

Case-Based Discussion With Nick Birch

Cast List

Steven Bruce	S
Claire Short	C
Nick Birch	N

S: This is a slightly unusual broadcast in that we, originally we had a, one of our speakers postponed his talk because he couldn't get in on time. And so, we put together an impromptu Case-Based Discussion using Nick Birch who's our favourite spinal consultant from Northampton. Very, very experienced both as a spinal surgeon and, more recently, as a consultant and he'd appeared on the show a number of time before and was very, very popular.

What happened, though, because we did this as a impromptu broadcast, we actually had some difficulties with our end of the recording. So, what we've done is, we've rerecorded the part with myself and with Claire and we've left Nick who joined us remotely from his study as was in the original recording.

So, let's take you back to what we did on that occasion. So, going back to Nick. Nick, in one of your earlier broadcasts, you talked to us about bone density scanning. Do you want to give us a bit of an update on that machine that you have incorporated into your own clinic?

N: Yeah. Steven, thanks so much. I talked about the Echo-S Ren scanner, which is a revolutionary device that measures bone mineral density without any x-rays. And as a direct result of that through our televised, multidisciplinary

team meeting, Reanne Peart, from Pulborough in West Sussex, contacted me through her friend and colleague, Jane Edmy, who is a Nutritionist, and we are running a clinic down in West Sussex doing bone mineral density scanning starting in December so that was brilliant and thanks very much for the opportunity and the introduction.

- S: Well, we're very pleased! Very please that you were able to help out one of our members and that they will benefit from this fantastic machine that you've just incorporated. Shall we start with the case-based discussions? Claire, do you want to start the first one?
- C: Okay, well, the first one is a gentleman called Ian, who's a long term patient of mine. He was told when he was about 17 or 18 that he could choose between being a professional footballer or a professional boxer, and, at about the same time, started getting terrible back pain. He got to the stage where, as he says he could barely walk. But the pain he describes was, it was more like spasms, it wasn't disc type pain, there were no radiating symptoms, he had no neurological signs. So, he suffered with back pain for about ten years before coming to me. By the time he came to me, he had seen a specialist at, I think it was at the Nuffield and had been given lots of medication that was starting to work, and the consultant there had also said that he thought Ian had a hyper-mobile segment and that was the main problem. So, he wanted to reduce the pain so that he could then stabilise this hyper-hyper-mobile area.
- S: That hyper-hyper-mobile segment was at the sort of DLJ area, wasn't it?
- C: That's right, correct, yeah.
- S: Yeah. Okay.
- C: Exactly, yeah. Anyway, he had lots of treatment and then had, was doing really, really well, and then had a massive flair up about a year ago. And Nick and I, have already talked about his scans. So, Nick, do you want to take us through the two MRIs, I think, was it 2009 was the first one?
- N: Yeah, it was 2009, and then 2016. Yeah.
- C: The spasms he gets around the DL last about 20 minutes and are crippling; if he's driving, he has to pull over onto the hard shoulder. But it's really interesting because he's not a whiny whiner, he comes in, he's always very positive, he asks how we are, he asks how the clinic's doing. He's a really, really nice person and very very upbeat. So there's no chance of him being malingering or anything like that. So, go on, Nick. Take us through, tell me about the MRI scans.

N: So we'll go to Ian's... here, we'll start off with the 2009 scan. That's 2009, yup, okay. So, what you can see, let's start off with an MRI scan. He started with this picture of the MRI. So this is a satchetal sequence, that's the, if you like the lateral view. And what I'm doing is just scrolling through from the right side through to the left. The first thing you do when you get to the midline... this is the midline sequence. And you know it's a T-2 because the cerebral spinal fluid, it's bright. But also the fat at the back is fat. It's not that much fat, you can see his tummy back there. He's a thin, nice, muscular guy. But, way down here, Claire, the bottom disc has not been fully developed. So, therefore, the anatomy of the spine isn't quite as normal.

Now, transition is pretty common, ten percent of the population have transition. So, we don't normally take much notice of it, unless actually, the patients got symptoms. But this is a normal, lumbo-sacral disc. Very bright signal within the central part of the disc, but, thick hangulus at the back and at the front. And the bottom three discs are all normal. But here he's got significant change in both L1-2, and L2-3, and the discs are not narrow. You look at that disc there: so L3-4 there, you look at that disc there, it's narrow, and here L1-2, it's really narrow. Look at this big defect in the end plate there, the top of L2. And there's irregularity at the end plates of L2 and L3. When you look at those pictures, if you're looking at the thoratical lumbar problem exactly as you described, where by the discs are not working as efficiently as they should do.

But also, looking at this, have a look at the spinal cord here. The spinal cord is uniform, it's dark because it's largely fat. And that's what nerves are, they're fat. And there's nothing in there that makes you suspicious of any problem. But if we go to the 2016 pictures, which are the latest ones, there has been a significant change. And this is the bit, when Ian and I were discussing it earlier, concerned me. So here we are, another satchetal sequence. And very slowly I'm just going to be clicking through from the left side coming through onto the right. The first thing you notice is that he's got a kyphosis here at the thoracolumbar junction, which is a little bit worse than it was. Can you see how those two discs now are subtly different? The change in that end plate of the upper end plate here, that's subtly different. But also, this flare of signal here in the disc in there at the front there indicating that he's undergone a process of inflammation around that disc. These bottom three discs are exactly the same as they were. But now, you've also got the picture higher up. Sorry about that, let's just do that. Higher up. And what you can see here is there's a disc up here - do you see that there? Okay, and that little bulgy disc going into, towards the thoracic core, you just can't quite see enough of it because this picture is not quite sensitive enough. But can you see also that within the cord itself, there's this pale streak here. Makes you wonder whether there might be an interruption of normal CSF flow within the cord. So let's have a look at that in a bit more detail. So we can look at this one, this is a T1 picture. And actually, you see one picture, you see it's really quite a substantial thoracic disc there. The problem about thoracic

discs is that, unlike a lumbar disc, a thoracic disc often will come out and they stay out and they calcify.

And it's not as though they disappear. We know that most lumbar discs become, they resolve, they disappear, patients get better, so we can treat them conservatively. But these thoracic discs, for some reason they calcify. And it looks as though this might just be calcifying. So the thoracic disc here, and there's the spinal cord, and it's beginning to be impacted by it. So when we look at the cross-sectional view, so here's the axial view there... so let's really zoom in on that. Don't forget that on an axial view, we're looking up towards the head. So this is the right side, that's the left side. So just coming across there, if we just make that a little bit clearer, there is that disc there on the satchetal view. Here, on the axial, coming down onto it... look, cord already is being a bit deformed on the right hand side. There's that disc, and it's got a rim of dark stuff around it. Dark on an MRI scan and TTS scan is hard material. This is a calcified thoracic disc pushing towards the cord; not yet compressing it not yet causing it too much trouble, but suspicious.

And then if we look at the, this is called the fat suppression sequence. Here, the fat now has become dark and fluid around the spinal cord is ultra-bright. But look at the central point of the spinal cord. There's a bright streak there. Is there something going on in the central part of the spinal cord that's causing a neurological problem? So your suspicion that this is more than just a bit of mechanical pain down here at the thoracic throughout the thoracolumbar junction is really cogent; that's really important.

C: Isn't it? It's really fascinating that because the pain is in the one area, they just focused in the report on that one area, and didn't look at what was happening higher up.

N: Yeah. If I just put the... there we are, I'll put the cursor on. The problem they've got here is if we, they've spotted this thoracic disc high up. They've imaged here in cross-sectional view which you see now, here. Down, onto the gris there, there it is, there's the cord just shifted backwards a little bit. A little bit deviated. And then look at the next one. Down, down, down, bosh. They miss out this great big section. But if you look at that section, let's talk about in detail. Look at this. This streak of pale stuff within the spinal cord. And that may be relevant, neurologically. But also, if you look at the overall alignment of the spine you've got normal thoracic curvature here, normal kyphosis. But a really flattened central part of the thoracic spine, and then the kyphosis is here at the thoracolumbar junction. So is there something going on here in the mid-thoracic spine that is really contributing to this chaps problem?

And when you look at that cross-sectional view, you think well, is that area there a little bit different from this area here? We don't know. That hasn't been properly imaged, and realistically I think what I would advise is that he is seen by a really good, top class neurosurgeon who can look at him

wholistically and say "is your thoracic cord okay?" Yes or no. And, if there is a problem, then what's the treatment for it.

S: Claire there's a question come in for you which is, when he stops driving his car, is there an exercise or a movement which helps him to relieve his pain?

C: No. There's nothing that relieves it, he just has to wait for the spasm to go. And, it's just occurred to me that one of the ways that I can recognise whether he's responded well to treatment or not is by looking at his thorasics. If his thorasics move well to the right, I know he's going to be in pain afterwards. If he's really stiff in his side bending to the right after treatment, I know he's going to feel better after treatment and I've never really understood why and maybe, maybe what you're seeing Nick is part of what's happening in that side bending of the throasics.

S: Did you see him before 2009? Am I right there, or is that the first-

C: No. No.

S: Okay, so, I'm just wondering, having seen that MRI, should we have immediately sent him on for something else or should we have been worried about making something worse in treatment? What would, what would, they have done, what have they done so far to him? What are the consultants recommended at that stage, when you first saw him?

C: He has been recommended to have surgery in the past, but the consultants at the Nuffield felt that wasn't necessary and that the medication really would stop the pain along with treatment.

S: So what's your thoughts Nick? Would they have been trying to correct the thoratic lumbar discs because there's nothing in particular pinching on the cord down there. Would they just immobilise this?

N: Yeah, it's a mechanical instability is what they're really looking at here. So what you've got there is a disc that is just got no ability to transmit load from L1 to L2 efficiently. L2 to L3, all these secondary changes around those discs are indications that there's mechanical instability. So, the usual... kind of blink of the view of the orthopedic surgeon is, well, if it's broken, can I fix it? If I can put some screws and rods into there to make it more stable will it take his pain away? I'm not convinced that that's actually the right approach, on the basis that we don't actually know what the cause of pain in Ian is. Because he's not got a typical pattern of mechanical back pain. We know that mechanical back pain gets better with rest, gets worse with activity. That's not what he's describing. He's describing episodic back pain of a severe nature with obviously some neurological component. And I'd be very suspicious in this case that there's something else going on here with that spinal cord looking like that. So my advice is... proper MRI scan and have a look and see what's going on with that cord.

C: So, Nick, what are his options with that calcified disk in his thorasics?

N: Yeah, well if you've got... if that calcified disc has grown, which is what they have a tendency to do, it could well be pushing even further into the cord. So this was a scan two and a quarter years ago, and there's opportunity for it to have grown since then. So then the first thing you do is you reassess that calcified thoracic disc and say has it grown, yes or no. If it has and is now producing a significant mass effect on the cord, then he may need to have an operation to deal with that. So, that's a neurosurgical operation. You can just about get them from the back, but quite often, you have to get through the chest to get them. You come through an anterior approach and take the disc out, take the calcification off the cord and then you have to do a localized fusion in the thoracic spine there.

If it hasn't increased in size, and if the appearance is the cord, more benign, and if the DL, as shown here, there ... So, if this is still very irritable, then it may well be that it comes down to that being the only problem and hey ho, you do an operation there. Well, really, it looks as though both of those discs might, in the end, want to fuse up by themselves. I'd be very hesitant to offer surgery for something that has a benign, natural history.

S: Nick, one of the questions that's come in is, are there any particular tests that we should be doing in clinic to try and rule out something like this particularly, of course, if we haven't got the benefit of the MRI scan?

N: No, I mean, the standard clinical test and then a proper neurological examination is the most important aspect of this, particularly looking for any evidence of sensory levels. If you suspect that there is anterior cord impingement, then you're looking for upper motor neuron signs. If there's anything suggesting of impinging on the back, the cord and the dorsal columns. You're looking for proper reception, vibration sense.

So, a proper early conducted neurological examination is the gold standard here. If that's completely normal and we're just dealing with a pain problem, then much of what we see on the MRI scan is going to be peripheral and maybe irrelevant. If there's an abnormality neurologically, then we have to corroborate that.

This is a 58 year old retired banker. It's amazing that he's retired so early. Whereabouts are we? So, he came to see me many years ago. He had a really horrible back problem, and he, after a lot of treatment, just said to me, "Look, Nick, I can't sort this out." I think he had a Spondylolisthesis.

So, I went ahead and I did an operation on his back, and that worked spectacularly well, and the last 10 years of his career as a banker in the city was very good. So, he retired a couple years ago. Since then, he's been doing regular exercise in the gym. He plays golf twice a week, he does gardening, all sorts of bits and pieces. About two weeks ago, he had been chopping logs

and he'd played a couple of games of golf, and he had been in the gym, his usual circuit training, and he developed pain behind his right shoulder. That got worse and worse and worse and got really unbearable. So, he came to see a physiotherapy colleague of mine, works at the Chris Moody Centre. That was last Monday.

She was very concerned, so she asked me to come and just pop in to see him. I hadn't seen him for five or six years. Hi, Martin. How are you? Et cetera. He couldn't move his shoulder. He only had about a third of normal movement. Over the back of his shoulder, he had a pretty tense, hot swelling over the posterior part of the deltoid, just where the infraspinatus comes into the humerus. I was highly suspicious, because when you see something that spontaneously comes on hot, swollen, you've either got an acute injury with a hematoma or you've got a complete rupture of the muscle with a hematoma. So, with an intramuscular injury maybe pulling a tendon off.

Rarely, on occasion you see it, and that is you might actually have a presentation of a malignant tumor. So, I told him that he needed to have an immediate MRI scan, which he had last week. These are the pictures. This is an axial view, looking down on the shoulder. So, as you see here, this is the humerus there and this is the back of the shoulder. So, this is the infraspinatus. Here is the deltoid there. Look, what you've got here is a massive bright signal on ... this is the fat suppression sequence. Massive bright signal coming in. A rounded mass. You can still see the fibers of the deltoid going through that, so it's not as though the deltoid is completely disrupted. You can see there that there's a central component to this. If we just reduce the signal of that, you can see here that this is almost an infiltration of inflammation within the muscle.

So, you can see here that it's rounded. It's not an infiltration that's gotten widely within the deltoid. Here is normal deltoid, here on the lateral part of it. But here, it's rounded. Something is going on there. What's really interesting is that I saw him yesterday, and he gave me permission to discuss this case tonight with you all. He's much better. The swelling on the surface has gone down. I'll show you what the swelling was like just on the subcutaneous tissue. You see ... Maybe not that one. Where's the T2? Bear with me a second. Just try that one there. Nope. Not good with that one. Okay, we'll get back to this one.

Take my word for it. But here, can you see there? This part of the deltoid, which is directly lateral to the humerus, there is flat fat. There is the skin. Here's the fat. Can you see that? There? Yeah? Here, there is swelling. Can you see the fat is swollen and edematous at the back here, overlying the posterior deltoid?

Anyway, so, but that all disappeared. He's a week down the line, and the swelling's much better, but he's now got a firm, tender mass here in the posterior deltoid. Oh, that didn't help. Let's just try to change that. Hang on a

second. We just need to reset that. Reset image view. There we do. Yeah, so there's now a tender but firm mass here in the deltoid overlying the infraspinatus muscle and the superficial information is much improved and he can now move his shoulder about three quarters normal.

So, fascinating. So what's the diagnosis? Because actually, this might be something that could present to any physiotherapist or osteopath on a day. So, guys, what are your thoughts?

S: Well, I'd be delighted with that improvement in his movement, obviously, and we'd take credit for that clearly.

N: That's fine. Well, the worry here, actually, is that if you've got a spontaneous injury to the posterior deltoid, it's actually never been described as an isolated injury. The radiologist who recorded these films looked up the literature and found that there is no description of that. And what you have to therefore be aware of, particularly if somebody presents with a spontaneous onset of swelling, heat and severe pain with sensitivity of the skin, is that actually, this might be a tumor. And it may be a sarcoma in there.

I've seen too many cases in my 25 year cases as a consultant of sarcomas presenting exactly like this. One was deep within the infraspinatus pushing outwards. That was a rhabdomyosarcoma and the other was an old lipoma that had undergone malignant change and was a liposarcoma and that had pushed into the deltoid. So, I'm highly suspicious in this case. Really, it's to say, if you've got somebody who comes up with this sudden change, a sudden, hot, painful swelling, without really an awful lot of evidence of a big trigger, he hadn't done anything very different from his normal pattern of activity, just think the rarities, particularly if it's hot. Because if it's hot, it's inflamed. That's the reason to give an MRI scan.

So, he's got off to the Birmingham sarcoma multidisciplinary team meeting. He's been referred yesterday by his GP. He'll be seen by them in the next couple weeks. They'll do biopsies and do some Gadolinium-enhanced scans to see if he's got a tumor sitting in there. But I thought that was just an interesting case that popped up out of the blue last week.

S: Well, that's brilliant actually. And, hopefully, everyone's going to find that really useful, particularly in terms of ruling out things that we shouldn't just be fiddling around with just aiming for a few more degrees of motion. Nick, can I take you back to the previous discussion, just before we move on because we've had a question from a viewer, Stephen, who says, "Is that presentation Syringomyelia?" And his second question is, "What are the differentials for possible fluid fat inside the center of the spinal cord?" So, over to you?

N: Exactly that. Is it a Syringomyelia? That's exactly right. If there has been a developing thoracic disc to allow all the flows there to change and for a cyst

to develop. That may well be what's been underlying as well all along, and it's just gradually ...

Sorry, we'll go back to the MRI. Hang on. So, looking here, here is the spinal cord. There's the central part of it which is pale and if Stephen is right that this is a Syringomyelia, it's over quite a long segment of the spinal cord. So, it's one, two, three ... three segments. That is said to be pathognomonic of a Syringomyelia rather than it just being a directed central cord.

So, I think the question here is, as I said earlier, are we dealing with something that is a neurological problem here in the central thoracic spinal cord, may be contributed to be this thoracic disc higher up? Maybe it is idiopathic and it's been sitting there and gradually developing as time's gone by. We don't know. If you look at the date of this scan, 19th of August 2016, it's not out of date. We need a new scan to find out and then to work out where we go from here.

S: Nick. I'm going to read you out another question. This one's come in from Anabelle. She says, "Hi. I know it's not technically related to the case being discussed, but could you pass on this question? I have a patient, otherwise healthy, 30 year old male who very recently compressed and shattered his L2 vertebral body following a motorcycle crash and has subsequently had five vertebrae surgically fused, rods on screws, from T12 to L4 to stabilize the fracture."

What she's asking is, "Is it common to fuse so many vertebrae for a single compression fracture? And the patient seems to be under the delusion that in a couple of years, the rods and screws will be taken out. Is that normal?"

N: So, basically, fuse short and fix long is the aphorism there. So, what they've done is, if he's got a burst fracture of L2, one is, he's lucky because it's at the level of the conus, and so, if it was at, say, T11, he'd probably been paralyzed because if you've got a really shattered vertebrae, you often pushed on the spinal cord. With L2, it's the conus medullaris. Sorry, not the conus, the Cauda Equina. That's much more forgiving.

But you need to fix the vertebrae above and below, and there's a thing called short segment fixation which would, in his case, would be fixed from L1 to L3. But because the mechanical advantage of that fixation is limited, often you then have to do an anterior approach, which is a big double operation and that's very difficult.

So, then some surgeons say, "Well look, if I go from T12 to L4, that gives me a big mechanical advantage in the back. I can fuse it up in the back, I can get the vertebral body to heal up front and then in a year's time, I'll take all the metal work out. Those discs that I've borrowed, if you like, the T12 and L1 disc and the L3, L4 disc, I've borrowed those for a bit. They've been a bit stiff for a year, but they'll come back to normal and eventually, what I'll end up

with is a nice, stable spine between L1 and L3 with a completely healed burst fracture. That's all sorted out.

So, yes, it's two operations still. But they're staged and by the time he has his second operation, it's quite an easy thing just to take the metal work out and then he does lots of rehabilitation to get the spine moving again. So, that's a pretty standard way to deal with that and I think that sounds very reasonable.

C: I have to say, I'm absolutely gobsmacked by what you've just said. The fact that you can fuse and then take out the metal work and allow them to go back to moving properly, to me, that just sounds like it's magical! It's just so amazing!

N: If you put screws and rods in the spine, you fix it, but you don't fuse it. To fuse it, you have to change the bone so that you mimic a fracture. You put some bone graft down to where you want the fusion to be. So, in this case, all you do was to add bone graft to the L12 and L23 levels so you're fusing two levels, which is just above and just below the fractured vertebrae. But the other thing, which you're just fixing ... and you're not going to fuse those joints up. They're going to just be resting for a year because they're fixed and immobile. When you take the spinal metal work out again, those joints should, with good rehabilitation, start to move again.

There's a difference between fixation and fusion. Fixation is, we'll stop you moving temporarily by a year. Fusion is, we'll stop you moving forever. That is a combination of techniques and that's why it's very effective. It basically came out of the AO school from Switzerland and they did this back in the 1960s and 70s. And it's been practiced ever since then. It works very well for the right fracture.

S: Claire, Olivia's just sent in a question, can we get an update on that patient, Ian?

C: Yeah, of course. I will get him sent for another scan and see what the results are and-

S: We should actually get him into the studio because he would be really good in a studio and he'd be up for that, wouldn't he?

C: Oh definitely, definitely, yeah. We might, we might get him to come and have a chat with you, Nick, first so that he can approach the neuro consultant with the right information. So, yeah, I'll let you know what happens.

S: Monica's just essentially asked Nick, that on that case we were just discussing do they unfuse T12 to L1 and leave L1, 2, 3, fused and so on. Or do they just take away all the rods and screws? But then you said it wasn't fused anyway, it was just immobilised on him.

- N: So, as long as you've done the right biological operation which is actually to biologically fuse L1 to L3 then, taking the metal work out from T12 down to L4, then allows the tip of L1 and the L3, L4 discs to move again. And so she's... Monica's absolutely right. It just basically unfixes those two, gives you back the motion there and what you've got is a two-level spinal fusion around the old fractured vertebrae but hopefully in good alignment.
- C: This next patient, John, he's, is it ex-navy?
- S: Yep, ex-navy.
- C: Okay. And, possibly about your age?
- S: Yes, that, that doesn't help people does it? He's about 59.
- C: Thank you. He's very similar to the previous patient we just talked about, isn't he? He's very upbeat, he's quite a dynamic person-
- S: So even more similarity with me here...
- C: No, I don't think so. Yeah, so, he's not a whiny whiner, he doesn't cause trouble, he's a really, really nice bloke. What happens with him is that periodically, he has really severe neck pain, or thoracic pain, or lower back pain. Sometimes he has a mixture but normally it's just one area and it's very severe, it makes him really miserable and he just kinda seizes up. But, he doesn't come in whining, he doesn't come in making a fuss about things.
- S: So, Nick, what are you seeing on the MRI for this one?
- N: Well, just look in the... 'cause Claire, you said earlier that the question here was whether they might be diagnosed ankylosing spondylitis.
- C: Yeah, exactly. His thorasics are very, very stiff but the whole spine feels stiff and very, very immobile. And because it had gone on for so long, and I feel like there are times when we don't really achieve very much with him, I wanted confirmation that I wasn't bugging around with an A/S situation that hadn't been diagnosed. So I wanted confirmation.
- N: First thing is, these pictures are taken three years ago, and I presume that there's not much change in him between then and now. And so first of all, you've got an upright whole spine sectional view. And the overall alignment, the cervical spine, thoracic spine, and the lumbar spine is pretty good. If we look at the C7 plum lines, so think about C7 here and draw a plum line down, it comes down over the sacrum, so his sagittal alignment is fine. His coronal alignment on the left hand film is fine. Looking at the sacral iliac joints, with ankylosing spondylitis, particularly a man of his age, these should be fused up if he has sacroiliitis and ankylosing spondylitis. They're not. You can see the joints are there. They're open. There isn't a massive fused bone across there. So, he hasn't got sacral ilicitis. He's not got floating osteophyte down his

spine. Normally with the ankylosing spondylitis, the pathognomonic radiological feature is the bamboo spine, where you have floating osteophytes coming round the vertebrae from one to the other, fusing up the spine progressively.

So actually he's not got a bony fusion of the spine. And actually when you look at this, if you look at his spine, look at his discs, they're all pretty good. So you have a look down there. L5/S1 is a bit oblique. Can't see that. But 4/5 is good. 3/4 is not bad, 2/3 is not bad. You know, for a guy who's in his upper 50's, they're not bad. And you can't see any degenerative change down the front of the spine. So that's okay. So these don't help us very much 'cause this really doesn't tell us what's the underlying problem.

Looking at the MRI scans, let's just put up a standard T-2 scan, so here we go. T-2 MRI, lumbar spine, so he's a thin bloke. So you've got... this is the front. This is the back. He's got... the belly button's over here. So he's not overweight. He's got a nice big disc here at L5-S1. L4/5 is a little bit narrower, 3/4 is a bit narrow, but that's okay. I would just call that pretty much normal for his age. We can lighten that up a bit, make that look significantly nicer. He's got nothing pushing back into his spinal canal here. Spinal cord looks okay.

So let's just go up a little bit. Let's stick his thoracic spine up over here. What's he got there? Well, not very much is the answer. He's got normalish disc through the thoracic spine. He's got another one of these appearances of sort of narrow, sort of pale streak through his spinal cord, but there's no disc associated with that. So, not quite sure whether that's anything or not. Could be, maybe not. He's got up in the cervical spine, he's got a little inflamed degenerative disc here, which is at C2, C3, 3/4, C4/5. Little bit of degeneration C5/6, C6/7, par for the course for a late '50's man. I would call that pretty normal.

What we discussed earlier though was what happens when you look at the cross sectional views of his spine. Because if we do that, he's got something that's a bit odd. So I'm just going to put up the sagittal view of the thoracic spine. Though again, it's interesting isn't it? If you look here, he does have what looks to be a bit of a dilated central canal. Can you see that there? That... in the spinal cord. Is this another case like Ian, maybe there's a neurological thing or is this just the appearance of this particular MRI scanner? Difficult to know.

Now this scan was done 2015, so it's three years old. And maybe things have changed. Who knows? But let me just point you out to this area here. Can you see what I'm circling there. There and there. These are the deep paraspinal muscles in the thoracic spine. So we've got a cross sectional view here, C2, C3, C4, C5, C6, C7, T1, T2. Cross sectional view at T2. Look at this. This muscle here is the trapezius. There, that big muscle there. It's just a big muscle and it's dark and it's muscle bundles. There's not fat in there. But look

at this rather pathetic paraspinal muscle, infiltrated by fat and really disorganized. And if we just go down, you look at the way those paraspinal muscles look there. They just are a bit pathetic, aren't they?

Let me show you what the muscles are like in the lumbar spine. Here's the lumbar spine. Look at these paraspinal muscles. They're huge. They're brilliant with very little infiltration. You go down there. They're just normal lumbar spine muscles. So your comment that he's really stiff in the thoracic spine has led to atrophy of all of his deep paraspinal muscles in the thoracic spine, which is really interesting. 'Cause I've seen a few cases of this over the years, a couple of places where the muscles have just completely wasted away. And one case was a lady who still comes to the Chris Moody Center to have neurological physiotherapy, and she has really benefited but it's taken her three years to get some muscle back.

So, something's happened to his thoracic spine to stop it moving and I think it's a secondary event that his muscles are wasted away, but because they might wasted away, he's basically got no support, so he has to use all of his secondary supports to keep his thoracic spine in order. And that means that the thoracic spine still doesn't move. So the whole thing then, spirals down into this complete loss of function. And that would kind of fit in with his clinical situation, wouldn't it?

- S: It doesn't help, does it, that some years ago, he actually fell 30 metres off a rock face literally onto his thoracic spine.
- C: Oh yeah, I forgot to mention that, didn't I? (laughs)
- S: Fairly key. (laughs) Anyway.
- N: 30 meters? Off a rock face? So, so, the other thing is that not only is there direct trauma that might have happened to the physical aspects of his thoracic spine, but also there again, could be a neurological component that's underlying it as well.
- C: Yep. Okay. So he needs to be looking at a lot of rehab type stuff and strengthening and lots of neuro rehab.
- N: His pacing. We know that a sophisticated rehabilitation program has got to start off very slowly because if you think about what's the tolerance of those muscles for activity. There going to be really, really low. And if you try to do too much, too quickly all that's going to happen is they'll fatigue, they'll produce pain. He'll get more discomfort, more spasm and then lock down again. So the key here is to get him into the hands of the right rehabilitation team, and it is a team. It's not an individual. But it's the right rehabilitation team to start him on a paced rehabilitation program whereby he incrementally begins to move his spine just within the range or comfortable motion, gradually building up his muscles again. And if this has been going on for a long time, it'll take him a long time to get better, but there's nothing

else in that spine that I can see that would stop him actually making a full recovery in due course.

S: It probably will be a lot in the head, won't it? Because, John's one of these really keen characters, if you tell him that 5 is good, then he'll think that 50 must be better. And so, yeah, we're going to have to cope with his over-enthusiasm in his rehabilitation of this, I think.

N: Well that comes down to the model of care, isn't it? And that is that you've got to really think about what the... I'm just going to close this down again. And let's just come back okay.

Okay. Yeah, so the biopsychosocial model tells us, that not only is the biological bit, which in this case is the stiff joints, the wasted muscles, 'cause his facet joints could be locked up, the discs aren't going to be moving very much. The muscles are weak and they're wasted away. But it's also up here somewhere. You know? It's can you actually get into his head the notion that less is good and starting off slowly and gradually building up is what you need to do, rather than going in it like a bull in a china shop, and all you then do is you crash and burn. Because that's what happens as we know with rehabilitation. You try to do too much too quickly, you exhaust the muscles. They get really sore. And then you can't do anything for a few days. And then you think, "Oh God, you know. I have a horrible injury." And you get all that misattribution and catastrophization and that then leads to kinesiphobia, so everything then is just conspiring to stop you getting better.

And really the key to rehabilitation here is that somebody takes him under their wing and says, "Right John, you do a little bit today and nothing more. And then a bit tomorrow and nothing more. And you carry on like that and then in a week, we do a little bit more than that, but we carry on and do that for a week and then a little bit more than that, etc. And in six months time, we might get you back to 50 or 60% normal function. And in a years time, you might be normal function, but that's how long it's gonna take." He's got to actually understand and believe that rehabilitation expert to say, "It's going to take that long."

S: We will advise him accordingly, Nick, thanks very much. One final question, if I can. If we go back to that shoulder case that you mentioned earlier on, what's the likely mechanism of that flair up, if there's a tumor present, is it as simple as fragile tissue infiltrating or being associated with the tumor iteself?

N: Yeah, I mean, normally it'd be, if he's got a tumor that element of it that has undergone necrosis and perfuse acute inflammation and that what then... that's what the trigger has been, and that's what tends to happen, that the tumor begins to grow. It outgrows it's blood supply, a bit of it dies off. That produces the inflammatory action and hey ho, you suddenly discover it.

S: Right, that's the end of this recorded CPD. A slightly different format to our usual ones as, as I said, it was an impromptu CPD. I hope you enjoyed it, I hope you found it really informative and, of course, for osteopaths, that's part of your obligatory studies in terms of Case-Based Discussions. Look forward to having you join us for one of our other cases, sometime in the future.