Academy of PHYSICAL MEDICINE

Transcript

Treating the Shoulder: Simple stuff that works With Jo Gibson

Cast List

Steven Bruce	SB
Jo Gibson	JG
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SB: Let me tell you a little bit about this evening's guest. We're going to talk about the shoulder this evening and all the related problems that we've all encountered in clinic. I have probably the preeminent physio in the country to help us along that particular journey.

Jo Gibson has been a physio for longer than she cares to tell me. Secretly, it's 1985. She was also the first specialist upper extremity physio in the country. She's the co-founder of the International Congress of Elbow and Shoulder Specialists, a leading light in the British Elbow and Shoulder Specialist Society, and she's got published research in peer review journals and at plenty of international conferences. There are very few people, I imagine, who could be more qualified to talk to us about problems with the shoulder, the diagnostic processes, and the rehabilitation protocols that might be of use to us in clinic. Jo, great of you to come all the way down here from the Wirral from Liverpool and fantastic to have you in the audience, in the studio, sorry. Tell us about the International Congress of Elbow and Shoulder Specialists. What's that all about?

JG: So, that really was our attempt as physiotherapists to not take over the surgeons, but certainly have a voice because I was enlightened very early in my career by a very kind of visionary surgeon, really, who saw that physios were at least half the story if not more, and there was no point him speaking at conference if we didn't go too. That gave me a voice very early in my career. Then, I just realized that if we really wants to change things and really give the patient the best chance, then to do that internationally rather than just in Britain was a good place to go. So, I was lucky to meet some influential people in the United States, spent some time on a fellowship out there. That's really where I made the relationships that allowed me to make that reality. So, we basically ran the first one in I think two ... I'm trying to think now when it was. 2004, and that was in Washington in the US. Since then, it's gone from strength to strength every four years, and now we have something like six hundred people attending.

SB: Who goes? Is this just physios, or is it surgeons, or is it physios, osteos, chiropractors?

JG: So, anybody can go. Essentially, it started as a surgeons conference, the International Congress, and now the physio runs parallel, but they also have some joint sessions. So, the first time we ran it, really, it was bit political, and we found that actually a lot of the doctors were coming to our sessions to find out what we got to say. As it's evolved, now there are much more shared sessions. So, we actually get to learn from each other. Essentially, it's probably primarily physiotherapists, but we've certainly had a lot more osteopaths attending the last couple of meetings.

SB: Right. And Chiropractors?

JG: Chiropractors not so much, but the definitely are coming to more of our courses that we run through the British Elbow and Shoulder Society. I think that's probably because we've been better at kind of building links with those specialties really. I think we've had a hard fight, and a lot of it's been very NHS based, but now that those relationships in private practice are getting more developed than obviously the osteopaths and chiropractors are a natural progression.

SB: I know you work in private practice and the NHS now, don't you, but I presume that you've got a long grounding in the NHS previously.

JG: Oh. Absolutely. Yeah. No. I've worked in kind of generalist physiotherapy, really, but always in outpatients up until 1995. That's when I started specializing in the shoulder, but ironically, at the time I got my shoulder job, I was completely disillusioned with the NHS, and not being able to spend time with my patients. So, it actually sets up a private practice at the same time. Then, got my shoulder job. So, ended up with both, and actually decided I really liked both because they gave me very different things.

SB: Yeah. I guess that's the experience of so many people. The NHS, wonderful institution, though it is, goes part of the way to solving the problem, but doesn't always seem to complete the process, does it?

JG: Absolutely. I think what I get from the NHS, no doubt, is I work with an amazing team of surgeons and physiotherapists, and that's where really we generate all our research because we've got great links with the university. But as you say, there are frustrations in the reality of how long I can spend with patients. I have a fairly understanding manager, so I push it to the max. If I can, I want to spend at least an hour with people that have failed previous treatments, but there are definitely limitations in terms of access and things happening as quickly as they should. So, it's very nice to have the alternative in private practice where I'm a bit more in control.

SB: We were discussing on a separate issue the other day the fact that for physiotherapy, I think it's in the west country, that waiting times can be six months. Do you ever get to see acute patients in the NHS?

JG: We do. We're very lucky in Liverpool. I think things have improved dramatically, but there's probably a couple of things that's important to clarify about that because if we look at the evidence, the justification for keeping people waiting is that about 50 percent of all acute shoulder pain will resolve within a 12 week period. There is a big push particularly from the Orthopedic Association and best that actually if you give people the right advice from the beginning, as long as they haven't had trauma, and it's just a gradual onset of shoulder pain, then, actually, those populations with good advice and support from their GP and relevant resources can do well.

Now, clearly, as a clinician, I'd rather see that person, and I think that's an amazing opportunity. If we saw every single person with shoulder pain, the NHS obviously couldn't cope. However, in Liverpool we're very lucky because we've got close relationships with the GPs. So, they get right advice, so by the time they come into us, we've got the people that really we can maximally help, but people don't wait longer than six to eight weeks to come and see us. But if they have certain pathologies or trauma, then we'll see them within two to three weeks. So, we're very lucky, but as you quite rightly say, unfortunately, there's a massive variation throughout the country.

SB: So, you say if they have certain pathologies. Which are the ones that you get urgently?

JG: So, somebody has fallen over and hurt themself and got pain and weakness, and weakness is kind of the key. Then, we want to see them soon, particularly in a group that are more likely to have a rotator cuff tear. So, really, you're looking at somebody probably under the age of 60 who's physiologically pretty well, looks after themselves, maybe has reasonably high functional demands whether their sport or their job. If they have a fall

and have weakness that isn't changing, then they are a group that surgery potentially has a role if they've got a rotator cuff tear. The key really with that group is that if they have surgery within a 16 week window, they've got the best chance of doing well with surgery.

Other groups, again, it's very much dictated by functional demands and having a relevant clinical history with a relevant presentation. If we look at young people under the age of 25, who have a dislocation playing sports at the weekend or fall over while out with their friends, but they have dislocation where they have to go to hospital to have it relocated, or the coach puts it back in, those athletes or people who have that history who continue to be apprehensive, again, early surgery is well supported. I think the key thing it's about what they want to get back to. So, if they want to get back to their sport, there is no doubt that surgery is the best chance of stopping them dislocating again. I think the big challenge at the moment is not everybody needs surgery, and it's sometimes difficult to know who should and who shouldn't, but those two groups are well supported at the moment.

SB: Yeah. Just rowing back a little bit on that, you talked early on about those people who have pain and loss of function, then they may have rotator cuff injuries. You talked about ... I think you mentioned somewhere else, perhaps earlier before we came on air, about diagnosing things through imagery, but we're all well aware that a huge number of people have asymptomatic rotator cuff tears anyway. Aren't we?

JG: Absolutely.

SB: So, what's the differentiating factor?

JG: The history of onset. Absolutely. You're absolutely right. There's a fabulous paper just come out that essentially if I lined up a hundred people with shoulder pain and a hundred people without, and I scanned their shoulders, gave all the scans to a radiologist, they wouldn't be able to tell me which group were painful. The key thing in that group is that there is no history of trauma. So, there's no one incidents that precipitated their shoulder pain. Once you have somebody with shoulder pain ... So, when you've had somebody with a history of trauma, obviously, it's working out if that's a significant trauma. We're talking about people who've fallen over, or they've slipped down the stairs and held the banister, or even fallen onto the side of their shoulder. Again, the age does seem to matter because as you quite rightly say, once we get over 60, and we have degenerative cuff pathology anyway, then it's really if they had a previous history, and then made it worse. That's not a group where early surgery is necessarily indicated. So, it's a very specific group that we're talking about.

SB: Not that I have any personal interest in this, but what sort of degenerative pathology are you going to see after the age of 60?

JG: So, if you-

SB: I'm not there yet. Not quite. But ...

JG: So, clearly, what I think as young is getting older all the time. When we talk about degenerative pathology, all it is really is natural age related change. So, if we follow up people over time, we see partial thickness tears. We see full thickness tears. We see degenerative changes in the acromio-clavicular joints. We can see osteophytic deposition within the joints, but fundamentally, those things don't relate to symptoms. So, what's really crucial in anybody who just develops shoulder pain is taking a structured approach to assessment of the things that may stop the muscle systems being able to do its job, and actually understanding that even if somebody had a rotator cuff tear, if you're able to demonstrate good compensated strength, they've got a really good chance of doing well with rehabilitation. I think one of the key things I would say is irrespective of your degenerative pathology, what we're seeing is that actually the level of pain correlates far more highly with psychosocial factors than it does any structural feature for rotator cuff tear.

So, that's why I've said a couple of times, weakness is kind of paramount. It's the weakness that you can't change with a relevant history of trauma that's relevant. Somebody with a grumbly shoulder pain who is over 60, who's a little bit weak, the evidence would suggest that if you do the right rehab, they've actually got a probably 70-80 percent of doing very well without surgery.

SB: Okay. We'll probably take a bit of time out to go down that psychosocial pathway in a bit, but what about preemptive measures in the aging population? What should they be doing to avoid? Is there any research to show what will prevent these problems?

JG: So, again, that's a great question. I think what we are realizing in physiotherapy, well in our health professions, generally, is that what we probably haven't done well enough is get people strong enough. What we're realizing is we've done very well at perhaps getting the system to do its job, but some research that's been done at the university that we collaborate with has shown very clearly that whilst that we can reeducate how the muscles are working or the timing muscles, what we perhaps don't do as well is educate people how to keep their shoulder strong. We know that after the age of 50 you've got to work harder to maintain that muscle mass. Actually, we probably just don't load people up well enough. There's certainly evidence to show that if people have failed usual physio or osteopathy or

chiropractor, and then you do a more progressive reading where you actually load them more and work them harder, that can be the differential.

SB: Are you familiar with Claire Minshull?

JG: I am indeed. Yes. I am.

SB: She was our last or last but one guest in here for a second time talking about overloading in order to improve strength.

JG: Absolutely.

SB: Yeah. And she's been marvelous. I've also followed up on case based discussions with her, and she sends in help for people there. Is that now becoming established protocol in the physiotherapy world that you're doing maximal loading for people to build strength.

JG: It is becoming more accepted, and there's certainly a lot of big trend for strength and conditioning courses at the moment. Whether we do it well enough, I don't know because I'm not sure within our education that we're perhaps educated specifically about those parameters, but I think we're getting better. It's certainly part of what I feel is important. And I certainly, when I look back at my kind of more junior practicing, I think perhaps, I didn't take patients far enough. I still passionately believe we've got to put the foundations in place first, but then I'm probably whereas I always would have done that with my athletic populations. Probably now, Joe Public, I will educate how to keep his shoulders healthy in the longterm which kind of why didn't I do that before? I think I just didn't take it far enough in terms of his strength-

SB: It's one of the benefits of aging, this is.

JG: Yeah. Absolutely.

SB: You learn stuff. Don't you?

JG: I'm learning all the time. I don't think I'm ever going to stop.

SB: I think back, and if someone had said to me 20-30 years ago, they'd said, "We need to build some strength." Somewhere in the back of my mind someone would have said, "Well, strength means you do three sets of ten reps with a particular weight and you don't fail in that time." Of course, Claire is saying, "Well, that's complete nonsense. You don't. You do five reps, and that's all, and you do 25 reps over the week in that particular exercise. Evidence shows that will build strength." She was quite good at explaining how doing that is very unlikely to cause damage in tissues as well. Obviously, there are some guidelines.

JG: I think that's absolutely key because the three sets of ten gets really bad press. There is an evidence base for it, but I think what you've absolutely nailed there is the problem is the populations that we're talking about actually often have very negative perspectives about exercise. Even the word exercise can mean very different things to different people. So, when we talk about physical activity, what we know about the five reps is that generally we won't get done. So, we won't get any delayed onset muscle soreness. So, in terms of buying people in and making a functional difference to them, it's a very attractive intervention.

SB: Yeah. Alright, take us down that psychosocial route, the components there. You talked about evidence showing that's a huge component in shoulder pain. So, what factors should we be looking for or considering in our clinical practice?

JG: Yeah. So, as part of my masters, my dissertation actually was looking into the biopsychosocial model, and essentially just demonstrated the way it's been kind of interpreted in clinical practice is very misleading. The reason it's a particular interest of mine is that consistently the evidence is telling us that actually the majority of our prognostic factors are within that psychosocial domain. Now, when we say that, it's kind of misunderstood in that people think it's about psychological issues. They think it's about poor social things. Whilst those things can contribute, it's actually much more fundamental than that. So, people's pain beliefs, pain catastrophizing, what the pain means to them, and actually the kind of social in the biopsychosocial model is about us as therapists and how our interaction can actually impact somebody's recovery, or actually help make them become a persistent pain problem. It was essentially a communication tool that was when you meet somebody, you need to sit and listen because all the things in their life that are relevant to their pain experience potentially can be a barrier to their recovery.

So, for example, as I said, pain belief, catastrophizing, fear avoidance. So, when patients use very negative language about what they shouldn't do or can't do, that's kind of an early warning system and correlates very highly with much more lengthy questionnaires.

SB: Do you have an example of that, perhaps?

JG: In terms of questionnaires, or ...

SB: No, in terms of what patients might say because if patients come to see me with a shoulder problem, they're going to say, "Well, I can't do this with my shoulder," which, surely, that's a natural way of explaining your functional problem.

JG: So, again, great question, and it's very much about what does that mean to that patient. So, if they can't do this, it's I can't do that because I believe it's

going to do damage. So, I can't do something. Well, we assume it's because of pain, but why can't you do that. It's like, "Well, I think that it's going to do more damage, or I've got a tear. It's going to make the tear bigger." That's one of the big issues for me working in a tertiary unit is patients have been given so much information, and often the clinicians are very well meaning, they've got they're favorite explanations, but they don't take time to find out what the patient has been told before. So, we introduce a whole lot of new language, and that incongruity of language, obviously, can then cause more problems than it solves.

So, when we look at prognostic indicators, the beliefs, expectations are another, one of the biggest reasons patients opt for surgery is not because they think surgery is great, but they have a poor belief in physio or chiropractor or osteopath. So, it shows you how important it is for us to sell ourselves well, and make them aware that particularly non-traumatic shoulder pain, we can get 75-80 percent of people better. It doesn't mean the other 20 percent needs surgery. That's a whole other discussion. Again, in terms of early warning systems, people who have severe pain that is disproportionate to the story they're telling you, again, that correlates very highly with these negative pain beliefs and fear avoidance.

SB: How do we get that communication right and wrong in clinic then?

JG: So, I think the fundamental thing is to listen. So, again, if you look at the evidence at the moment what patients complain of is a lack of empathy. When you ask them what relates to a lack of empathy, it's that people didn't listen, and they interrupted, and they didn't let them tell their story. So, there is a sound evidence base emerging that says nothing more complicated than asking your patient and opening questions that tell me the story of what brought you here or similar words, and letting them talk. The evidence shows that we actually interrupt after about 25 seconds, but most patients will take 90 seconds to two minutes to tell the full story. By interrupting-

SB: So, a general thing, interrupting.

JG: Very good.

SB: Is that a general thing, or is that specific to the shoulder? Is that research about all patient problems or-

JG: No, that's been shown in low back pain, in knee pain, in shoulder pain-

SB: So, you can go on now.

JG: Yeah. Thanks. But I'm completely gone now. Again, it's a real passion of mine because it is our most powerful tool. People often don't like to do it because when people start talking about, "My husband doesn't understand," or, "work don't understand," and things that we perceive as being out of our

practice, but actually, what's really empowering is the communication research says you don't have to do anything, but you do have to acknowledge it. So, if I get to the end of hearing that story ... and people do go on longer than 90 seconds or two minutes, but actually to me that's great because I'm getting to the nub what matters to them. Then, just reflecting it back to them and summarizing the key things such as it sounds like you're having a difficult time, sounds like it's massively correlated with showing empathy because it means they've been heard. It sounds like you've had a really difficult time. I don't know. You had a crash that wasn't your fault. Your husband doesn't understand. It's had a big impact on your life. You're not able to do this, etcetera.

Now, that all sounds very negative, and often patients will get quite upset if they're in a group that have persistent pain. However, that means that we've got to the root of the things that matter. So, as I get to the end, if I haven't found lots of physical things that actually explain the pain, I'm in a very powerful place to help them understand all the other influences on their pain. When we look at shoulder pain, I think there's a very ... what I struggle with slightly is that everybody is about persistent pain. Lots of people with persistent pain still have a very straight forward mechanical issue that just hasn't had the right treatment. It doesn't mean it's centralized or nociplastic, all these words we hear about. Actually, in shoulder pain only about 20 percent of patients are at risk of becoming a persistent pain patient, but I think, again, with the biopsychosocial model, perhaps what's been misunderstood is that it was very much related to people who had chronic pain and what we now understand is even if somebody comes into you with that first episode of shoulder pain, just letting them talk and hearing that whole story can be the difference to them getting better in 12 weeks or actually ending up being a chronic pain problem.

SB: What do we do to address the problem that you mentioned earlier on, that's they don't trust osteopaths, chiropractors, and physios to fix a shoulder pain, and we can all see why a patient can understand a mechanical intervention such as surgery. A surgeon goes in. A surgeon cuts, sews, puts it all back together. He's actually done something and fixed, whereas with us, it's never, well, almost never going to be a single intervention that fixes a problem even if it's multiple interventions by the patient themselves.

JG: And ironically, this is where the evidence has been fascinating over the last couple of years. So, there was a paper that came out at the end of 2018, that basically showed it looked at placebo surgery in the shoulder. So, in people with non-traumatic shoulder pain, they did a subacromial decompression in one group. In the other group they did a placebo procedure where they just put the camera in, took it straight back out. Then, they had a group that were just on a waiting list that they brought in every so often. Made them feel very special as part of the project but didn't actually do anything to them. Fascinatingly, there was no difference whatsoever between doing the

subacromial decompression and doing the placebo procedure, but slightly more scarily, even though there was a difference, it wasn't that dramatic between the people who had just been left for longer. So, a lot of the-

SB: But they had been made to feel special? They weren't just left-

JG: Exactly, and this is where placebo and context and the environment is so key. So, that was one study. There's another study, again, that shows in atraumatic rotator cuff tears where the surgeons go, "Oh. I must operate. It will get bigger. It will get worse." You're not doing your patients a service. It's not true. Bottom line is there's a lot of patients with atraumatic rotator cuff tears. They'll take longer to get better with rehab, but, again, the outcomes are no different than surgery. So, the key message is to patients you have a three and four chance of getting better with rehab.

SB: From the patient's perspective though, if the outcomes are no different, they might well say, "Well, I'd rather get better quicker, and the NHS says I can have surgery."

JG: So, what's interesting is their recovery will not be quicker. So, this is what's been well demonstrated. Again, if I do an intervention on somebody with an acute shoulder pain, they'll generally get better within 12 weeks. If they've got a scan that shows they've got some polished or thickness tear, the pain has been going on for longer than six months, you can double that period. Certainly, people who've got neck involvement, then, again, that increases the length of their recovery.

Now, what's crucial about that is those same groups that they have surgery will take that amount of time plus some to get better because introducing surgery, you've then got to address that before you can get to the nub of actually what was the problem in the first place. So, I think how we educate patients and the options we give them is really important. I think what's key about what you've asked there, is what surgery does for the patients. It validates their pain. It gives them time out of their life. It gives them time out to engage with rehabilitation. If they have a life where incorporating those things is difficult, I think we need to look at how we facilitate that without having to give them an operation.

SB: Just going back to the research that you mentioned, there's the placebo research, there's the other stuff you mentioned. Are those studies all powerful enough for us to rely on?

JG: Ah. That's such a great question. So, the CSAW trial, which is quoted everywhere at the moment, it was methodologically sound. It was done by one of the top researchers in the UK, Andy Carr and his group who lead shoulder research, really in the UK. However, there were some methodological ... there were some crossover late drawn after the study. As

you can imagine, the orthopedic surgeons were very unhappy because it was kind of negating something that they believe they have very good results with.

SB: That was going to be my next question was how do they feel about it?

JG: To be fair to the surgeons ... the ones I work with are clearly very well informed, and we've completely indoctrinated into our way of thinking, but in the UK, generally, there has been a massive reduction in the amount of shoulder surgery for non-traumatic shoulder pain because I think they realize that. We're understanding from a rehab point of view the things that work better. So, perhaps, the patients aren't getting to the surgeons in the end anyway because we're kind of the gatekeepers particularly in the NHS. So, to be fair to the surgeons, they've responded to the research. I think the issue is with people who scan before. So, again, in non-traumatic shoulder pain we wouldn't scan anybody until they'd failed rehab because we also know if we scan them, as you said at the beginning, the problem is they have a scan, they're told they've got a tear. I must need surgery. Well, no. Do you rehab and only if you fail do we need to worry about that because then that becomes part of the decision making.

SB: How do you think that effects the patient psychologically because virtually every patient wants an MRI regardless of what's wrong with them these days because as far as they're concerned, that's the gold standard for every possible ache or pain or injury. And if you say, "Well, no, you can't have one," does that influence their response to treatment?

JG: So, again, that's such a great question. I think from my-

SB: Ah. I'm doing well this evening.

JG: Well, it's all the things that are so topical in my world at the moment. That's for sure. Interestingly, we've actually stopped local GPs being able to do scan apart from when they're worried about malignancy or somebody has got a worrying history because we know that if somebody has an ultrasound scan and the GP says, "Oh. Well, you've got a rotator cuff tear," that probably means you need surgery." I then take three to four sessions of challenging those patient beliefs and getting them back on board with the rehabilitation. So, if patients are insistent, it's understanding why they're insistent. I will often say to them, "Look. You know," particularly if I've been able to change their pain as part of my assessment, "we can do this to reassure you that there's nothing horribly wrong, but we're likely to find these things, but then we would find them in every other person who is not necessarily had shoulder pain who is your age." So, I think that's where our skills as educators and reassurers is absolutely key, but also, having a knowledge of the evidence. So, we have charts with research on. We have lots of different resources that we can point people to if they need to be convinced or

educated or change because we have a very high threshold before we'd consider surgery in that group. It's so important because those patient beliefs are absolutely paramount. So, if I don't refrain those, then I set myself up to fail. So, that is where I'd invest my time at the beginning.

SB: We've had a couple of questions. We have three questions come in so far. One which came in before the show. We'll deal with these first of all. Martin has asked what the incidence of further dislocation after surgery is.

JG: Again, very good questions tonight because they're all things I know about which is very rare which is-

SB: And that's what defines a good question. Right.

JG: Not necessarily.

SB: I see.

JG: Just things I have to talk about a lot. If you look after surgery, the recurrence rates are recorded anywhere between about four and 12 percent. There are some groups where it's definitely higher. So, if you look at under 17 rugby players, irrespective of what you do surgically even if you do a boney procedure like a latarjet, the recurrence rates if they go ... So, latarjet is a boney procedure. In shoulder surgery you have two key options. When you dislocate, you tear off the cartilage at the front of the joints. So, a bankart just basically sews that bit of cartilage back where it should be. In some people who play contact sport, when that piece of cartilage pulls off, you can pull the bone off with it. So, essentially, the surgeon will make a decision because you can also as the joint dislocates you get what is called an impaction fracture or Hill-Sachs legion on the humeral head. If you then examine that shoulder and that impaction fracture then causes it to be unstable. A soft tissue procedure won't work. So, that's the bankart.

So, then they would do a latarjet. Now, what a latarjet is, is they basically take the tip of the coracoid, and they lie it around the front of the joint to basically create that congruency or that depth to the socket again. So, it's a much more robust procedure. There's pins holding that bit of bone in place, and it's very popular in rugby players. Again, a real word of caution. In the under 17 group that aren't fully, skeletally mature ... So, we all know one 17 year old isn't the same as the next one. So, somebody who is like this not such an issue. Somebody who is not finished growing yet, it's a big issue because even with a latarjet, they can be up to 70 percent likely to re-dislocate even with surgery. Now, they are one specific group. If you look at football, if you look at throwing sports, the recurrence rates are low. Again, in sporting populations under about 12 percent.

SB: Okay. Hopefully, that will satisfy Martin. I don't know who asked this question, but already we've been asked whether you have an online course about shoulder rehab. Tell us about your online course on shoulder rehab.

JG: Yes. I do. In fact, I think it's due to be launched again in November, but I did an online course with a guy called David Pope who runs an online education company in Australia called Clinical Edge. Yeah. So, we do loads of free resources and stuff. There's a lot of free content they can access if they want to get a taste without having to commit to anything at all. I'm a great believer in education. I like what David does because we give a lot of stuff to people to ... Really, I just want patients to get a better deal, but if people are interested, then it's there as a resource if they want it.

SB: Okay. I was going to ask ... I've asked this before. I think I asked this of Simeon Niel Asher when we've had him in, and I know you know of Simeon. Have you worked with him?

JG: I've not been lucky enough to meet him, but I've certainly heard a lot about his work.

SB: He's done quite a bit on the shoulder. One of the things that's always puzzled me is the reliability of the myriad shoulder tests that we have for various things. Which ones do you use? We'll probably see later on but ...

JG: Yeah. Very few. If I have somebody with non-traumatic shoulder pain, I think the day of Hawkins and their impingement tests are long gone because they don't tell us anything than what we already know is the shoulder hurt. So, they don't really have any role other than making somebody's pain worse. I think in terms of rotator cuff testing, again, in that non-traumatic population they're of very limited use. I think the one time that special tests potentially have a role is when you have that history of trauma. So, if you think of the example I gave earlier with the young dislocator who had a dislocation which relocated. If they're apprehensive ... So, you put them in a position of 90-90 and take them into external rotation, that actually is very reliable, but only combined with that relevant history.

So, the big problem about most of the studies about special tests is that they take a heterogenous group of patients, they apply all the tests and say they're rubbish. Well, they are always rubbish if you don't combine them with the age, the mechanism of injury, the location of pain. That's 70 percent of your decision making. So, your clinical testing is a little, tiny bit so I would probably use some of the gross cuff tests like the Jobe, and maybe even the drop arm test. But I use my own tests, which I think are more research-based to look at the cuff in more detail. But I have to talk a language that my orthopedic colleagues understand. So I might use some of those tests in a traumatic group. But what I'm interested in is if I apply some modification

procedures, can I change the outcome of that test? Because that to me gives me a much better idea of whether I can help that person or not.

SB: So when was the last time you did a standard full can, empty can tests?

JG: A very long time ago.

SB: A long time ago. Well that's really interesting.

JG: Yeah.

SB: We'll have a look obviously later with a real model on what you do now. I warned you we had this really, really long question. It's actually a case-based question. So the osteopaths will be chuffed to bits because that means we get two case-based discussions this evening, which is boxes ticked for their CPD. I think this was sent in by Ree, the name is somewhere down in the notes. Now, you're going to have to pay attention for this because this is a long case history, but it is really interesting, and Ree herself says, "It's a bit long-winded."

She has a patient. "A 63-year-old male diagnosed with MS in 2002, with a history of depression. He fell onto his face and right shoulder 16 months ago, and the diagnosis was dislocation of the humeral head, total rupture of supraspinatus at the humeral head with a labral tear somewhere, and a lesion of the axillary nerve. Humeral head was relocated under GA, and no rehab was provided," which is, it's astonishing. "no rehab was provided. The patient's been doing some exercises from the NHS website for improving the general shoulder range of motion for about three months but hasn't had any treatment," until visiting Ree a couple of weeks ago. "A follow up MRI reported nothing abnormal and-

JG: Which is by the way, takes precedence.

SB: Ree says later on "Despite the fact that there's a full thickness tear," which is kind of bizarre. Now I've lost my place, "So nothing abnormal. That's two months after relocation. Supraspinatus has not been operated on. Patient is attending the clinic and the shoulder will flex to about 90 degrees only and abduct two 45 degrees with restricted external rotation." Hope you're getting all this? "Passive range of motion, gives bony end feel at end range on both movements. Humeral head blocked at ACJ and very restricted STJ. Scapulothoracic range of motion." It's lovely when people abbreviate because it makes the things shorter. But then I have to think-

JG: Work out?

SB: ... remember what the abbreviations are. "Patient's got pain radiating into C5–6 distribution in the upper extremity, decreased after two sessions, but no improvements in flexion or abduction. Thoughts on the best approach and

prognosis given the biopsychosocial components including muscular sclerosis, depression, extreme fatigue and low extremity power loss," she says.

"Length of time, now past since trauma without therapy, supraspinatus trauma. Would you refer for more imagery? Would surgery would be indicated at this late stage? There's still been even after that follow-up MRI, there's been no further treatment." Did you manage to hoist all that in? Sorry, it's a bit of a gallop.

JG: There's so many potential relevant bits within that. It's a great case study because it highlights so many different things. I think the first thing to say in terms of this gentleman's MS and his depression, and trauma, all three of those things are a risk factor for developing stiffness after having a traumatic dislocation. So his chances developing what we consider a true frozen shoulder are very high.

The other thing that makes him at risk is the auxiliary nerve injury. The other thing that makes him at risk is the rotator cuff tear, so he's ticked so many boxes in developing true stiffness within the capsular tissue. My first question really would be understanding whether or not that auxiliary nerve injury is recovering, because if you have a full thickness supraspinatus tear with an auxiliary nerve that is still injured and not fully recovered, that puts you in a very difficult place in terms of being able to improve his active range.

In terms of passive range, it's very much dependent on pain levels. So we know that unfortunately our manual therapy in very, very stiff shoulders, in true frozen shoulder where it's within the capsule, is that actually the kind of sound methodological papers suggest that whilst it might assist somebody's recovery, fundamentally they need to stretch, and hydrotherapy seems to have a good role as well. So getting people in a pool if they're physically able does seem to have some additional effect.

However, as we all know, people with true stiffness, it can be a real challenge. So with this guy, my order, I guess my priority order, I'm not really interested in the cuff tear until I understand about the auxiliary nerve, because if I have an intact auxiliary nerve with a deltoid that functions, I've got the potential to compensate for that rotator cuff tear. Now having said that, I've now got this huge stiffness that I need to do something about. There's been a lot of interest recently in using eccentric exercise, in terms of having a lengthening effect on subscapularis.

So I'd probably in somebody like this who's this far down the line, if his pain levels would allow, I'd get him doing some eccentric work to really try and target where subscap interdigitates with the capsule to have a lengthening effect. It depends how able he is to do his stretching. And again, I think it's making sure we get patients doing stretches that target the bit of the joint

that's tight. As I say, all these things are going through my head all the time to make sure I give all the right advice.

Make sure you know what's happening with the auxiliary nerve, because that's kind of pivotal to know what's happening, because if that's not recovering, you're in a very different place. If it is recovering, that's great. But again, nerve conduction studies will give you a timeline in terms of how long that's going to take. In terms-

SB: But he hasn't had any of those, of course.

JG: No, and he needs those doing because otherwise you're working in the dark, and that for me with this sort of patient is pivotal. It's a really good example of what happens when older people dislocate their shoulders because the prevalence of nerve injuries, the prevalence of cuff tears is very, very high. So what's slightly concerning about this gentleman is that the kind of pathway, the national pathway that the British Elbow and Shoulder Society actually did with the BOA, says that this gentleman should have had an early ultrasound, and also should have had nerve conduction studies in the presence of a nerve, because otherwise you can't plan or have any clear prognostic idea of how he's going to do.

SB: Right.

JG: So we can try and address the stiffness to set the ingredients up for him to get better, and that would be targeting the bit of the capsule that's tight, but in terms of reeducating his muscle system, you don't have the information to know whether you have the potential to change it.

SB: How receptive do you think the NHS would be to an osteopath or a chiropractor saying, "We need nerve conduction studies in this"?

JG: I think that they would be very hard-pressed to refuse the offer. A very nice letter saying, "I'm keen to help this gentleman, but he clearly has signs of ongoing deltoid dysfunction and to know how much I can help him. I need to know whether that auxiliary nerve's recovering," entirely reasonable. The guy's got a full thickness tear that's kind of irrelevant till you've got the range of movement and you've addressed the auxiliary nerve function. Once you've got some range of movement and an auxiliary nerve that's recovered, then potentially the rotator cuff tear becomes more relevant. But to be quite honest, this far down the line, you're looking more at compensation, with his MS and the other things, he's not a massively good surgical candidate anyway.

SB: No, sure. Explain again why that full thickness tear is irrelevant?

JG: Basically because if you have stiffness like that, no surgeon would repair it, because you need to get people mobilizing early, otherwise they'll get stiff. If

they get stiff, you're not going to get the benefit from the repair. But the other most important thing is the auxiliary nerve function. Surgeons generally will not do a rotator cuff repair in the presence of an auxiliary nerve injury, purely because you need deltoid to compensate. And so functionally you're really setting them up to fail.

SB: Okay. It just seems to me that if you leave it and leave it, and leave it, is it still possible to repair?

JG: Absolutely. And the thing with somebody that's 63, is you have to ask yourself, what I don't know from the radiology is whether that is a traumatic tear or whether it's an extension of a preexisting tear. So again, if you look at the follow-up studies of somebody who's 63, then for me it's quite likely he already had a tear there and the dislocation has extended it. So that is less worrying than somebody perhaps who's 50.

SB: Yeah.

JG: Yeah, who's doesn't have all those other co-morbidities, in which case your window is probably more important. There are still things that they can do. But as I say, without a better range of movement and auxiliary nerve recovery, it would not be a good idea to repair because he won't do well.

SB: Okay. So you've already touched on this, but just if someone presents to you and they've got shoulder pain, what would be the clinical indicators which said, "No, you do need to go and get a scan straight away," or, "You're a very likely candidate for surgery"?

JG: The history of trauma is really key, or let me think who else? So again, even if I look at athletic populations, who've had pain that has got worse, who've had lots of physio, they've usually had scans, to be fair, by the time they've got to me. But again, what we understand is it's probably not that relevant. It really is only the people that have a history of trauma.

Now some people get excited and say, "Well what's trauma?" It's a significant enough event that they could have torn a soft tissue or injured a bit of bone. And so really without that, I wouldn't get them scanned unless they failed treatment with me, unless of course they had so they had a history of cancer or they were a prevalent smoker and had chest symptoms. Let me think. In Liverpool, we have quite a big drug and alcohol population. So things like avascular necrosis. We also have an ethnic population, so TB. So as soon as there's any systemic markers, as soon as features don't fit the common pathology, is then my threshold for imaging would be lower. But in a straight-forward non-traumatic shoulder pain, imaging doesn't have a role until I've not got them better.

SB: Yeah. Explain the connection, TB and shoulder?

JG: So we know that certain ethnic minorities in terms of if they've had TB in their chest, they actually can get tuberculosis within the actual humeral head. Again, I'm really glad you've asked the question, because when we look at frozen shoulder, frozen shoulder is one of the most common misdiagnosis for nasty pathology. So we see people who've been diagnosed with frozen shoulder who actually have AVN, or they have TB, or they have metastatic disease. But because everything is so limited, then they get labeled as a frozen shoulder.

SB: How would you distinguish then?

JG: The history, again. So if you look at the typical demographic of frozen shoulder is generally between 40 and 60. The peak age is about 56. Generally, there's no clear mechanism of injury, so for a true primary frozen shoulder. So patients will normally tell you nothing more exciting than, "I reached into the back of the car," or, "I picked some shopping out of the boot and felt a bit of a twinge, but nothing major." They wake up, it's a little bit sore, but then they get quite a quick increase in pain and then that gradual loss of range of movements. If they don't fit that story, I'm already suspicious if they tell me they've got a stiff shoulder. Now we know that people can develop secondary stiffness after surgery, after falling over, after a whiplash. But in terms of primary frozen shoulder, that is the typical history that's well supported.

SB: Yeah. Okay. I would have said that frozen shoulder in my experience is actually quite a common misdiagnosis just generally, isn't it?

JG: Absolutely.

SB: Because a GP looks at a shoulder that doesn't work and says, "It's the frozen shoulder." Even when it does whatever it'll do.

JG: Absolutely.

SB: It's painful, therefore it's frozen. I'm also interested that you use the term, frozen shoulder. Does that mean that you like some others don't believe that adhesive capsulitis is an appropriate term for a frozen shoulder?

JG: Not at all. I actually think the move away from adhesive capsulitis has kind of muddied the waters because at the moment there's a real move that frozen shoulder is more about muscle stiffness than it is any true capsular contraction. That's misleading because there is definitely evidence that supports, there is a true pathology within the capsule in that group. However, there is research where they've taken people with a diagnosis of frozen shoulder, put them to sleep on an anesthetic table and then shown they've got full movement, and said, "Oh, it's muscle stiffness, no it's the capsule." No, they just didn't have frozen shoulder.

SB: Right. Okay.

JG: But what I think, when I grew up a bit and didn't go, "Pah," about that research, when I reflected on it, I thought, "Well that's very interesting is that people presented with what appeared to be a capsular stiffness that was mediated by the muscle." So it shows you that if people, certainly if they've got neck involvement, certainly if they've had pain for a long period of time, those protective patterns can be significant enough that they present as true stiffness. But in terms of what you said at the beginning there, if you look at GP studies or rheumatology studies, the most common diagnosis is frozen shoulder, whereas, the most common pathology is rotator cuff related.

SB: Right.

JG: So it is massively over-diagnosed.

SB: Yeah. Going back to the terminology though. I was-

JG: Oh, sorry, yes.

SB: ... I am convinced that I saw credible research some years ago now, so I can't remember the authors or anything else, that said that, "In numerous cases of frozen shoulder," now I don't know how accurately those were diagnosed, they, "found no evidence of adhesions."

JG: Well, I think that the misleading word is the adhesions on the capsulitis separately, because depending on when you do the histology, depending on when the studies were done, you will or won't demonstrate evidence of an itis. So if you look in the very early stage, there does seem to be some evidence of sign of itis in the joint that corresponds to a kind of neurogenic or neural inflammation within that top part of the joint. What we understand now is it's a two stage process, so you get a contracture rather than these adhesions within that superior rotator interval, and then a reactive fibrosis around the rest of the capsule. So it's more of a fibrosis, a contracture, than actually things sticking together. So that's why the shift away from adhesive capsulitis.

I guess my point was it is still a capsular mediated problem. The reason that frozen shoulder has become popular again is purely because there's a big move away from fancy biomedical terms because they are scary for patients. Ironically, if you look at qualitative research, and you ask patients, they quite like the term, frozen shoulder, because they believe it means it's going to thaw and get better. So is a positive end result then actually it seems to have positive connotations once they understand the process.

SB: Yeah, I imagine it's less scary for example, than saying, "You've got a full thickness tear of your rotator cuff." When you just say, "You've got a frozen shoulder." I mean, it's not the same problem, I know.

JG: No, but absolutely.

SB: But in terms terminology.

JG: Yeah, exactly. That why, I mean if cuff related pain we've got an absolute nightmare because nobody can agree what to call it. There's still people call impingement, subacromial pain, whatever. But I think frozen shoulder is the term that is being bandied about. Physios tried to do a sub-classification of the contracted shoulder, but it hasn't taken off. So I think we've still got a lot of confusion and a lot of use of both terms.

SB: Okay. Question from Vispi. Vispi says, "If tendon damage is seen as an artifact in non-symptomatic patients, and the same are seen in symptomatic patients, what is likely to be the cause of pain? And one would imagine inflammation accompanies both groups. So again, what will be really giving the pain?"

JG: You've got a fantastic audience.

SB: They're osteopaths and chiropractors, what do you expect?

JG: Well, absolutely. I'm realizing this. Again, this is a question where I feel like I'm going to give a politician's answer, because the bottom line is we don't know what causes the pain. There is actually a lack of evidence about true inflammation with a lot of patients who have rotator cuff related pain. Similarly, when we look at rotator cuff tendinopathy, again, there is an absence of evidence about true inflammation. There are no doubt studies that show us you have inflammatory signalers, but they don't actually necessarily correlate with the active process.

SB: Right.

JG: The most we have to support inflammation in anybody who presents with shoulder pain is if they come to you where they've perhaps, I don't know, been on holiday and lugged their suitcase around, or they've upped what they're doing in the gym. If those patients have a constant background anterior lateral shoulder pain and don't like lying it on nights, that seems to have a high correlation with inflammation within the bursa. Does it change your treatment? Not to jot.

SB: Right.

JG: The most that we know is it seems to relate to the muscle system not doing its job properly. It's heightened by patient's beliefs, whether they've got neck involvement, their general lifestyle, the health of their tissues, but fundamentally, all we really know is if we make the muscle system work differently, it seems to get rid of their pain.

SB: Okay. Look, Jo, I'm really conscious that we can sit here and gas about all these things for ages, and there are more questions coming in, and I've certainly got several in my mind, but perhaps we ought to set aside some time for looking at our model this evening.

JG: Super.

SB: Should we go have a look at a Stella?

JG: That sounds like a great idea.

SB: Let's do that. Right Jo, I know you've already been introduced. This is Stella.

JG: I have. Thank you.

SB: So Stella has shoulder problem, so I'll leave it to you.

JG: Lovely. So I've been very lucky to speak to Stella already, but I think what would be ... do you mind terribly just summarizing your history in a couple of sentences or three sentences, which ...

SH: Six years, whiplash injury, minor whiplash injury. Developed into a frozen shoulder and now into an 18 month phase of physiotherapy.

JG: Okay. Fabulous. Stella and I have spoken a little bit about where her pain is, and so when somebody ... obviously I haven't done my let you speak for two minutes and tell me your story. So apologies for that. But in terms of getting to the nitty gritty of what I do with my assessment. I have a structure in my head that I go through every time I assess a patient.

Essentially what I'm interested in, the things that potentially stop the muscle system doing its job. So the first thing I would like to know from Stella, after hearing her story is where she gets her pain? Because that immediately gives me an indication whether it's likely to be the local shoulder or whether it's likely to be driven by her neck. So if you can tell me where your pain is, just so everybody else understands, that would be great, because it'll inform my reasoning.

SH: Okay. So it's from a middle of the shoulder, up along the neck, and into the bottom of the head.

SB: Can you just run through that once more because the camera didn't switch in time to see what you did there?

SH: Okay. Okay. So shoulder blade, up through the neck, and into the bottom of the head.

SB: Good. Thank you.

JG: Okay. Do you get any radiation down your arm at all?

SH: Occasionally, yes.

JG: Okay. But essentially this is the main part-

SH: Yeah.

JG: ... and it radiates up into here? Okay. What sort of things make the pain worse?

SH: Sitting still, not moving.

JG: Okay.

SH: When I've been sitting in the chair at work for too long, I get stiff and tense.

JG: Okay.

SH: So yeah, the more I move, the better it is.

JG: Super. So there's probably ... clearly, I'm not going to go massively into the subjective because I'm really keen on showing everybody about the objective things that inform what I do with my patients. But immediately hearing Stella's history, in terms of pain location, as soon as anybody has periscapular pain, that would indicate that the neck is significantly involved in their presentation. Similarly, if you have any radiating symptoms beyond the elbow, if you have any hand symptoms, again, those things have been shown to correlate highly with your neck. Now if you've had a history of frozen shoulder, you'll have developed compensatory strategies. So we know that in itself can create a neck issue. So I would obviously spend more time understanding that background.

But in my head what I go through is a very simple clinical reasoning framework in terms of is there a history of trauma, therefore something could be torn? Is there stiffness? If that stiffness is significant, i.e. less than 70%, compared to the other side, because we know with that degree of stiffness, the muscles can't do their job through the full range of movement. So if I have that significant stiffness, then potentially that's what I need to target first before I can get the muscle system doing its job through range. I can still work on the muscles in isolation, but just not above 90 degrees, because it's likely to make your pain worse, not better. It doesn't mean you can't stretch and do those things, but in terms of what I might do for the muscles.

If it's not torn, so I'm not worried about any tear of the cuff or the labrum, and it's not stiff, then the next question I ask myself is, "Is it irritable?" Now really what I'm talking about there is a developing frozen shoulder, a calcific

tendonitis, or a reactive tendinopathy. Something with clear cause and effect. Okay? And we can always talk about that again. If it's not torn, it's not stiff, and it's not irritable. Then what I'm interested in is, can I change it? Okay? Now in terms of the looking at ... let's look at stiffness first before we look at whether or not I can change it. So I'm just going to ask Stella to literally just bend her elbows and just do external rotation. Okay. Now you can see that we're restricted on this left side. Okay? which is your symptomatic side, I hope.

SH: It is indeed, yes.

JG: Okay. Now it looks stiff, so it's something I then need to go in and just ascertain whether that's a true capsular restriction or whether that's mediated by muscle stiffness. So there's a couple of things I can do to do that. So if you just turn that way for me, Stella, that's lovely. If you can relax that arm now, that super. We know that if I unload the shoulder, so if I take all the weight off the arm, I take away the compensation in the pecs and the lats, so those muscles work harder when the rotator cuff's not doing its job properly. If I unload it, but also give a little bit of compression into the joint, we know that that's a very easy strategy to just get the rotator cuff a little bit more switched on. Okay?

I'm going to ask her to just relax completely and my hand at the back, which I'll show in just a minute, it's just monitoring lats. So I'm going to take her, and you can see, I can get a little bit more range, which suggests that that stiffness is mediated by muscle rather than capsule.

SB: Is that effective, because there's a little bit of abduction in her arm now, in her shoulder now as well?

JG: So again, as long as I'm only between nought and 30, I'm still targeting the same part of the capsule.

SB: Right.

JG: But that's a great question, because if you look at the capsule ... I'm sorry, I keep saying, "Great question," I do mean it.

SB: Oh, I'm happy. I'm happy. I'll take any praise I can get.

JG: If we look at the capsule, and if you think about it as a big circle, then rotation is your friend in terms of working out what's limiting any sort of elevation restriction. So I can look at external rotation in neutral, which looks at the anterior superior capsule. I can look at internal rotation in neutral, which looks at the posterior superior capsule. This is an area that often gets missed because we look at hand behind head and hand behind back, which are combined movements, but we actually need to do this as a pure movement to actually isolate where that's stiff. In fact, just come and have a

look at me again, because that felt a little bit tight. Just turn in for me. Oh, not so bad.

SH: Both sides.

JG: Okay. Now those are the areas where people with non-traumatic shoulder pain will generally get specific stiffness, because that's where the bursa is, and that's also where the capsule is. Now, if I'd had somebody who'd had surgery or a true frozen shoulder, we can also look at the inferior part of the capsule and look at abduction, external rotation, and obviously I'd compare that to the other side, but also look at our internal rotation. Ooh, and that's not very nice, is it? Okay.

So that then tells me which parts of the capsule is most tight. But clearly, I need to compare that to the other side. Now I have a feeling when I support this and I repeat her movement, that I can get her shoulder further. Okay? That won't always happen with patients. But again, if I've got that kind of suspicion in my head that essentially this is not a true frozen shoulder, I might want to search this out further. Now I can do this by lying her down. I could show you.

SB: Yeah.

JG: Yeah?

SB: Please.

JG: Do you mind having a lie on your back there for me?

SH: Yeah, that's fine.

SB: We're just going to move this over slightly, aren't we?

JG: Yeah, perfect.

SB: So the shoulder's clearly visible.

JG: So again, am I okay to just switch over there to check sides?

SB: Yes.

JG: Perhaps I can do over here so that we can see. So let's have a look at your range there. Fantastic range there. And let's have a look ... and fantastic range there. So Stella's telling me she's got a history of a true frozen shoulder. So I expect her to have true stiffness throughout the capsule. So let's just have a look now. Lovely. Okay. Now interestingly, each time I do this, she's getting a little bit more range, which would suggest there is a muscle stiffness issue. If somebody has a neck component to their problem,

that will give them muscle stiffness, because clearly the elevation for the cuff in the shoulder muscles is C5-6. So I can't ignore the neck component here, but I'm going to show you what I do to just try and search out if this is just the bursa or the muscle that are causing the stiffness, but importantly, take those out of the equation, so anything we do for the capsule is at the true limit of that restriction.

So what I would do is, actually you can see I've got Stella's arm really lovely and supported here. As you pointed out beautifully, when I wasn't concentrating, I must keep nought to 30 degrees because otherwise if I come further out, I start targeting a different part of the joint. But if I hold her in this position, you can see I'm holding her in her maximal range. Let me know if it's uncomfortable because I don't want to flare you up.

SH: Yes.

JG: So what I'm going to do is just come off the acromion here, and my heel of hand is actually just going to sit on the top of the humeral head. So I'm literally going just let my nice soft bit, nice design bit here come off the acromion, onto that humeral head, and importantly, that's just going to take up tension. The body will always take the path of least resistance, so it's really important we localize that stretch, particularly somebody like Stella, who the last thing I want to do is start giving her neck a good stretch. So I'm going to take up that local tension and then both hands are going to work together. Okay? It's not horribly rough. Is that okay?

SH: Yeah, it's fine.

JG: You can say if I'm being mean, I'm trying to be very nice, but again, it's not a horribly aggressive technique because you're really winding up the part of the capsule that is tight. Now I know Stella tells me she has a history of a frozen shoulder, so I could target any part of the capsule. But again, the evidence suggests this is where it starts and this is what will give you the best way in to address those other quadrants. That generally you're better working just on one direction at a time. So if you try to do both directions in one treatment, you end up chasing that range of movements.

Now as part of my decision making, so I have somebody who tells me they've got stiffness, I know she's got a neck component. I'm keen to know if this is truly capsular. You can probably see just from doing that, we're starting to get more range, and I've done about 15 seconds. So what does that tell me? It tells me there's a lot of muscle stiffness that is making her range of the movement restriction look worse.

SB: Yeah.

JG: Okay?

SB: So you've done 15 seconds. How much would you do realistically?

JG: Yeah, generally I would do 20 or 30 seconds and I'd probably do it at least three times. If it's improving really nicely like this, I just want to get her muscle system going, because muscles are stiff because other things aren't doing their job properly. So I can release things off and make her feel fabulous for a few hours or a couple of days. But bottom line is, that will not maintain if I don't get the muscle system doing its job. If I do this for three times, it's not really changing, I might do it a couple more, but if it's really not changing and I'm feeling that real resistance, that tends to fit in with a true capsular restriction. So what that then tells me is this will make it easier for her to stretch, but fundamentally she needs to be stretching the relevant bits of the capsule.

So it's very useful in my decision making. If I have somebody in that standing position, I unload it, I can't increase their range and I'm suspicious the history doesn't quite fit. This just helps complete that story.

SB: Okay.

JG: Okay?

SB: How does that feel for you Stella?

SH: Yeah, it's fine. No pain.

JG: Oh good ... there's a relief. So would you stand up for me again now?

SH: Yeah, sure.

JG: Is that okay? Because what I'd like to show you now is just the assessment, I go through in terms of changing somebody's pain. Now I'm going to imagine you have got a pain, but we know that you've also got a bit of restriction when you lift your arm up. So if you just come there, hopefully we can see. So all I want you to do is just lift both arms up forwards for me. Okay.

SH: All the way?

JG: All the way, as high as you can. Now you can probably see that Stella's got a little bit of restriction on that left side at the end of range of movement. So come back down for me. So the format I was telling you about is it torn, is it stiff, is it irritable? The next part of my assessment is can I change it? Now why do I want to change it? Because most of the evidence suggests that our pathology is because muscle system isn't doing its job properly. And having just done that there, your restriction isn't bad enough for me not to be able to target your muscles. So what I'm going to ask Stella to do is turn around. Now I can I just talk you very quickly through what we understand about the muscles-

SB: Please.

JG: ... because then it will make sense. So if I have a patient with pain, what I'm interested in is can I change their symptoms? We know that just before we move our arm, the cuff kind of co-contracts, apart from subscap, which is a bit lazy and waits till the party's started, but the rest of the cuff co-contracts ready for action. We used to think it was biomechanical. We know now it's just a feedforward reflex to get that arm ready for action.

Once we start to move, depending on which direction we move, one side of the cuff works harder than the other. So when I go through elevation, because I've obviously got pecs and my anterior deltoid elevating me, then the posterior cuff must work harder. And that's really relevant because most of the evidence suggests that it's the posterior cuff that doesn't do its job properly.

SB: Right.

JG: Okay? So that's often where we want to target, okay? The other thing to consider about the rotator cuff, because it's got three roles. There's switch on, there's direction specific activation. So posterior cuff in elevation, anterior cuff in extension, and only truly co-contracts in the scapular plane. Then we then have this pure torque production. Now you can't go on Google and put in rotator cuff without seeing this, the least useful exercise in somebody with shoulder pain because if you had shoulder pain and you do external rotation down here, are EMG research has shown that people just fix with their pecs and lats because they can't dissociate their cuff.

What we need to do actually is work them in higher degrees of elevation to be able to target that rotator cuff and I can show you some very simple things to do for that. Now, in terms of how that informs my improvement test, the one thing I haven't mentioned is the scapula, that's because it's very out of favor in the shoulder world. We're not saying it's not important but what we know now is that clinically, the most I can say is, it looks symmetrical or it doesn't. All these measurements, there's about 41 different assessment techniques reported in the literature, the only ones that have any reliability are static measures but static measures have no correlation with what happens when you move, so it's not a good use of your time.

SB: So that scapula thoracic rhythm that we use to assess ...

JG: Yeah, there is such a massive variation between people and what they've shown that inter-testing reliability is poor but this is why improvement tests have become very popular, because what we know from lab based studies, if you put EMG on people, or you put them in a 3D scanner, there are key differences with people with pathology, it's just clinically we can't pick them

up. So the scapular systems test that I'll show you in just one minute is the alternative, if you like.

So let's just get you to do your elevation again and you can see how that feels and we can just see we've got that loss of range at the end. So I'm going to make life easier for the shoulder and the rotator cuff, oh you show this beautifully. So can you see the position of the shoulder there? If I unload the shoulder, can you see how that scapula position changes straight away? Now in the old days, we'd have done scapular setting, laid you down, released off your pec minor, now we know that that positional stiffness is because the cuff's not doing its job. So if I make it easier for the cuff to do its job and you know make a fist, you can see you've got this improvement in position straight away. Now I could just ask Stella to just take that-

SB: Could you do that with Stella's back towards the camera so that the audience can see-

JG: Of course.

SB: Yeah, that's probably a perfect position there.

JG: Yeah? Perfect. Am I all right to go on the other side?

SB: Yeah, of course.

JG: Yeah, so if we just look at this position here, this is what we would call anterior tilt, even though I'm told I'm not allowed to assess it but if you look at the position here, if I just unload the arm, can you see straight away-

SB: Yeah.

JG: ... we get the improvement in position. So as I say, in the old days, we were scapular setting et cetera, what's important, I don't know whether osteopathy and chiropractors are probably more enlightened than you don't both with it anyway but we had years of spending lots of money on scapular setting and what we know now is that if people have had shoulder pain for six months or longer and you make them very vigilant about this, they'll just over-correct because proprioceptively it doesn't make any sense.

SB: Well, I used to worry that I wasn't very good at it but now I'm know I was right, so that's ...

JG: It's great, you're right, you're ahead of the game Steven. So we do that, as I say you can see now this shoulder's really happy. You can see I've taken the load of it, it's kind of going, "Oh okay, yep, I can cope with that." So if I show you what I'm going to do now, I just want you to take your fist straight up to the ceiling, so I just see what affect that has on her range of movement. Now

you can see that actually she's going higher than she was before without me doing anything very specific. Okay? How's it feel?

SH: That felt good.

JG: Oh, Stella, I love you, you're great. What a fantastic model. So what I'm going to do this time, this hand on her ... I'm not really doing anything here, I'm clearly giving her a postural cue but it's more so I don't push her over because what I want Stella to do now is just push very gently in my hand because remember we said, through elevation it's the posterior cuff that works. So she's just going to push gently into my ... Much more gently. So feel this, I don't want that to work. So let me ... Just follow my hand, that's lovely. Now little pressure and follow me up to the ceiling. All the way up, all the way up. Nice.

JG: Now look at that range of movement. So all we've done is change her muscle recruitment strategy. How did that feel?

SH: Good.

JG: You did brilliantly. Now the last part of that, if I just come to the side again, is the scapula assistance. So what I'm interested in is can I change her pain, or can I improve her range of movement? What she illustrated beautifully, which is the most important thing, is how it feels to the patient. Let's say those things hadn't worked, then the last part of my improvement test is to do a scapular assistance test. So I still get her to do that short to long lever elevation and now do the scapular assistance and then Stella tells me which one feels best.

SH: The first one.

JG: Yeah?

SH: Yeah.

JG: Awesome. Well that's great because guess what? That's going to tell me which exercise she's going to do at home. So, what these improvement tests basically tell me is ... They can't take me home, sadly, so then that tells me where we need a bit of TheraBand, or some pressure from the wall, or something to help Stella do this as an exercise at home, purely so that she then reeducates the muscles to do their job in the right way at the right time so that then that becomes habit again. What's so powerful about that, I did 15 seconds of mobilization there, but actually the most effective thing is getting the muscle system to do its job in the right way at the right time.

SB: What would you be doing to address the neck?

JG: So one of my favorite techniques, and the most researched techniques in the shoulder, is lateral glides to the cervical spine, which I'm very happy to show you now.

SB: Yes, please do.

JG: Yeah? Do you want to come ... I'll come and do something nice to you now instead of making you work. Come and have a lie on your back. So lateral glides in the cervical spine actually the research for this technique very much came from the tennis elbow research, bizarrely and they noticed that people who had stiffness in their shoulders in association with their tennis elbow, that when they did lateral glides, not only did the elbow sensitivity improve, but also the shoulder got less stiff. Now we're having a real problem with manual therapy in physio at the moment, which we can talk about, but I still have a massive belief in it as part of my practice.

Essentially, what we're going to do is just position the cervical spine in mid-flection. So, sorry Stella, if I just show ... So my elbow is coming underneath the head so it's really supported and I'm in that mid-flection position. Then I'm going to use this part of my hand on the lateral aspect of the cervical spine. So I find C7 and I just come up to C5, 6 and then swing round. I can show it on the other side as well if that would be helpful?

SB: I think that probably would. We might be able to get that on the other camera.

JG: Sure, come round. The good thing with this technique, it doesn't matter which way you do it. I always do it towards the side of pain but ... Sorry, don't hold your head. I don't want to make you worse. The good thing with this technique is that actually the research shows as long as ... it doesn't matter if you go towards or away from the side of pain it still has an effect. What it does is increase your pain pressure threshold, reduce sympathetic activity in the upper limb but fundamentally gets your cuff switched on. Only temporarily, but it will make it easier for her to do the exercises.

SB: Now we haven't got a camera to capture this angle but any osteopath or chiropractor looking at this now says, "You've got a chin hold and you're about to whack that neck."

JG: Yeah, I'm not, not

SB: You're not going to do that?

JG: No, I'm just going to ... To be honest, we're not allowed to manip any more in the NHS, it's banned but again this technique is just into gentle resistance and oscillate and it has a therapeutic effect.

SB: Right, do we have any concerns about its safety? I know that mobilization of the neck, or rotation of the neck is often associated with arterial problems, just as much as manipulation is. So do we need to get specific consent for this technique from the patient?

JG: So, interestingly, in the research that's been published, there's been no adverse effects at all because you're not really going beyond the physiological limits of tissue, it's purely an oscillating technique, it's a gentle soft tissue resistance and again, to answer that question even further, they've done MRI studies and looked and there's actually no displacement at all, so in terms of occluding blood or anything else, there's no risk factors. I would consent, always, for anything I do at the beginning of the session, but to get ... there's no indication based on the current research to need it for this.

SB: Good, I'm glad to hear that because consent is a major issue for chiropractors and osteopaths.

JG: Really?

SB: I don't know what it is for you, and that's nothing to do with vertebral artery dissection or anything like that, it's just if ever anyone is taken before the professional conduct committee, they always say, "Did you get consent for that technique?" Of course if you didn't, immediately your stock is as low as it can get.

JG: Right, that's very ... We have to do a blanket consent at the beginning of every consultation and that has to be in your notes because if anything happened and you haven't got that, you're stuffed. So you have to do that every single time. In terms of specific techniques, this isn't something ... we just been stopped doing the ones that needed consent, basically.

SB: Sure. Okay, we're running out of time, would you like to demonstrate some of the exercises give Jo? Jo, give Stella, sorry. You're Jo.

JG: Absolutely. Can I show you one more thing in terms of assessment, I think will be really helpful for people?

SB: Mm-hmm please, yes, please.

JG: Because not every patient who comes into the clinic will have pain that they can demonstrate, it'll come on after activity. Do you mind lying on your tummy? Is that okay? Are you going to be all right in that position? I don't want to make you worse.

SB: Shall I take that?

JG: I'll just get ... thank you so much. Are you happy to lie on your tummy? Shall I take your glasses?

SH: Yeah, that's fine.

JG: Now, you'll remember when I was talking about the rotator cuff, we said that we'd got this switch on, this through range recruitment and then this torque reduction. So I've done my improvement test, this is a really invaluable part of your assessment because it will tell you whether the cuff's doing its job or not. So if I always look at the unaffected side first, so what I'm going to look is at Stella's passive range of movement and then I'm going to ask her to hold the weight of the arm in that position, just hold that there, perfect. Keep your elbow still and lift your hand up towards the ceiling. Now she actually does that really nicely, that's super. So what does that tell me? Just tells me the rotator cuff can do its torque reduction role with the weight of the cuff.

SB: You had a finger on the lats here somewhere, was that important or was that just ...

JG: That's just me.

SB: Just you.

JG: Yeah, you can ... but again, thank you because the clarification's really important. When you're looking at people being able to do this, if we over complicated in terms of what's happening to the scapula, the inter-testing reliability's pants. Sorry, it's obviously getting later now, so the articulateness has gone now.

SB: No, that's the language we like.

JG: But if you look, the common compensations are pulling the elbow down to the side, pulling the elbow up to the ceiling, extending the wrist, or they just can't get as far as you can passively. So we don't know if it's weak or inhibited, because we Stella we showed if we remind the muscles what to do, she can work beautifully, but it tells us if the cuff's not doing it. So that's her good side, or her unaffected side, so let's have ...

Now, I know she's a little bit of stiffness there, I don't want this to be painful so you just let me know if it's a problem. So there we look at her passive range and now I'm going to ask her to take the weight of her arm in that position and now try and lift up. Okay, so you can see immediately, much harder. So if I support the weight of the arms, I take the weight of the arm away, what this also does is take deltoid and lats out of the equation. So now I'm going to let her make a little fist, just to get that cuff switched on. Now lift up for me and see if you can do that better. So she gets further. Perfect. So if I had to say what exercises I'm going to give to Stella, I'm going to give her this to switch it on and then I'm going to give her something with the arm

supported to get that torque production and then I tick every box in terms of what we understand in terms of rotator cuff rehabilitation.

SB: Right.

JG: That easy. You thought I was a specialist. You can have a sit up, that's perfect.

SB: It takes a specialist to know what the research says and what's going to be effective and so on.

JG: So just in terms of time, if I just talk through this ... I won't make you do it just now, but essentially you want your patient as near 90 as possible, I'd want that they must be pain free. So you've got to have the arm supported, and you want the elbow at 90 degrees. It's got to be anywhere from 30 degrees or higher to target the cuff. Now you would just start with no weight, and make sure that they can do 20. If they can do 20, then you just increase it by half kilogram reps. Once they can do two kilograms at 90 degrees, generally that translates well into supporting the weight of the arm, for a normal population. A rugby player will probably go higher, footballers a bit higher but it depends on their functional demand.

SB: So hang on, you said there at 90 degrees, that's supported at 90 degrees?

JG: Always supported because remember, you demonstrated that beautifully. So when she was unsupported, the cuff couldn't do its job. When I supported it, it could, so I've got to gradually load that up. It's more of a motor control exercise and then when she can do it with a reasonable weight, we can then work everything together.

SB: So you've got to instruct this patient quite carefully on how to set this exercise up at home, haven't you?

JG: Yes.

SB: To make sure that she's actually ... "Oh, there's a convenient table there, but my arm's only going to be at that angle."

JG: Absolutely.

SB: You've got to find something which is going to hold it up at that angle.

JG: Exactly but again, if they've got pain, as long as ... remember we said down here is rubbish. As long as we're 30 degrees or higher, we'd get a good therapeutic effect from the cuff, but I'm very happy to post some links to some exercises and stuff that we can have after this.

SB: Yeah, we'll definitely put this up.

JG: Yeah, no problem at all. So in terms of the other exercises, based on the improvement test, if you just come and have a stand here? Now Stella liked this one just with this, but I'm going to pretend that you like a bit of resistance. So you just bend your hands in here for me, that's lovely. Now, we haven't really talked much about it tonight, but we've also done some research, done a systematic review et cetera, that shows if we initiate our shoulder exercises, using the rest of the body, it makes life easier for the shoulder. So if you've got somebody who's had pain for a while and you're just trying to protect it, quite normally, that's what your brain does, it's a quite a sensible thing to do. We know that if we get them to use the rest of the body it makes it easy to override this compensatory strategies.

So all I want you to do, you did beautifully before, just gentle tension on that band, it's not strengthening, it's just reminding it to work, don't want you getting tired. I just want you to do a lovely step forwards with your right leg as you just punch up to the ceiling. Nice, really nice.

SB: So the length of this step is not important, it doesn't have to be a lunge.

JG: It just has to be dynamic but if that didn't work and I was a bit ... not so happy, then I would get her to do maybe a step up, because that would make it more proprioceptive, more dynamic and make it even easier to override that strategy.

SB: A complete step up, so walk up one step on the stairs at home?

JG: So again, you want to ... Really interesting, silly things make a huge difference. If you start with the foot on the step and push up, it works beautifully. If you get people to step, actually they can do that without getting their glutes working at all and it doesn't have anything like such a good effect. Yeah, if you could just turn and face Steven, that would be awesome. If you imagine, if my scapular assistance test made the biggest difference, then what I would do ... Sorry, is actually put the band around the shoulder blade. So you pop that round your hands for me, that's lovely. I need the band around the lateral aspect of the hands because I need to get that posterior cuff going again. Doing great, keep that close in, so bring your elbows down to your side, bring your hands right in front.

That's really important to keep this lever arm really short, just take a step back, perfect. Then if you do that same thing, so you do step, taking your fist right up to the ceiling and just grow tall, nice. Now that looked better than the other one but basically this bit of TheraBand just reinforces which facilitation made the biggest difference. Because Stella's got problems with her neck, I want to really unload that system as much as I possibly can, so another option is actually to put people against the wall with the loop of TheraBand, with a ball behind them, or the wall, so that as they squat down, it actually does the scapular resistance test for them, as they also get their

rotator cuff going. But I think what's really important is this structured assessment immediately gives me two exercises that are going to help her. She did a great job with the stretching, because you've actually got some fabulous movement there, she's just not getting the benefit of it because your muscles have forgotten how to do their job. So we can re-teach them by doing this and doing this and then she'll get a much better carry over of the other work that she's doing.

SB: You happy with all of that stuff?

SH: Yeah, great.

SB: Now we're not going do demonstrating against the wall, I'd like to get through some more questions.

JG: No problem at all.

SB: Let's go back over there-

JG: Thank you very much.

SH: Thank you.

SB: Thank you very much Stella. They always do this to me, they always come in in packs at the end of the broadcast. Mr. Steward Cramer says, "A large number of patients seem to present with a glenohumeral head in an anterior superior position with reduced AP superior inferior glide. Do you have any rehab ideas?"

JG: So again, I'd start exactly the same. What we know is that a lot of these compensations or adaptions over time relate to the muscle system not doing its job and you go through a similar drill, you'll see an improvement straight away and my great belief is if you use the muscles to achieve but you don't do it passively.

SB: Okay. Here we have, "Do you feel it's important to evaluate traumatic and/or non-traumatic shoulders with an ultrasound scan?" Asks Steven.

JG: I don't use ultrasound for non-traumatic shoulder pain at all. We have a radiologist in our clinic and they will basically do ultrasound for anything that we suspect a tear. I would rather not ultrasound. I have colleagues who do ultrasound and they say it's great to be able to show patients that yeah, the other shoulder's got the same thing. The cohort that I see that have failed with about eight other physios, they would just say, "Well when's that one going to become painful?" So I would rather not have to reframe those beliefs. So for me, until somebody's failed rehab, or if something doesn't fit, imaging doesn't have a role.

SB: Trevor MacArthur says, "What about deltoid contractures as a cause of shoulder pain?"

JG: Oh that's an interesting question. So in terms of deltoid contractures, I think unless you've actually had a specific injury to it, stiffness, or apparent ... Or I guess your gym goers who do have true short ... because of what they do in the gym, again I'm a great believer that muscles stiffness is mediated because other things aren't doing their job. So my approach to it would be working out why it's working harder and usually that again is because the cuff and scapula muscles aren't doing their job. You're going to think I do two things for every shoulder problem, it is slightly more than that because I have to tweak the exercise into it. Again, my experience of anything where deltoid is overworking is it's generally because other things aren't doing well enough.

SB: Okay, Thisbe's come in with a second bite of the cherry here. Thisbe says, "In frozen shoulder, do you have a view on reinforced shoulder abduction into full abduction into and despite pain?"

JG: So again, it's very ... In terms of your interventions with frozen shoulder, it's very important to be clear whether you're in the pain predominant phase or the stiffness predominant. There is really sound evidence that if you do anything that's provocative for pain in the initial stages, you will make it worse and it will last for longer, so I certainly wouldn't do it then. I think again what I would ... I would go back to what I said about assessing stiffness, I think increasingly the evidence is pretty clear, that rather than do movements through range, you get much better benefit from targeting the capsule that's tight. So rotation is your friend if you want to get the best effect from treatment.

SB: Regular viewers of our little show here will be surprised that I haven't used the word bollocks yet, so what is the current research? What's the current evidence for manipulation under anesthetic for frozen shoulders?

JG: Well, that patients do well, if they've failed everything else. So the general pathway would be that you've done rehab, you haven't done well, you've still got restriction and pain that are functionally causing restriction, or significant restriction that isn't responding to intervention. The next line would be to do a hydrodilatation. If that doesn't work, then our guys would actually do an arthroscopic release, they wouldn't do an MUA, but the guys who do MUAs will tell you that the results are the same as arthroscopic release and that the incidence of broken bones and nerve injuries and everything else is actually no more than most surgical procedures but I have to say the technique, I think it's kind of going ... It's not as popular as it was.

SB: Interesting you say all those things because long ago, we interviewed Simon Lambert, who's a shoulder surgeon-

JG: I know him very well, yes.

SB: ... from the Royal National Orthopedic Hospital in London and he was quite vehement. He said, "There is no evidence ever for doing MUA." He also said that he'd looked at hydrodilation and said, well frankly, he'd looked into the evidence for it but to get the sort of pressure into a shoulder capsule that you need is almost impossible.

JG: Again, I love that you said that because that is the pathway, but actually if you go onto YouTube and you look at videos of hydrodilatation, you'll see miracle moments where somebody goes like this, has the hydrodilatation and then goes, "It's a miracle." It wasn't frozen shoulder, it's back to the conversation we had at the beginning about muscle stiffness. The body will always take the path of least resistance, what's interesting about hydrodilatation, no superior effect over intraarticular injection and it will always give at the weakest part of the capsule. You don't have to tear the capsule to get therapeutic effect, so what you illustrated beautifully there, that there are still people who get diagnosed with frozen shoulder that will have a hydrodilatation and do brilliantly, they weren't a frozen shoulder.

So I've had exactly this conversation with our radiologist recently because one of them unfortunately said to me, "Jo, our results are amazing, we do this." I said, "Who's results are amazing?" They said, "Oh, the GPs, or the surgeons and they do brilliantly but the physio ones don't." And I said, "That's because they're proper frozen shoulder. So we've done an audit and I think if we stick to the history that we talked about, then it's much more consistent, so absolutely The problem is at the moment, it's all part of the pathway, so whether you do an intraarticular injection with or without pressure, that should be done to facilitate rehab. Actually the other thing that's important to say in terms of the evidence, is if you have people that are struggling, that's when hydrotherapy has a really additional benefit and adding damp heat to your stretches also seems to have an additional benefit but if all those things have failed and people are still struggling, then there is sound evidence for ... I know Simon very well, and I'm sure he'd be giving me a jibe right now, but there is evidence to support MUA and arthroscopic release.

SB: Well he of course practices arthroscopic release, doesn't he?

JG: Exactly and the arthroscopics will all tell you that MUA's the work of the devil and arthroscopy's fabulous. The MUAs will say it has a good effect and actually if you look at the guys who do arthroscopy, they do a mini MUA at the end of the procedure.

SB: Right, okay, we'll challenge him on that when we get here one day. If we get him here.

JG: When I see him next, I'll say, "Simon, we need to speak."

SB: Do yeah, it will be nice to get him back again, he was a lovely guest. A couple of quick questions. "A chronic rotator cuff syndrome patient gets a cortisone injection and then develops complete rupture of long head of biceps. Any thoughts on that?" Exclamation mark.

JG: I'm so sorry, can you say that again?

SB: "A chronic rotator cuff syndrome patient has cortisone injections and then develops a complete rupture of the long head of biceps. Any thoughts on that?" I don't know who this is but their impression is that the injection may have created holes that develop into tears as he's a weightlifter.

JG: So bottom line is, if somebody ... Long head of biceps pathology is rarely primary. It's usually an indication that the cuff's not happy so if you've got somebody with a rotator cuff tear, they will develop long head of bicep symptoms if that tear gets big enough because it destabilizes the long head of bicep. What I would say is, that's fabulous because without his long head of biceps, he's less likely to have pain because once the intraarticular portion of long head of bicep becomes symptomatic, it's a horror.

Actually the French are known as the biceps killers because they just cut out the intraarticular portion. You only use about 4%, 5% of your strength, you can compensate very well. So it's more, in somebody ... depending on how young there, it tends to me more the cosmesis than anything else that worries them, so they would do a tenodesis, which is just basically chopping out the bit that's left of the joint and then just reattaching it in the groove here. So I wouldn't worry about it. It's not going to make any difference to his outcome.

SB: Steven, possibly the same one as before says, "In serratus anterior weakness, with pronounced winging to the right scapula, following a minor trauma, a forward roll, MRI shows minor C5, 6 disc bulge, do you have any suggestions on helping to strengthen the area after nine months of failed rehab? Neck pain is fully recovered." He says.

JG: I guess it's back to the nerve conduction study thing again. I'd want to know if it's a true serratus and if actually the nerve is functioning well because long thoracic nerve injuries don't tend to recover, they're fatigue resistant and whilst they can do functionally okay on a few reps, they tire very quickly and they don't seem to be able to get completely rid of the winging. I would take exactly the same approach as we've done, I always work the cuff and scapula together but then I would target exercises. So again, I can post an order of what gives you best value with serratus rehab if that would be helpful?

SB: We'll hold you to that.

JG: No, absolutely. Well I've just had to do as part of an education thing so in terms of literally ... There's good evidence EMG-wise to tell you which exercises give you best value.

SB: Any final thoughts from you on advice to chiropractors and osteopaths greeting shoulders then?

JG: I've been very privileged that I've had osteopaths and chiropractors come to my clinic bringing people that they've done great with but never quite been able to solve the issue. The commonest thing I think we need to do better, is get that muscle system working in the right way at the right time. I think we've had a model where we've addressed stiffness with our manual therapy, we've addressed pain with our manual therapy and these things effect a fantastic results but they should always be to facilitate reeducating the muscle system because that's what the evidence suggests is the key driver in a lot of our pathologies.

SB: I suspect that the skeptics out there would say, "Well physios always say let's do some muscle reeducation," but you've come in with evidence to back up what you've said, and clinical evidence as well to back up what you've said.

JG: Absolutely, yeah.

SB: Of course an international reputation for being able to fix shoulders, because I didn't mention at the beginning how much in demand you are around the world for lectures, for courses and things like that.

JG: Well it's lovely that you say that but I think I'm just very passionate about what I do and I've just got a massive belief in what we do and my aim was always to make clinic research a reality so that I had a sound base to say what I was saying. It's very exciting that it's proving what I've done for years, it's a bit of a relief actually, I'm not quite sure what I'd do, but that's important. It's based on science but then again, I think we're in a difficult time because evidence of absence doesn't mean we shouldn't do things, I just think we have to be mindful and challenge our practice all the time.

SB: Yeah, so where's the research ... What are you doing at the moment?

JG: The two big studies we've got at the moment are looking at ... We've done fMRI, looking at the brains of people who've failed rehab for complex instability and the other research is looking at EMG and people with shoulder pain and how it responds after rehabilitation.

SB: Has that already published?

JG: The fMRI one has just been published, yep and it showed that basically people who haven't got back with rehab that the emotive centers of their brain was on fire, which kind of took us to the persistent pain model, but it's

also showing that in some, they have a change in the representation in the brain, which is exciting because it validates some of the techniques we use. The other is early but again what's interesting with that group, you might remember I was saying we don't know if it's weak or inhibited, what we found was in some patients, the cuff doesn't switch on but when it does, it switches on too hard. So often your patients aren't weak, they just need to reeducation that order of activation, which is exciting because it means that people can get better quicker than perhaps we thought.

SB: Claire says please could she borrow your brain every time she has a shoulder patient? Jo, thank you so much for all that information and for your time-

JG: Thank you.

SB: ... and for traveling all this distance, it's been a real pleasure.

JG: The pleasure's all mine, thank you so much.

SB: Very relevant to all of the people watching this evening.