, how do you feel about running on for a few minutes? Let's say 15 minutes to I don't know, it's two o'clock. I'm conscious it's your time.

Chris:

Oh, I'm fine, I'm absolutely fine.

Steven:

Okay, we will run on then because I know you've got some very interesting slides. Lots of interesting material to come. Can I ask you a few questions before we move on? Josephine says, what's your view on shoulder issues not being related to the neck or thoracic spine? And the only way to rehab a shoulder is through exercise. Oh, sorry. It's the same questions we had before really. Asking whether exercise is the only way to rehab shoulders.

Chris:

No, but it has, if you're seeing shoulders and they're not having any rehab, and you think it's from the shoulder, then I think you're missing a component of the treatment. But again, not every shoulder pain as we know is from the shoulder.

Steven:

Justin's asked whether you can determine the type of calcification by the appearance on ultrasound. And Jen has said, is it not painful to ultrasound a fracture? Because of course we used to teach that as a diagnostic tool.

Chris:

Yes. So the first question that you, there's no sensation when you do an ultrasound scan and if there's a fracture there's no sensation. What you're talking about there is therapeutic ultrasound and it works at a very different frequency of sound. So the answer's no. It doesn't hurt unless you push too hard with the probe, then it probably does hurt. And what was the first question?

Steven:

Can you determine the type of calcification that you're looking at?

Chris:

The answer? Yes. And there's no other imaging modality that can give you that information. So as somebody that tries to suck this stuff out, sometimes I want to know whether or not there's something called an acoustic shadow. So if you've got the bit of bone but you can't see underneath, then it means that the sound waves have hit the bone and bounced off. So it means it's quite hard cortical bone that would be hard to get out. Whereas the one I showed you is soft and there was a partial shadow so you could see underneath it. So I think I could have sucked that out if I needed to.

Steven:

Right. You're quite an evangelist for ultrasound, aren't you?

Chris:

Yes. Absolutely.

So if we move onto actually a very interesting case. Actually if we skip that one, let's go to the next one, next case. Yes. So this was a lady that was, and I remember her, because I remember as soon, she's one of those patients, as soon as she sat down, she started crying. So this had really got to her. She was a very active individual. And she was sent to me for, what was she sent to me for? I think it was just what's going on here. So she was that patient that came in with pain in the forearm. We all see lots of this, don't we? She presented clinically, you know, grip was painful. Middle finger was painful and she was getting pain into the elbow region.

Okay. She'd had a steroid injection by her GP that hadn't helped. She had had shockwave therapy that hadn't helped. And she'd been given physio, she'd had osteo, she's encouraged. She had seen everybody. The only thing that was a little bit different about this to a classic tennis elbow was the location. And this isn't her elbow, but it was a bit more distal her pain than where the classic, you know, tennis elbow pain would be. So I did a scan, I scanned her tendon first of all, and it was beautiful. It was absolutely nothing wrong with the tendon. And if the tendon looks normal on ultrasound, it has a very high negative predictive value. It is very unlikely and very rare that that tendon is causing the pain if it looks normal on ultrasound.

And then as we went further, so if we just look at the anatomy, so my next thing I would always check out is this posterior interosseous nerve. And I've been teaching it as a differential for lateral elbow for 10 years, but never seen one. Anyway, so, and what we're looking at here is the posterior interosseous nerve, the motor branch of the radial nerve and it goes from the forearm and it goes through into the supinator. Okay. And you can see that red circle, it's where it's going through that tissue layer on the area that we probably remember from our anatomy days, called the arcade of Frohse.

If you play the video now you're looking for a round dot. So we see where the arrow is and there's a round dot there on the left hand side. The arrow will go to it there. Now this is in transverse section, but I just want to show you, you'll see it suddenly go big and then go small. Can you see that?

So this is transverse section. So that is an entrapment of the posterior interosseous nerve as it's going through the arcade of Frohse. Can you see it?

And then it gets thicker. Now, what we did with her is I didn't do this. I referred her off to a sports doctor that I worked with and he did a local anesthetic injection around that area and I was in the room because I thought it was very interesting and she got complete resolution of her symptoms.

Now what happened after that, I don't know. She was either going to go for a steroid injection or she was going to be seen probably to get that debrided or get it to be seen by an elbow surgeon. But again, you're just not going to know that if you haven't got an ultrasound scan in your hands. And that's, don't get me wrong, that's one in a how many, but I think, that we do have lots and lots of cases of that, you know, that have made a significant difference. And, and I do often say like, you know, half of the people we see are probably going to get better anyway. Some people might disagree with that. Then what you do to somebody is that 20, 30% where what you've done is made the difference to other people maybe. And then you get that group that are at the end of their tether that have been shopping around and actually what you need is to just stop, take your time and confirm the diagnosis. And that's a good example of where, you know, it really did make the difference.

Steven:

Yes. I suppose the big question is if you like this lady you've just mentioned, she's been around the houses and seen lots of people, had lots of treatment, quite possibly paid a lot of money for it. It kind of suggests that actually they should all be scanned straight away rather than waiting until we found out whether treatment works or not.

Chris:

I think that's a really, you're never going know. You can't, I don't believe we should be scanning everybody. I don't think from a, well actually my practice, I'll scan everybody and I don't charge for my scans, but in the NHS, you know, I don't want to advocate that everybody needs a scan because that's not cost effective. But if things aren't improving, then I think we should be quicker to get imaging. The problem is particularly with what's going on at the moment. This is not a priority and I get that. But Yes, I do think we should be looking to confirm the diagnosis if things aren't going in the right direction. Just a quick point, again going back to my rubbing it thing, 80% of the clinicians that she'd seen, including people getting acupuncture had just been sticking it into that painful area.

And for me, all they've been doing is inflaming that nerve more and more and more. So I think again, we have to just be aware that we don't know everything. We can't feel everything. And there are limitations in our clinical assessment.

Steven:

We may have time if you're happy to go through your next one, which I think is a Baker's cyst

Chris:

Yes. Anybody that's seen me lecture before and if anybody's on here that's seen me lecture before, apologies, this is like the one thing I bring out all the time. So

this was a lady in my clinic in Chelsea, 32 year old, fit as a fiddle just being in the gym actually, and then came to see me and she described this sort of throbbing, she talked about anterior knee pain but also some posterior knee pain.

I did all the examinations. There was no patellofemoral joint, was a bit grumbly but not too bad. Patella tendon was fine, meniscal tests were fine. Full range of movement. Got her squatting, hopping, lunging. And I remember it was just before lunch and I thought, no, this is very mild. Not really a big deal here. Anyway, so we started to examine her a bit more detail and she'd also been told that she might have a Baker's cyst and obviously that's something that you can see beautiful on ultrasound half the time. But more than that, you don't need to do anything with it. But it's good to find out whether it's there or not in my opinion. So if we go to the next slide, I started to scan the back of the knee and this is what my learning point here is. First of all these things, as we all know, walk into osteo clinics, physio clinics, chiro clinics.

But so I started to scan and I started to see this thing at the back of the leg, which wasn't far off where a Baker's cyst would be. But because I'm pretty experienced at this, it just wasn't looking right. If we go to the next slide and press play. If you look carefully here, you'll start to see a pulsating mass, which we should have all picked up, but it wasn't picked up by two previous clinicians. And interestingly, the patient hadn't even noticed this. They hadn't noticed that was a pulsation there. I carried out, continued to do the scan, if we go to the next slide, and on our ultrasound machine, you've got the color Doppler. So it was clearly a vessel, and if we press play on the left hand video, not only was it that you can start to see, we've lost a bit of resolution, but you can start it pulsing away.

I don't know why that's fuzzy. Yes, pulsing. Anyway, it turned out that she had a popliteal artery aneurysm which burst the day after I'd seen her. I told her what it was. I told her to go to A&E because I hadn't seen one before. She refused to go to A&E, she had other things to do, and the next day she felt something running down her leg. And so she had to end up going for emergency surgery of which the vascular surgeon sent me this image. And that's it. So Yes, it's, it's pretty impressive. And Yes, so it's a, it's a good one. And the reason I show it all the time is that if you're going to start scanning, you need to take it seriously and take your time to learn it and get good at it.

Because as soon as you put ultrasound onto someone. If I had clinically, like the previous two clinicians, missed that, okay, it's not great. I'm not going to feel good about it, but I don't think anybody would sue me. However, if I put an ultrasound on it and I've missed that, I think I'm in trouble. So we've got to be aware that we are putting ourselves into a, we are putting more potential risk onto ourselves. Absolutely. And some people may say, well, why would you do that? And I get that, but, but for me, it's very important that we get the right diagnosis.

Steven:

So if we wind up with a few questions from the audience we should finish this in about 60 minutes I think, which is a nice round number for our CPD record. Josephine says, do you need an MRA to see labrum clearly like the hip joint or will a standard MRI show a shoulder labral tear or ultrasound?

Chris:

Yes. So ultrasound is not the imaging modality of choice for a labral problem. However, you can see a labral cyst really nicely on ultrasound. Okay. MRA. Yes, you're going to see a labral tear on that. MRI. My understanding, and I'm no expert, but from speaking to the shoulder surgeons that I work with, MRI generally is also going to see a labral tear. I think they've improved. That's improved with the quality of the MRI these days.

Steven:

Luke essentially asked a question which might be interesting to many people, which is why were those fractures not showing up on x-ray, which of course traditionally we're taught x-ray is the modality of choice for fractures.

Chris:

Yes, so I mean, Yes, absolutely. So I don't know the answer other than it didn't, so it's probably to do with the angle of the x-ray. It just didn't show that, but also ultrasound is very subjective. We know that, but so is x-ray, so's MRI. The interpretation of these imaging modalities is subjective, whatever modality it is.

Steven:

I guess the strength of your ultrasound though is that unlike the single plane x-ray film, you can wiggle your head around and have a look at 'em

Chris:

You nailed it. That's exactly it. It's multiplanar imaging. It doesn't matter where that fracture goes. I can move the probe to get perpendicular to it, the other end. So this year I've had a radial head fracture that wasn't shown on x-ray, I've had a lunate fracture, I've had a navicular fracture, probably about four or five avulsion fractures of the fibula following a bad ankle sprain. So, I don't want to say don't trust x-rays, but just hang your hat on your clinical assessment.

That bone is really tender and you know, and it's still painful after three or four weeks and maybe it is, but you've got to be aware of the limitations of these things.

Steven:

Yes. Keith says he's got a patient who he suspects has a hip acetabular tear. Could this be seen by ultrasound or is it too deep? If it can be seen, will it be scanned for me when the standard pathways GP referral to MSK clinic or will it require them to refer on again?

Chris:

Does he mean a labral tear of the acetabulum?

Steven:

I think he does, Yes.

Chris:

Yes. So same answer is, shoulder. You can see the labrum but not well enough on ultrasound really. So Yes, they should be sent for an MRI to find that information or an MRA depending on the pathway.

Steven:

Andrew Oliver, how effective is ultrasound guided steroid injection for trochanteric bursitis?

Chris:

Hmm, good question. I do a lot of them.

Steven:

You clearly trust it.

Chris:

Yes, I mean I will always try conservative measures first, but this is a lovely question. To go back to the original question, the original thing, what is your diagnosis? 80% and I'm quoting one study here, I think it was 80%, of lateral pain on the lateral side of the hip was glute medius tendinopathy and not a bursitis. So I would suggest that most bursitis are not a bursitis as it's a tendinopathy. So how would you differentiate? Ultrasound.

Steven:

Right. I think we're going to stop there if that's alright, Chris. There are a few, a couple more questions, a few more questions, I haven't had the time to answer, to ask, and I apologize to the viewers if we haven't got all the questions out, but great of you to share that stuff with us. And of course the slides will be available later this afternoon from the recordings page for this where we, you won't see the video, but you'll have the PDF document of, of those slides and of course the sports medicine ultrasound group of which you are probably one of the founders I think, aren't you?

Chris:

Yes, there's two of us, myself and Rob.

Steven:

And that's available for people to go to if they want training or to learn more about this. And just give us a quick round number of it, a typical price for a usable machine in clinic.

Chris:

So I currently have one that's been sent to me, which is a mobile device, which is 5,000 pounds and is much better than the mobile device I was sent two years ago. So prices are going down. My machine is a GE Logiq, which is probably one of the best portable machines, which is around 15,000 pounds. But you, you probably looking at anything from minimum of five to 10,000 pounds.

Steven:

So maybe I will ask one question because one anonymous person says, what's your view on the butterfly ultrasound probe? Cheap enough but is it any good?

Chris:

So I have just written a blog on it. So if you go to ultrasoundtraining.Co.Uk, you'll see, Should I buy a butterfly? And the answer is NO

Steven:

Right. Good enough.

Chris:

For musculoskeletal ultrasound, I don't believe the imaging is good enough at the moment, but they've got 350 million pounds worth of investment. So I'm sure it will get better.